

PLATFORMS
4CPS



Deliverable 4.2

Overview of Collaboration with other European Programmes



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Executive Summary

This document provides an overview of collaboration with other European Programmes, recording interactions with EU programmes / associations, workshop outcomes and summary of best practice for Cyber-physical Systems (CPS). It reports actions taken by the Platforms4CPS Consortium members, relating to the provision and encouragement of collaboration opportunities between the CPS Community and European Research Programmes. These activities have occurred during the two year period of the project with associated reports (all of which are available online at: <https://www.platforms4cps.eu/resources/>). They have been supported e.g. by project studies on the availability of platforms and also the user/market landscape for CPS.

Platforms4CPS engaged with stakeholder groups that are already significantly involved with the development of future CPS systems. A two-way interaction between researchers, practitioners and ICT providers in major programmes such as ECSEL, ITEA and ARTEMIS-IA has been encouraged through workshops. Building upon ongoing partner activities, strong connections have been further developed with these organisations. This has included via inclusion of key actors from these initiatives in expert group meetings and through contributions to the community building activities. Best practice for CPS has been sought, as well as the outreach via these links, to promote and spread Platforms4CPS key messages.

There have been five key work areas for collaboration taking place within Platforms4CPS. These are the workshops, the CPS Cluster initiative, the online PlatForum tool, and development of an External Advisory Board. Additional support was provided by partner involvement other related initiatives.

Workshops of particular significance included: Collaboration on the foundations of CPS-engineering; Roadmap consensus and constituency building; a dedicated event with programmes and projects to exchange perspectives and ideas for enhancing collaboration; Consensus on societal and legal issues. Actions also included the fostering of discussions on pre-normative standardisation and ensuring links to other relevant initiatives. The CPS Cluster was formed by agreed collaboration between five CPS H2020 projects, bringing together over 80 specialists. The PlatForum has provided visibility of CPS to the Community and Public with 35 blogs on various CPS subjects, and also brought the results of project studies online for further discussion. The External Advisory Board was built up during the project to 29 members with a good spread across the domains considered (Manufacturing, Transport, Energy and Health), business/academic backgrounds and across the European Union.

1 Introduction

Constituency building and collaboration with the various stakeholders in the CPS context has been a major task within the Platforms4CPS project. All partners of the project have been very active in stimulating and establishing collaborations among the European Programmes and stakeholders from a wide variety of CPS-related fields across multiple levels.

The Platforms4CPS Project has built upon and brought together the already strong R&D CPS networks of consortium members. These include previous and ongoing initiatives like ARTEMIS-IA-SRA (Thales and KTH participation), ECSEL MASRIA (Thales), the ICT-1 Road2CPS project (coordinated by Steinbeis 2i), CPSoS and PICASSO (THHINK), CPSSummit (Fortiss) and the concluded CyPhERS roadmapping project (coordination Fortiss, participation KTH). Steinbeis 2i furthermore coordinated Road2SoS (FP7 ICT-CSA) and Road4FAME (FP7-FoF-CSA). Thales chaired the ARTEMIS-IA “Strategic

Research Agendas” working group and also a member of the HiPEAC high performance computing H2020 CSA. Festo are members of the ICT-3 CSA project inSSight and FoF-11 CSA project ConnectedFactories. The partner Systematic represents an embedded systems Cluster with 100s of members.

The structure of this document is based on the key work areas for advancing collaboration. Section 2 provides a summary of work for each partner of the Platforms4CPS consortium, with more specific actions listed in detail in subsequent sections. Section 3 presents the actions relating to leading workshops and also participating in workshops to help engage the CPS community. Section 4 shows the actions which have been specifically dedicated to the CPS cluster, which has been formed during the project with four other Horizon 2020 CPS flagship projects (CPSwarms, Boneyes, CERBERO, DEIS). Section 5 specifies the actions taken to engage the CPS community online via the PlatForum tool developed by the Consortium. Section 6 lists the CPS specialists who have been invited as active advisors and Section 7 specifies supplementary activities that have contributed to collaboration between the CPS Community and European Programmes. Conclusions are drawn in Section 8 of this document.

2 Consortium Activity Summary

This section provides for each partner of the Platforms4CPS consortium a summary of their work which is listed in detail in the later sections of this document.

2.1 Thales SA - France

Thales provided overall coordination of the project and also organised several workshops, which were mostly in the second half of the project. These were:

- An event to Collaboration\Consensus\Constituency Building Workshop,
- a PlatformsArena \ Showcase event and
- the Final CPS Consultation Event.

European programmes such as ITEA, Artemis, ECSEL and H2020 were both invited directly to these or have results disseminated/discussed at their events. Thales supported organisation of the other workshops and contributed seven of these related to roadmapping, platforms and collaboration. The European Commission requested that the consortium support activities with some of their flagship CPS projects in a “CPS Cluster”. Thales chaired a kick-off meeting for the CPS Cluster and provided continuity for monthly meetings. The PlatForum online community tool has come along a good way. Thales encouraged discussions on structures to best connect with the community. The External Advisory Board (EAB) provides a proactive core representing the CPS community and whose feedback contributes to the collaboration across the European Programmes. Since the beginning of the project Thales has registered nine new members to the EAB, including three from health which required some negotiation. It was fortunate we had a Cluster as partner, as external groups were difficult to bring into the loop.

