

Editorial

It is our pleasure to present the third issue of our Road2CPS Newsletter that includes the activities implemented within the last six months with the aim of carrying out strategic action for future CPS through roadmaps, impact multiplications and constituency building.

All Newsletters are available on our website www.road2cps.eu, as is other interesting information and we invite you to visit the web and also follow us on our social networks (twitter and Facebook).

The Road2CPS Consortium

This third issue offers information on activities and events implemented within the Road2CPS project.

This newsletter focusses on the successful meeting held in Vienna, and an interesting interview with Dr. Werner Steinhögl, Programme Officer - EU policies within the entity 'Complex Systems and Advanced

Computing' at the European Commission.

We hope this information is interesting for you.

Yours sincerely,

The Road2CPS consortium

Strategic action for future CPS through roadmaps, impact multiplication and constituency building



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What do we understand by CPS?

The term Cyber-Physical System (CPS) describes hardware-software systems which tightly couple the physical world and the virtual world, under the control of humans. They are established from networked embedded systems that are connected with the outside world through sensors and actuators, acquiring data streams from the physical world, establishing and continuously updating a virtual

twin of the physical world and with the capability of interacting with the physical world, following instructions from the virtual sphere. Furthermore, CPSs are not merely networked embedded systems but software-intensive, intelligent systems with the capability to collaborate, adapt, and evolve. CPS can be considered to be the technological foundation for the Internet of Things in which every physical object has a virtual representation and in which the physical and virtual reality form a continuum.

What are you going to find in this Newsletter?

Results Road2CPS Clustering and Communication Event

Vienna, 14th April 2016



INTERVIEW

Dr. Werner Steinhögl,
European Commission



Visionary CPS Scenario Roadmapping Workshop

Stuttgart, 7th June 2016



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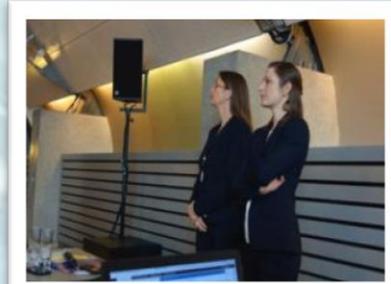
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Road2CPS- Results Smart CPS Clustering and Communication Event

The Road2CPS Clustering and Communication Event brought together over 120 experts from the fields of Cyber-Physical Systems (CPS) and the Internet of Things (IoT). 16 projects were presented that had been funded under the first call of Horizon2020 complemented by three ARTEMIS and ECSEL projects. The meeting was very successful in raising awareness of the activities being performed and highlighted that the areas being addressed within the project portfolio provide good coverage of the research, development and innovation needs across the domain. The timing of the meeting was also very pertinent with the launch of the new ARTEMIS-IA Strategic Research Agenda and also the Digitising European Industry initiative with many synergies being apparent.

Notably there was a mix of higher TRL activities being addressed by the ARTEMIS-IA and ECSEL large scale projects addressing key industrial topics such as integration of tools for safety-critical systems development, interoperability, factory automation, and maintenance systems. Underpinning and extending this H2020 projects are performing novel work in the areas of verification and validation to deal with the new reality of not being able to predict all eventualities in autonomous applications such as cars, and to deal with key issues such as guaranteeing safety and security in a world which is becoming increasingly vulnerable to cyber-attack.



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A number of projects are addressing multicore processors to maximise application performance and to provide trusted computation when mixed-criticality applications are implemented.

To get past the valley of death and successfully introduce technologies it is notable that the CRYSTAL and CP-SETIS projects, addressing standardisation, provide a model for proposed actions within the agenda for Digitising European Industry addressing interoperability and standardisation. Likewise the Innovation Hubs projects, CPSELabs and EuroCPS, target engagement with SMEs to raise awareness, transfer skills and provide access to the latest technologies also directly support Europe's goal of Digitising European Industry.

Looking to the future the roadmapping activities being performed in projects such as Road2CPS and CPSoS have an important role to play in bringing together the constituency around CPS and providing recommendations for future research needs. The markets for CPS are global and the CPS Summit and TAMS4CPS projects are identifying areas within CPS where it may be possible to collaborate with the US to tackle common problems and work jointly to bring together critical mass. Here it is also important to address barriers that exist to technology roll out through harmonisation of standards, regulation for privacy and approaches to liability at a world-wide level.

