

Press Release: European Project CPSoS

Publication: March 2014

Top level European experts from several different industrial sectors and scientific domains start to prepare the European Research and Innovation Agenda on Cyber-Physical Systems of Systems

The term Cyber-physical Systems is used to describe modern technical systems where physical systems (motors, robots, machines, cars, power plants, etc.) are managed and controlled by means of computer systems that are connected by communication networks, including the internet. Systems of Systems are large systems which consist of many units with autonomous management and control, e.g. the electric power grid with many power plants, distribution centres and large and small consumers. The competitiveness of Europe and the well-being of its citizens depend on the optimal management of these large systems with respect to quality of service (e.g. reliable and in-time transport of passengers by a railway system), cost, energy and resource efficiency and environmental impact. Such optimal system-wide management requires new methods and tools which are currently not fully available. The European Union is sponsoring the Project CPSoS to gather inputs from experts in many domains where Cyber-physical Systems of Systems are built and operated and from researchers in the domains of automation, control, computer science and communications to develop a roadmap for the future research in the area of Cyber-physical Systems of Systems.

Up to now, research activities on Cyber-physical Systems of Systems have mostly been performed by domains, e.g. computer science, simulation technology and systems and control, with little cooperation and exchange between the different areas. The aim of the project CPSoS, "Towards a European Roadmap on Research and Innovation in Engineering and Management of Cyber-Physical Systems of Systems", is to provide a forum and an exchange platform for Systems of Systems communities in Europe and to define common concepts and research challenges.

On January 31, 2014, 27 top level specialists, representing different industrial sectors and high-tech areas, solution providers and end users discussed the challenges posed by the design and management of Systems of Systems in transportation and logistics, industrial production systems, power, gas and water distribution networks, smart buildings and others, and the state of the art in tools and methods.



The coordinator, Prof. Sebastian Engell from TU Dortmund, Germany, presented an input paper "**Cyber Physical Systems of Systems – definition, relevance and research needs**" as a basis for the discussions during the meetings. The subsequent discussions were organised around the following topics:

- Prototypical cases of Cyber-physical Systems of Systems
- Main difficulties that are currently encountered in the engineering, realisation and operation of these systems
- Specific demands and challenges for advanced methods and tools for CPSoS
- Important open research questions for CPSoS in the next five years

The discussions confirmed the main ideas of the scope document and provided important inputs for its further elaboration. Numerous examples for Cyber-physical Systems of Systems were presented and discussed and the three Working Groups proposed prioritised lists of future topics for research and development in the area of CPSoS. These will be discussed inside the consortium and the Working Groups as well as with domain experts in order to provide a first draft of a strategy document by June 2014. In this process, information about the requirements of industry and about methods and tools that are currently in use or developed in on-going projects world-wide will be gathered and analysed.

Based on the outcomes, a “**European Research and Innovation Agenda on Cyber-physical Systems of Systems**” that summarizes open issues and promising trans-disciplinary research directions will be proposed. It will impact the work programmes of the EU, as well as national and other funding programmes.

CPSoS at a glance:

Start date: 1st October 2013

Duration: 30 months

Budget: Total budget of 688,823.00 € with a contribution from the European Commission of 561,000.00 € provided under the 7th Framework Programme for Research, Technological Development and Demonstration.

Project Coordinator: Prof. Dr.-Ing. Sebastian Engell, Technische Universität Dortmund, Germany

More information and contact: <http://www.cpsos.eu/>

CPSoS consortium members:

	<p>Technische Universität Dortmund, Germany is a German research university with focal research areas in production and logistics and modelling, simulation and optimization of complex systems. www.dyn.bci.tu-dortmund.de</p>
	<p>Founded in 1999, Haydn Consulting Ltd. is a small high tech enterprise that performs consultancy work for a number of key customers. http://www.haydnconsulting.com/</p>
	<p>TU Eindhoven is a Dutch research university specializing in engineering science and technology. http://www.tue.nl/en/</p>
	<p>inno TSD, France is a leading innovation management consultancy firm, specialised in helping private and public stakeholders to design and implement R&D and innovation projects, as well as to disseminate and exploit their results. http://www.inno-group.com/</p>