2.2 Steinbeis Innovation GGMBH Germany

Steinbeis 2i GmbH has been collaborating very actively with other European Programmes. Having been the coordinator of the former ICT-1 CSA Road2CPS, S2i is well anchored in the CPS/ICT-1 community and has a long track of collaboration with ARTEMIS/ECSEL and other EU programmes. This has provided assurance of direct benefits right from the start of the Platforms4CPS project. S2i had invited Platforms4CPS partners to the Road2CPS strategy workshop, finalising its roadmap, and also to two CPS cluster events, to directly transfer results and contacts to the starting project.

Regarding Platforms4CPS organised events, S2i has coordinated the first Platforms4CPS Roadmapping workshop, co-coordinated a PlatformsArenas WS, and participated in the MarketLandscape WS.

In terms of cluster activities, S2i has participated in the cluster kick-off and coordinated a joint ICT-1-booth at the DIF. S2i has also presented Platforms4CPS heavily at different collaboration events in 2017, like the ARTEMIS brokerage event in Brussels, DEI stakeholder forum in Essen, the ECSEL event and Digital Assembly in Malta, DIF in Amsterdam and ICE/IEEE in Madeira, above others. S2i has built a close connection to Factories of the Future/EFFRA/Connected Factories and the Platforms specific FoF 11 projects, being member of the association and project. A close collaboration has been set up between Platforms4CPS and ConnectedFactories through sharing deliverables, participating and co-locating in events and elaborating on a mapping framework. Being partner in the starting (09/2017) SAE-CSA Smart4Europe, and the running CPSELabs IA, S2i also links the project to the SAE initiative. S2i regularly participates in EC impact and info days and consultations (FoF and ICT above others) fostering new collaborations.

As Dissemination Partner, S2i is also taking care of collaboration with the external CPS specialists (about 60 experts registered) and provides the CPS community with information on upcoming collaboration opportunities (newsletter, social media, linked in, calendar of events, etc.). As a highlight in terms of dissemination/collaboration, ARTEMIS has included an article on Platforms4CPS and its engagement at the DIF event in its magazine and newsletter.

Many further collaboration activities have taken place, including the conduction of followup Roadmapping Workshops, participation at the EF ECS booth and in I4MS, SAE, ICT and FoF events.

2.3 THHINK Wireless Technologies Limited - United Kingdom

As leader of WP4 THHINK has been very active supporting activities to promote collaboration. THHINK has presented and facilitated at Platform4CPS organised meetings on Market Segmentation in Amsterdam, on the foundations of CPS in Stockholm and Roadmapping in Brussels. THHINK also organised and facilitated a Workshop on Societal and Legal Issues in Brussels. THHINK was also a speaker and Rapporteur for the Platforms4CPS Final Consultation Event. THHINK provided input for PlatForum on platforms and 18 blogs on autonomous cars, autonomous aircraft and societal and legal issues. In addition to this THHINK has been extremely active working for the European Commission as Expert and Rapporteur for the ARTEMIS, ENIAC and ECSEL evaluations with many meetings in Brussels and also in Malta. This has led the company to have much stronger links with the ECSEL community (ARTEMIS-IA, AENEAS, EPoSS) via meetings, attendance of Brokerage events and conferences, e.g. EF ECS, and via acting as an expert on ECSEL projects such as MANTIS, as well as with related communities such as ITEA at the DIF Event in Amsterdam. THHINK also gave a presentation at the HiPEAC Conference.

A key activity for the company is engagement with relevant clusters. This not only includes the CPS Cluster, where THHINK attended the Cluster Meeting Kick Off in Brussels and has been a reviewer of the DEIS project, but also with related clusters where THHINK has acted as a Reviewer and Rapporteur for meetings of the Mixed Criticality Systems Cluster in Barcelona and the IoT Cluster meetings in Vienna and Athens. Additionally, THHINK acted as Rapporteur for an EFFRA Connected Factories meeting, meetings to discuss standardisation with SDOs across Europe and joint standardisation with the US leading to THHINK presenting the results to the Commissioner at an EC Round Table. THHINK has been actively working with the CPS, IoT, Competitive Electronics and DG Grow units providing input in a variety of areas such as Digitising European Industry (THHINK was the Rapporteur for the DEI Stakeholder Forum in Paris), autonomous cars, smart agriculture and Horizon Europe as well as having meetings with the Heads of Unit for Smart Cities and 5G to discuss research priorities. This led to THHINK being engaged to review the Large-Scale Pilots on autonomous cars and

Internet of Farming. THHINK was also asked by the Commission to support the Digitising European Industry Working Group on Platforms with a number of meetings in Brussels acting as Rapporteur and producing reports identifying priorities which led to funding being assigned to this area. Notably THHINK was engaged to be the Rapporteur for an Electronics Industry Group to put forward priorities and budgets for the industry in Horizon Europe. THHINK was also on the PPP Expert Review Group covering 10 PPPs and is a contributor to the EC Hearing Criteria Framework.

THHINK has also been active engaging with other projects such as Road2CPS and TAMS presenting at their events on funding for SMEs and also on EU-US collaborations. Going beyond this THHINK has been working with NIST supporting EU-US activities on CPS collaboration with related projects, e.g. BILAT 4.0 as an expert and PICASSO as a partner, organising events as well as giving keynotes on autonomous transportation and sitting on panels at the Transatlantic Symposiums in Minneapolis and Washington, USA. THHINK has also been engaged with Intelligent Manufacturing Systems a US based organisation.