Information on the agenda and speakers can be found on this [link](#)

Presentations given during the clustering event were:

- [CPS week Wien 13 – 14 April 1016 plenary speech](#)
- [UnCoVerCPS, Matthias Althoff \(Technische Universität München\)](#)
- [TAPPS, Nora Koch \(Fortiss\)](#)
- [SAFURE, Carolina Reyes \(TTTech\)](#)
- [INTO-CPS, Peter Gorm Larsen \(Aarhus University\)](#)
- [IMMORTAL, Heinz Riener \(DLR\)](#)
- [CPSELabs, Holger Pfeifer \(Fortiss\)](#)
- [CP-SETIS, Jürgen Niehaus \(safe TRANS\)](#)
- [EoT, Noelia Vallez Enano \(UCLM\)](#)

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- [EuroCPS, Philippe Bonnot \(Thales Group\)](#)
- [AXIOM, Roberto Giorgi \(University of Siena\)](#)
- [COSSIM, Apostolos Dollas \(TSI\)](#)
- [Mantis Project, Erkki Jantunen \(VTT\)](#)
- [CRYSTAL ARTEMIS, Christian El Salloum \(AVL List\)](#)
- [European Commission, Werner Steinhögl \(DG Connect\)](#)
- [Arrowhead, Jerker Delsing \(Ltu\)](#)

For more details please find the workshop report on our webpage, on the following [link](#)

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**INTERVIEW with Dr. Werner Steinhögl,
European Commission**

Why are Cyber Physical systems important for Europe?

Europe accounts for 30% of the world market with many key companies (see Figure 1). The embedded systems sector is a major contributor to employment in Europe, accounting for 939M associated jobs.

European Commission Strategy and Vision Keynote (Werner Steinhögl)

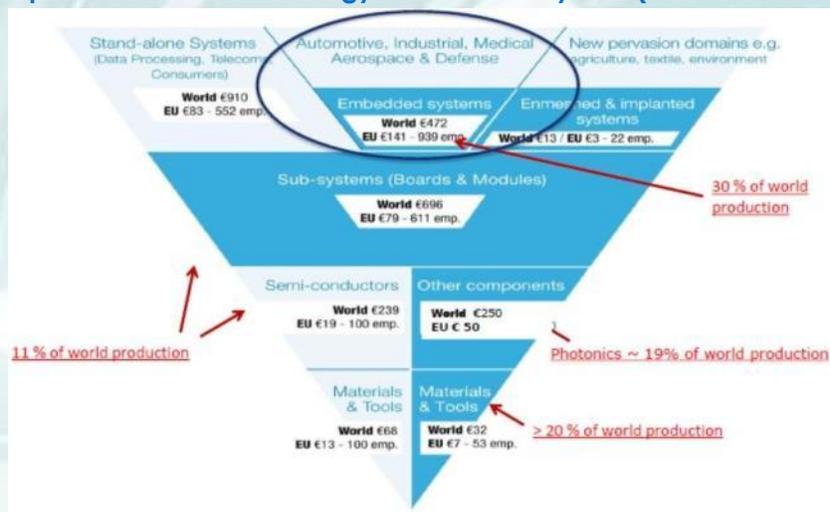


Figure 1 Europe's Strength in Embedded Systems

What do the running CPS projects aim for?

The main vision of the twelve research and innovation projects is one of promoting model based design to build cutting edge CPS to save development cost and time. Use cases being addressed include aerospace, automotive, telecoms, health, surveillance, smart buildings, logistics, smart grids, manufacturing, railway, agriculture and visual search. The underlying methods being developed, however, could also be reused in other areas.

These projects will be complemented by the Internet of Things large scale-pilots which will start in 2017 and cover areas such as smart living environments for

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ageing well, smart farming, wearables for smart ecosystems; smart cities and autonomous vehicles in a connected environment.

What is the strategy for Cyber-Physical Systems for 2018 and beyond?

To connect CPS value chains in all types of industry covering applications in aerospace, automotive, white goods, medical, industrial automation, software is very high on the agenda and is key to adding value to many products. Typically 40-50% of added value comes from embedded electronics in the automotive, aerospace, and medical sectors. There is also a move towards providing services.

What are the opportunities in the existing Industrial Leadership 2016-2017 EC programmes?

These programmes will call for activities which will strengthen the technological base of the digital industry and encourage use of digital technologies in all industries. Public private partnerships will tackle the areas of a new generation of components and systems, next generation computing, Future Internet, content technologies and information management, advanced interfaces, robots, micro- and nanotechnologies, and photonics amongst others.

What are the Commission's priorities looking to the future?

The Commission supports the concept of digital transformation of all industry. The R&I programmes funded by the EC play a major role in this. Digital transformation is built on three pillars:

- (1) Better access for consumers and businesses to digital goods and services across Europe,
- (2) Creating the right conditions and a level playing field for digital networks and innovative services to flourish,
- (3) Maximising the growth potential of the digital economy.

What does Europe need to digitalise its industry?

Embedded systems are an essential technology for digitising European industry. The aim is to provide leadership in open digital platforms for industry. This should be driven by EU actors so that any business can utilise them and make products, processes or provide services ready for the digital age. A key aim is to bring together demand and supply as the digital transformation of all industry in Europe requires a strong digital sector.

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How does the Commission intend to achieve this?

The Commission wants to align national initiatives, create and support Digital Innovation Hubs and provide leadership through partnership (see fig. 2). The aim is to create leadership in digital technology value chains and provide SMEs, midcaps and non-technical companies with access to the latest technology. There is also a need to skill the work force across for digital change and adapt legislation to eliminate barriers for digitisation. The key challenge is to build upon strengths of vertical markets and develop a European presence in cross-sector platforms for IoT, Data Web and consumer markets.