The company has also been engaging via its other national networks in the UK such as via the Advanced Engineering Show which is held annually and via the Business and Innovation Network event presenting on Digitising European Industry. At an academic level THHINK was on the organising committee for the IEE ICPS 2018 Conference in St. Petersburg and has interactions with Cranfield and Sheffield Universities.

2.4 Festo AG & CO KG - Germany

Festo supported activities to promote collaboration with European programmes, in particular by using relations to the (digital) manufacturing & Factories-of-the-Future (FoF) community as well as to the European Smart Systems Integration Community (mainly EPoSS). With regard to EPoSS, Festo is partner in the ICT-3 CSA project inSSlight and represents Platforms4CPS in EPoSS events such as the EPoSS Annual Forum. Regarding the manufacturing & FoF community, Festo is involved in various Manufacture and FoF boards and works together with the FoF CSA project “Connected Factories” in order to define scenarios and building blocks of CPS-based digital (manufacturing) platforms.

Festo facilitated a joint Digital Manufacturing Workshop at Festo premises together with the Connected Factories and the BEinCPPS projects. In this workshop, stakeholders from the national/regional Industrie 4.0 community have been involved. To engage European Programmes through PlatForum, blogs on smart manufacturing as well as results of CPS platform survey and a CPS Compass with integrated repository of CPS building blocks have been published. Furthermore, interviews have been conducted with CPS experts from European Programmes in order to define common building blocks for a joint CPS repository.

2.5 Kungliga Tekniska Hoegskola - Sweden

KTH has actively promoted and supported collaboration with European programmes and related initiatives. KTH has been in particular,

- Organising workshops as part of its role within Platforms4CPS, including Foundations of CPS and a platform arenas workshop.
- Supporting Platforms4CPS and other related EU-level organised workshops (ECSEL, ARTEMIS-IA, H2020).
- Setting up the PlatForum Tiki-Wiki platform for supporting workshops, information overviews, and further community building (e.g. through blogs and questionnaires).
- Promoting and disseminating the project activities using KTH academic and industrial networks

2.6 FORTISS GMBH – Germany

Fortiss has been involved in the organisation of several workshops events for the Platforms4CPS project, including:

- endorsement workshops for the CPS technology market segmentation and business opportunity assessment
- collaboration and constituency building workshop on foundations of CPS
- roadmapping consensus workshop
- PlatformsArena showcase event

Furthermore, Fortiss actively promotes and supports collaboration with other European projects and initiatives, most prominently through the Smart Anything Everywhere initiative projects CPSE Labs, FED4SAE, and Smart4Europe in which Fortiss is participating as a partner in the project consortium. Moreover, links have been established to related I4MS projects such as BEinCPPS and MIDIH.

2.7 SYSTEMATIC Paris Region Association – France

SYSTEMATIC Paris Region has been actively involved in the organisation of the four workshops PlatformsArena. In particular, with the definition of a unique model of questionnaire towards the participants that should help for improving the collaboration between the programmes.

SYSTEMATIC Paris Region has been supporting Platforms4CPS and other related EU-level organised workshops (ECSEL, ARTEMIS-IA, H2020).

Furthermore, SYSTEMATIC Paris Region actively promotes and supports collaboration with other European projects and initiatives, most prominently through the EIT Digital projects, in which Systematic is participating as a partner. Moreover, links are being established to related I4MS projects such as MIDIH. (An IA project with cascade funding towards SMEs)

3 Workshop Engagement

Here we summarise the actions of consortium members relating to leading workshops and also participating in workshops to help engage the CPS community. A transverse activity has also been presented and updated during several different workshops: That is the ability for the public, policy makers and industry to distinguish CPS. This is important as a major contributor to society, but less in the public eye as principal customers are from industry. This particular information will appear in public reports next month.

THALES

Workshops Coordinated

- MARKET LANDSCAPE WORKSHOP - The first workshop of the project and relating to T1.3 Community Endorsement. Contributed to leading preparation in conjunction with Fortiss and S2i. It was an interactive event having focusing on i) relevant core technologies for CPS and IoT, ii) a market perspective investigating the current commercial offer, iii) needs and barriers for a successful implementation in different application domains (manufacturing, transport, energy and health) and iv) opportunities for the adoption of CPS platforms. There were 15 participants with feedback integrated to the related study ([Market segmentation for CPS technology](#)).
- CPS COMMUNITY ENHANCEMENT: COLLABORATION & CONSENSUS BUILDING ALIGNED ACROSS EUROPEAN POLICY AND PROJECTS (theme: Collaboration\Consensus\Constituency Building). This had a particular purpose to engage European Programmes such as

ITEA/Artemis/EXCEL and was held back to back at the EFECTS Brussels event in December (26 participants). (see [CPS Community Enhancement: Collaboration & Consensus Building Aligned Across European Policy And Projects Workshop Report](#))

- PLATFORMS ARENA at THALES – The fourth of the Platform Arena series. Several technology and organisational platforms were presented to SMEs (44 participants). The Platforms were the Nokia Innovation Platform, Capella, Cappella Industry Consortium, Systematic and HIPEAC). (see [Report on PlatformArena workshops](#))
- FINAL CONSULTATION EVENT: CPS INNOVATIONS FOR THE FUTURE - including highlights derived from an analysis of the CPS domain and recommendations to policy makers, CPS community, big and small industries and other stakeholders. In addition, there were keynote speeches providing perspectives on bridging with other technology classes. Examples provided of CPS technology integration with frequent discussion and feedback during the day (41 participants).
(report to be available in October at <https://www.platforms4cps.eu/resources/>)

Participation at Platforms4CPS workshops or external events

- MARKET LANDSCAPE WORKSHOP – Initially contributor to this workshop, presented market survey of health domain and led a market segmentation discussion looking at civil-defence technology client differences.
- Participation at DIF event (May 2017) – collaboration with ARTEMIS/ITEA. Assisted with booth preparation and had representation of three of the projects from the H2020 CPS Cluster that we lead (the 4th project was present at another booth). Presented Platforms4CPS to DIF dignitaries during their tour (CPS Cluster also presented their projects briefly).
- PLATFORMS ARENA at KTH – contributed to discussions and led a session focused on needs, raising perspectives on what participants considered as types of platforms. This was followed by a discussion of barriers for establishing and growing platforms, and then a general discussion.
- EFECTS 2017 - Participated with a booth shared between the CPS cluster.
- BUILDING BLOCKS FOCUS For CPS (theme: endorsements) - Engaged in discussions, contributed experience.
- SOCIETAL AND LEGAL ISSUES REGARDING CPS DEPLOYMENT (theme: Collaboration/ Constituency/ Consensus building) - Engaged in discussions and contributed experience.
- ROADMAP CONSENSUS WORKSHOP #3 – Engaged in discussions, contributed experience, led a discussion session on Autonomy.

Steinbeis 2i

Workshops Coordinated

- Coordination of Roadmapping Workshop at 23rd ICE/ITMC/IEEE Madeira (June 2017) – interaction with ICE/ITMC/IEEE community (academics, industry and policy making) on future CPS technologies and societal themes, international event (see [Cyber-Physical Systems \(CPS\) Roadmapping Workshop Report](#))
- Roadmapping Consensus WS, Paris, October 2017 &
- Roadmapping Consensus WS, Brussels, May 2018: Collaboration with Roadmapping Community. Representatives from ECSEL, ARTEMIS-IA, EPOSS, HIPEAC, IoT Community invited and presented at the event. Converging visions and missions for the CPS area were derived and a Technology and Research Radar created.
(see [Roadmap Consensus Workshop Report](#)) &
- Roadmapping Workshop IEEE, Stuttgart, June 2018
(see [Roadmapping on Cyber-Physical Systems Workshop Report](#))
- Collaboration with system engineering community and diverse EU, national and regional project. Technology Radar and Missions were elaborated.

Participation at Platforms4CPS workshops or external events

Platforms4CPS workshops

- Co-coordination of Platforms4CPS PlatformsArena Workshop at Festo (Mai 2017) – collaboration with Connectedfactories (FoF-11) and BeINCPPS, reaching out to SMEs
- Participation in Platforms4CPS MarketLandscape Workshop (Mai 2017) – collaboration with ConnectedFactories, targeting industrial participants from different domains
- Coordination of Platforms4CPS booth at DIF – Collaboration with ARTEMIS/ITEA, collaboration with ICT-1 2016 projects (joint booth), collaboration with other projects (SAE, HiPEAC, etc)
- Participation in Platforms4CPS Kick-off (November 2016) – internal collaboration
- Participation in the Platforms4CPS Collaboration Workshop (December 2017) – collaboration with ARTEMIS, EPoSS, AENEAS, ECSEL

External Events

- Road2CPS Strategy Roadmapping Workshop (November 2016): Interaction with predecessor ICT-1 project, Roadmapping and strategic priorities for future EC funding and upcoming calls – collaboration with ARTEMIS/ECSEL, EFFRA, HiPEAC, and other projects and clusters in IoT/CPS/ES/Computing
- Road2CPS (ICT-1), TAMS4CPS (ICT-1) and Scorpious (FoF) final event (January 2017) – collaboration with 16 ICT-1 2014 projects and 4 ICT1 2016 projects and HiPEAC
- Participation at DEI Stakeholder event in Essen (February 2017): EC strategy and industry needs
- Participation and presentation at ARTEMIS-brokerage event (February 2017) – collaboration with ARTEMIS/ECSEL
- Participation in CPSELabs Meeting (ICT-1) (February 2017), ConnectedFactories Meeting (March 2017), Road2CPS and TAMS Meetings (March 2017)
- Participation in DIF event/panel (Mai 2017) – collaboration with ARTEMIS/ITEA
- Participation in FoF Impact days (May 2017) – collaboration with FoF projects / EC
- Participation in ECSEL Meeting in (June 2017) – Collaboration with ARTEMIS/ECSEL
- Participation in Digital Assembly (June 2017) – academia, industry, policy making
- Participation in 23rd ICE/ITMC/IEEE Madeira (June 2017) – panel and participation in FoF 11 session, interaction with ICE/ITMC/IEEE community (academics, industry and policy making) and FoF-11 community
- Collaboration WS, Brussels, December 2017
- Legal and Societal Issues, Brussels, June 2018
- Final Consultation, Paris, September 2018

THHINK

Workshops Coordinated

- Facilitated at Market Segmentation Workshop, Amsterdam
- Facilitated Foundations Workshops, Stockholm
- Facilitated Societal and Legal Issues Workshop, Brussels
(see [Societal and Legal Issues Workshop Report](#))
- P4CPS Final Consultation Event – Speaker and Rapporteur

Participation at Platforms4CPS workshops or external events

- Presented and acted as Facilitator at Market Segmentation Workshop in Amsterdam, Netherlands. Market opportunities were identified.
- Presented and acted as Facilitator at CPS Foundations Workshop Stockholm, Sweden. Key important topics were identified and summarised in report.
- Exhibition stand at DIF event – interacted with ECSEL and ITEA community.
- EF ECS 2017 - Participated on a booth shared between the CPS cluster.
- Societal and Legal Issues Regarding CPS Deployment Workshop (Collaboration/ Constituency/ Consensus building) – Organised Workshop, presented P4CPS findings and facilitated break outs

- Roadmap Consensus Workshop – Helped organised the workshop, facilitated break outs.
- Platforms4CPS Recommendations Meeting, Munich, putting forward community recommendations
- Presentation of EC priorities at Business Innovation Network Event, UK
- Presentation of transportation markets at HiPEAC Conference, UK
- Organising Committee for IEEE ICPS 2018, St Petersburg.