Figure 2 Digitising European Industry

What activities are being promoted to ensure European leadership in digital platforms for industry and to provide technology gateways that businesses can use?

- The upscaling and further integration of R&D&I core platforms
- Reinforcement of the development of European Reference Architectures
- Support for experimentation environments such as reference implementations, test beds and large-scale demonstrators
- Fostering of constituency building across value chains and vertical silos

Innovation Hubs such as those funded under Smart Anything Everywhere are seen as a very successful mechanism to provide access to digital technologies supporting bottom up integration and access to digital technologies and expertise at a local level.

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Road2CPS Visionary CPS Scenario Roadmapping Workshop in Stuttgart

On June 7th 2016 a group of CPS experts from industry and academia came together in Stuttgart, Germany, to discuss visionary CPS scenario in the course of the Road2CPS project. The workshop focussed on the generation of visionary scenarios and future needs for cyber-physical system (CPS) applications. The elaborated scenarios shed a light on the impact and uncertainties in relation to major trends, drivers, and technologies in CPS. Based on this, future scenarios for CPS applications in different domains like manufacturing, health, energy, transport and smart cities were elaborated and used for the identification of further future research needs.



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EXPERTS GROUP and TASK FORCES

The Road2CPS project will not only build a constituency united by the commonly faced challenges but will also create a joint action plan for the future development of CPSs, with dedicated task forces to further detail and implement/realise the findings/recommendations from impact analysis and foresight activities (roadmapping).

The ROAD2CPS project is carrying out constituency building activities involving experts groups and cross-cutting task forces that will cover a broad range of application domains and include actors from across value chains.

During the workshops different external experts have been invited. We would like to thank all experts for their valuable contribution.

Road2CPS continues **looking for external experts** to increase the knowledge on CPS. Would you like to become a Road2CPS expert? Visit our webpage (<http://www.road2cps.eu/experts.html>) and register!!!

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RESOURCES

Within the Road2CPS webpage (www.road2cps.eu) you can find a number of interesting documents published by the consortium:

- Deliverables

- [Road2CPS D1.1 State of Art and current impact Report](#): This work has used a collaborative approach to categorise data relating to 53 EU-funded projects all concerned with research into and applications of Cyber physical systems. To facilitate this activity an online tool, the “Vulture Tool”, was created and populated with text snippets annotated with metadata describing the nature of the snippet
- [Road2CPS D2.1 Report on Scientific and Technological challenges](#): the aim is to produce a top-down assessment of the scientific and technological challenges over that period, with attention to sustainability. This aim was chosen to provide a long-term perspective, including some global aspects, to augment other reports that have taken a shorter, more market-focussed, perspective
- [ROAD2CPS Deliverable 2.2 Report on market requirements and Socio Economical needs](#): This document aims at elaborating the future vision of Cyber-Physical Systems (CPS), market requirements and socio-economic needs within the domains approached by Road2CPS: Energy, Transport, Health, Smart Production and Smart Cities.
- [Road2CPS 644164 D3 1 Case Study Implementation Strategy](#): This document explains the goals for the work to be conducted under WP3 (Case Studies) for Road2CPS and provides plans for executing the work. Under WP3, Road2CPS will produce a set of case studies. These will be aimed at practitioners who are not familiar with CPS technologies and “CPS thinking”
- [Road2CPS 644164 D5 1 Task Force Action Plan](#): This deliverable provides a description of the activities that have been developed by the different task forces of the project. Task forces will develop activities seeking consensus building on the topics of future issues on implementing CPS,

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business trends and business models, barriers and pitfalls for implementing CPS within process and networks, and knowledge sharing

- [Road2CPS_644164_D6_1_Road2CPS-Corporate-Identity-and-project_Website](#)
This deliverable provides a description of the activities carried out to define the Road2CPS logo and website

- Papers

- [Paper based on findings in Road2CPS work accepted for presentation at the UK conference, Ergonomics & Human Factors 2016; 19-21 April](#)
- Sinclair, M.; Siemieniuch, C.; Henshaw, M. (2016): Some implications of software-dominated manufacturing for the Ergonomics profession, ESoS Research Group, Loughborough University.

You can also find the presentations from our workshops by following the links listed on previous pages.

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Upcoming events

INCOSE International Symposium

July, 18th, 2016, Edinburgh (UK)

Knowledge Engineering in BioMedical Informatics and Digital Health

September, 5th- 11th, 2016, Varna (BU)

Factories of the Future Conference: Materialising Factories 4.0

September, 15th-16th, 2016, Brussels (BE)

Industry of Things World

September, 19th-20th, Berlin (DE)

ICT proposers' Day 2016

September, 26th-27th, Bratislava (SK)

Digital Week

September, 26th-29th, Bratislava (SK)

Constituency Building Workshop

October, 11th, Mallorca (SP)

Industry Case Studies Program 2016 – Industry Day

October 25th, 2016 Rhodes (GR)

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