Festo

Workshops Coordinated

- Facilitated a Digital Manufacturing Workshop at Festo premises (4th of May 2017, in context of PlatformArena at Festo Technology Factory) together with the Factory-of-the-Future (FoF) project [Connected Factories](#) and the I4MS project [BEinCPPS](#), thus linking to the FoF community/programme and the Digital Innovation Hubs (see [Report on PlatformArena workshops](#))

Participation at Platforms4CPS workshops or external events

Platforms4CPS workshops

- Participation in Platforms4CPS MarketLandscape Workshop (May 2017): collaboration with ConnectedFactories, targeting industrial participants from different domains
- Participation in DIF event with Platforms4CPS booth: collaboration with ARTEMIS/ITEA
- Participation in the Platforms4CPS Collaboration Workshop (December 2017): collaboration with ARTEMIS, EPoSS, AENEAS, ECSEL
- Co-ordination of Platforms4CPS Community Endorsement Workshop on Building Blocks for Cyber-Physical Systems (February 2018): collaboration and discussion with CPS experts from various sectors and fields
- Participation in final consultation event “CPS Innovations for the future”: collaboration and discussion with CPS experts from various sectors and fields, amongst others from the “CPS cluster” projects

External Events

- Participation in **Road2CPS Strategy Roadmapping Workshop** (November 2016): Interaction with predecessor ICT-1 project and collaboration with ARTEMIS/ECSEL, FoF, etc.
- Participation in **Smart Cyber-Physical Systems - Concertation Event** (January 2017): collaboration with ICT-1 projects and FoF community
- Participation in and presentations at ICT-3 CSA project meetings (inSSlight) and EPoSS Working Group meetings (Manufacturing & Robotics and Smart Com & IoT) in the context of the **EPoSS Annual Forums** (October 2017 and October 2018) as well as at the **SSI conference** (April 2018): collaboration with ICT-3 CSA and Smart Systems Integration Community (EPoSS, ECSEL, ...)
- Participation in **FoF Impact days / Digital Platforms meeting** (May 2017) as well as in **EFFRA General Assembly** (March 2018): interaction with FoF projects
- Participation in **Manufacturing Performance Days** (May 2017): interaction with digital manufacturing community and EC
- Participation in **Connected Factories Scenario Building Workshops** (September 2017 / September 2018), in **regional Connected Factories Workshop** (June 2018) and in central **Connected Factories Public Event** (February 2018): collaboration with FoF CSA on digital manufacturing platforms and FoF community, in particular with regard to CPS Scenarios and Building Blocks
- Participation in and presentation at **Manufuture 2017 conference** (October 2017): interaction with manufacturing community including EC
- Participation in **EF ECS 2017** (December 2017) with a booth shared between the CPS cluster
- Participation and presentation at **European Industry Day** (February 2018): discussion with

<p>European digital manufacturing community including EC representatives on “How Companies Implement Industry 4.0 Technologies”</p> <ul style="list-style-type: none"> • Participation in and presentation at the ICE/IEEE International Conference on Engineering, Technology and Innovation (June 2018): collaboration with IEEE Technology & Engineering Management Society • Participation in World Manufacturing Forum (September 2018): collaboration with manufacturing community including EC • Participation in ManuFuture and FoF PPP Board meetings (on regularly basis): interaction with manufacturing / FoF community including EC
<p>KTH</p>
<p>Workshops Coordinated</p> <ul style="list-style-type: none"> • Foundations of CPS workshop (June 2017, Stockholm). Industrial participation representing multiple programmes (e.g. 5G and AIOTI), also participants from NIST in the US. (see Collaboration on the foundations of CPS Engineering) <p>Platform Arena at KTH: Presented two platforms, AIDE and the KTH Research Concept Vehicle Platform. Additionally discussed innovation coaching, resources & networks, funding access. There were 41 participants. (see Report on PlatformArena workshops)</p> <p>Participation at Platforms4CPS workshops or external events</p> <ul style="list-style-type: none"> • Participation and support for the Platforms4CPS booth at DIF • Participation and KTH co-coordination of the CP-SETIS workshop at DIF introducing the Interoperability Coordination Forum • Participation in Platforms4CPS Kick-off (November 2016) – internal collaboration • CPS summer school hosted by Halmstad University • Participation at ARTEMIS-brokerage event (February 2017) – collaboration with ARTEMIS/ECSEL • Participation in CPSELabs Meeting (ICT-1) (February 2017)
<p>FORTISS</p>
<p>Workshops Coordinated</p> <ul style="list-style-type: none"> • Platforms4CPS Community Endorsement Workshop: CPS Market Segmentation Connect to EFFRA and particularly the Connected Factories project by having Chris Decubber, Technical Director of Factories of the Future PPP, as an invited speaker. Exchange on Connected Factories’ “Mapping Framework” in comparison with Platform4CPS’ roadmapping methodology. • Roadmapping Consensus WS, Paris, October 2017; helped organise the workshop, facilitated breakouts. • Roadmapping Consensus WS, Brussels, June 2018; helped organise the workshop and facilitated breakouts. Collaboration with Roadmapping Community <p>Participation at Platforms4CPS workshops or external events</p> <ul style="list-style-type: none"> • Participation at Platforms4CPS CPS Foundations workshop (KTH) • Participation in DIF event with Platforms4CPS booth: collaboration with ARTEMIS/ITEA • Facilitated hosting of Platforms4CPS Community Endorsement Workshop on Building Blocks for Cyber-Physical Systems (February 2018): collaboration and discussion with CPS experts. • Organisation of PlatformArena workshop “Designing for Digital Transformation” in conjunction with CPSE Labs final results presentation day (April 2018). Collaboration with CPS experts and engagement of CPS projects of SAE. • Participation in final consultation event “CPS Innovations for the future” (Sept. 2018):

<p>presentation of recommendations for future R&I priorities and discussion with CPS experts from various fields</p>
<p>SYSTEMATIC</p>
<p>Workshops Coordinated</p> <p>Supporting the creation of workshops PlatformArena (Four events at : Festo Technology Factory, KTH, Fortiss and Thales group) (see Report on PlatformArena workshops)</p> <ul style="list-style-type: none"> • Creation of the online pre-workshop questionnaire for the four events PlatformArena (Festo Technology Factory, KTH, Fortiss and Thales group) <p>Participation at Platforms4CPS workshops or external events</p> <ul style="list-style-type: none"> • Participation in Platforms4CPS Kick-off (November 2016) – internal collaboration • Participation at ARTEMIS-brokerage event (February 2017) – collaboration with ARTEMIS/ECSEL • Participation to the final review of the Artemis project EMC² (June 2017) – linked with ECSEL • As Task Leader of Platform Arenas, Systematic is coordinating effort between these workshops, with feedback aiming to contribute to improving collaboration between the programmes, in particular with SME involvement. • Participation to the I4MS event on DIH in Madrid (September 2017) • Participation in the Platforms4CPS Collaboration Workshop (December 2017): collaboration with ARTEMIS, EPoSS, AENEAS, ECSEL • Collaboration WS, Brussels, December 2017 • Attendance and networking at the European Industry Day in Brussels (February 2018) • Participation to the 2nd "Stakeholder Forum" for the Digitising European Industry initiative in Paris (March 2018) • Participation to PlatformArena workshop "Designing for Digital Transformation" in conjunction with CPSE Labs last results presentation day (April 2018). • Participation in final consultation event "CPS Innovations for the future" (Sept. 2018)

4 H2020 CPS Cluster

A CPS Cluster was formed during the project with four other Horizon 2020 CPS flagship projects. These are CPSwarms, Bonseyes, CERBERO, DEIS. Monthly meetings are taking place with collaborative taking place on many activities including defining CPS, summer schools, dissemination and work on boosting exploitation. Some of the consortium partners led actions in the cluster.

<p>THALES</p>
<ul style="list-style-type: none"> • Chaired a physical meeting for ICT-1-2016 CPS Cluster Kick-off (Feb 2017). This included the H2020 CPS projects: • Set up monthly meetings with chair rotating among CPS Cluster projects, minutes template provided and light process to follow. • Set up central SVN repository for collaboration on joint activities. • Survey of CPS related events. • Mailing list created and maintained. • Joint booth at EF ECS, December 2017 • CPS Glossary action underway with the projects contributing feedback. • Applied for a joint networking session at the upcoming ICT 2018 Imagine Digital (Vienna)

Steinbeis 2i
<ul style="list-style-type: none"> • Road2CPS final event (January 2017 see above) • Participation in ICT-1-2016 cluster kick-off (February 2017) • Joint booth at EF ECS, December 2017 • Interviews with Cluster Members • Featuring Cluster Members via website and final newsletter
THHINK
<ul style="list-style-type: none"> • Attended H2020 CPS Cluster Meeting to engage with community and identify synergies • Reviewer for DEIS Project – part of CPS Cluster <p>Related Work</p> <ul style="list-style-type: none"> • Rapporteur for Mixed Criticality Cluster summarising the status of research work in mixed criticality systems and also key achievements. • Rapporteur for IoT Cluster meetings summarising the status of research work, key achievements and input to task forces on international collaboration and platforms, Vienna and Athens. • Rapporteur for EC Digitising European Industry Platforms Working Group summarising state of the industry in the area and research/funding priorities, Brussels • Rapporteur for EFFRA Connected Factories Meeting summarising state of manufacturing and research priorities, Brussels • Meeting with EC to discuss Standardisation across Europe, Brussels • Rapporteur for EC Standardisation Meeting with SDOs and Commission to harmonise standardisation activities across Europe, Brussels. • Rapporteur for DEI Stakeholder Forum, Paris • Rapporteur for Electronics Industry Working Group, Brussels, highlighting funding priorities in a variety of sectors for Horizon Europe. • Presentation at EC Round Table on Standardisation, Brussels • Attended Integrated Systems Engineering, Amsterdam • Attended Intertraffic, Amsterdam, for discussions with government and industry on autonomous cars. • Reviewer for AUTOPILOT (autonomous cars) and IOF (Internet of Farming) EC Large Scale Pilots • External expert for ECSEL MANTIS Project • Member of PPP Expert Review Group (covering 10 PPPs) and contributor to EC Hearing Criteria Framework
Festo
<ul style="list-style-type: none"> • Participation in Road2CPS final event, ICT-1-2016 cluster kick-off and joint booth at EF ECS in 2017 • Opened communication channels for exchange on CPS platforms survey as well as on CPS Compass with repository of common CPS building blocks with CPS cluster in 2018

5 Online Community & CPS PlatForum

Here we list the actions taken to engage the CPS community online via the PlatForum tool developed by the Consortium.

THALES
<ul style="list-style-type: none"> • Contributed to guidelines and diagnosis of specification. A forum taking a group challenge to be solved by multiple people has additional challenging requirements than the usual one person with a problem and can be solved by one person. • Market segmentation examples provided to the PlatForum for extension by the community.

<ul style="list-style-type: none"> • Proposed interactive events calendar where community can add events and/or indicate participation. • Discussion page for distinguishing CPS. • Interactive CPS glossary in preparation. • Invited CPS specialists to the PlatForum
Steinbeis 2i
<ul style="list-style-type: none"> • Linking the PlatForum with the Platforms4CPS website • Inviting CPS specialists to PlatForum • Technology Radar - EPs invited for feedback • Interactive Roadmap - EPs invited for feedback • Recommendations - EPs invited for feedback • Inviting specialists to PlatForum - EPs invited for feedback
THHINK
<ul style="list-style-type: none"> • 18 Blogs produced on Autonomous Cars, Aircraft, etc., and Societal and Legal Issues to stimulate discussion within the community • Input on platforms that are currently used by industry • Invited CPS specialists to the PlatForum
Festo
<ul style="list-style-type: none"> • Blogs on Digitising European Industry and Industry 4.0 with examples from company perspective • CPS platform survey on-line • CPS Compass with repository of CPS building blocks on-line • Invited CPS specialists to PlatForum and to give feedback
KTH
<ul style="list-style-type: none"> • Setting up the PlatForum including providing tutorials and assistance to other partners to make use of it • Supporting the linking of the Platform with the Platforms4CPS website • Inviting CPS specialists to the PlatForum • Posting blogs and foundations workshop information including a summary on the PlatForum • Drawing up plans in collaboration with other partners for the further use of the PlatForum
FORTISS
<ul style="list-style-type: none"> • Invited CPS specialists to PlatForum
SYSTEMATIC
<ul style="list-style-type: none"> • Supporting the build-up of the PlatForum, with recommendations on how to build and maintain an online community – internal collaboration • Invited CPS specialists to PlatForum

6 Specialists Invited and Registered to the External Advisory Board

Specialists in the CPS domain were invited to be active advisors at workshops and for reports and studies produced. They are detailed by those in the initial project proposal and per partner.

From Proposal Phase
<ul style="list-style-type: none"> • H M Lastra (Industrial CPS) • B Eynard University of Technology of Compiègne (Mechanical Engineering on Factories of the Future) • T Lecompte ClearSy (Safety critical railway signalling systems)

<ul style="list-style-type: none"> • C Comar AdaCore (CPS Generalist) • T ColletteList CEA • A Cohen INRIA (CPS Generalist) • A Bagnata SOFTEAM Cadextan (MD&SE for CPS) • L Orue-Echevarria Arrieta Tecnalía (Cloud Applications) • R Plana (Industrial Internet) • C Pecha Hahn-Schickard (CPS Generalist) • Philippe Letellier Héphaïstos (E Health, Energy management, Smart city)
THALES
<ul style="list-style-type: none"> • P. Rohr Trixell (CPS Health) • D Cancila CEA (CPS Generalist) • K Nieuwenhuis Thales NL (CPS Generalist) • D Sergers Barco (CPS Health) • F Van der Linden Philips (CPS Health) • K De Bosschere Uni Gent (CPS Generalist) • R Ruiz RGB Medical Devices (CPS Health) • M Larsson Uppsala University Hospital (CPS Health) • T Weyer University of Duisburg-Essen (CPS Generalist)
Steinbeis 2i
<ul style="list-style-type: none"> • Raik Hartung; SAP • Armando Colombo • Aided via workshop invitation - Koen de Boschere; Gent University • Afonso Ferreira (Director for Research at CNRS, France), Seconded to the European Commission as expert in cybersecurity, future and emerging technologies, and foresight. • Over 60 registrations of followers (esp. newsletters to the wider community).
THHINK
<ul style="list-style-type: none"> • Jean-Luc Dormoy EDF (CPS Energy) • Karel Beckman (EnergyPost) (CPS Energy) • Maher Chebbo (SAP) (CPS Energy) • Patrick Van Hove (EC) (CPS Generalist)
Festo
<ul style="list-style-type: none"> • Dr. Volker Nestle, Head of Corporate Research at Trumpf GmbH & Co. KG • Eduardo Beltrán de Nanclares, Innovation & Technology Director at Mondragon Corporation • Additional external experts for CPS Building Blocks Repository: Chris Decubber (EFFRA), Dr. Günter Hörcher (Fraunhofer IPA), Johannes Hoos (Festo), Prof. Alejandro Masrur (TU Chemnitz), Jürgen Niehaus (SafeTRANS e.V.), Stefan Saller (Festo), Prof. Dr. Axel Sikora (HS Offenburg), Dr. Sven Spieth (Hahn-Schickard), Dr. Holger Steltner (Festo)
KTH
<ul style="list-style-type: none"> • Participants from the CPS foundations workshop • I Horvath Delft University of Technology (CPS Generalist) • S Karnouskos SAP (IIoT aspects of Industrial CPS) • Industrial partners and experts from the regional eco-system
FORTISS
<ul style="list-style-type: none"> • Aided via workshop invitation - F Van der Linden Philips (CPS Health)
SYSTEMATIC
<ul style="list-style-type: none"> • Dr Tomaz Vidonja from Eurocon d.o.o (Slovenia)

7 Other Interactions

In this last table consortium members have indicated supplementary activities that have also contributed to collaboration between the CPS community and European Programmes.

Thales
<ul style="list-style-type: none"> • HiPEAC Industrial Committee project partner. • Thales HQ in the loop and supporting. • Invited keynote speaker to IEEE SoSE conference in Paris 2018. • Partner of projects EuroCPS, AQUAS and FED4SAE. More generally a wide presence of Thales across European research programmes. • Joint industrial report to French national funding agency to raise awareness of the significance of CPS research and development.
Steinbeis 2i
<ul style="list-style-type: none"> • ARTEMIS-IA published an Article about Platforms4CPS in its Magazine and Newsletter, spread to the overall ARTEMIS community – Collaboration with ARTEMIS-IA • Participation in related Projects (Road2CPS, TAMS4CPS, CPSELabs (ICT-1), ConnectedFactories (FoF-11) Smart4Europe (ICT-4 SAE), enhancing collaboration with Platforms4CPS. • Sharing of information and Deliverables with ConnectedFactories, contributions to the CF mapping framework • Organising joint or co-located workshops with ConnectedFactories and BeINCPPS • EF ECS Conference and Panel Moderation, December 2017 • ARTEMIS Brokerage Event, Berlin, February 2018 • Digitizing European Industry Stakeholder Forum, Paris, March 2018; Participation in various working groups (see Dissemination Table) • Collaboration with IoT Community (IoT week, Bilbao, July2018) • Collaboration with Connected Factories (Different events see Dissemination Table) • Collaboration with Smart Anything Everywhere (Different events see Dissemination Table) • Collaboration with national/regional initiatives (Bilateral Meetings with Ministry)
THHINK
<ul style="list-style-type: none"> • Interactions with ECSEL community and EC via meetings and attendance of Brokerage and ECSEL Summits • Interactions at EU-US level giving keynotes on autonomous transportation and sitting on panels at Transatlantic Symposiums in Minneapolis and Washington, keynote at TAMs meeting and also interactions via PICASSO and BILAT projects (Rome and US). • Attended EU-US Standardisation meeting, Brussels • Meetings with Intelligent Manufacturing Systems (US) • Interactions at the UK National Level targeted at Industry (Industrial Advisory Boards) and also research into CPS, e.g. via Cranfield and Sheffield University.
Festo
<ul style="list-style-type: none"> • Cross-linking activities between ICT-1 CSA project Platforms4CPS, ICT-3 CSA project inSSlight and FoF-11 CSA project ConnectedFactories such as communicating surveys, events, etc. and engaging the different communities in leveraging synergies (e.g. in the context of the “CPS Compass” with a repository of CPS building blocks) • Interviews have been conducted with CPS experts from various field in order to define common building blocks for a joint CPS repository
KTH
<ul style="list-style-type: none"> • Interactions with US players including NIST and leading CPS researchers in US including at UC Berkeley (Prof. Ed Lee) and Vanderbilt University (Prof. J. Stipanovits)
FORTISS
<ul style="list-style-type: none"> • Interaction with projects of the Smart Anything Everywhere and I4MS initiatives: CPSE Labs,

Smart4Europe, FED4SAE, BEinCPPS, and MIDIH. Promotion of PlatformsArenas and PlatForum, invitation to provide feedback on Technology Radar, R&I recommendations.
SYSTEMATIC
<ul style="list-style-type: none"> • Interactions with ECSEL community and EC via meetings and attendance of Brokerages and ECSEL Summits • Member of the French ICT NCP • Interactions established to related I4MS projects such as MIDIH. • Member of EIT Digital • Member of Embedded France

8 Concluding Points

This report demonstrates the significant effort of partners towards building further collaboration between the CPS Community and European Programmes. The described activities of the consortium were divided into five key work areas taking place within Platforms4CPS:

- the workshops;
- the CPS cluster initiative;
- the community interaction PlatForum tool;
- developing an External Advisory Board;
- and other activities.

It should be noted that while THALES, Steinbeis and THHINK had more funded effort for collaboration activities than the other partners, it can be seen that Festo, KTH, Fortiss and Systematic provided also provided strong support for interactions with stakeholders from the varied domains and across multiple levels.

One can conclude that a broad spectrum of CPS community groups have been brought together: The researchers, practitioners and ICT providers from the CPS cluster initiative but also from the broader associations (ECSEL-JU, ARTEMIS-IA, EPoSS, ITEA, etc.). Regional stakeholders (e.g. in the context of PlatformArenas) as well as international collaboration (e.g. PICASSO and BILAT projects) have been addressed. The currently identified of common challenges will encourage continued collaboration after the project. Among others, bridges with the IoT and Smart Anything Everywhere communities as well as with the Digital Innovation Hubs initiative will be beneficial to be established (e.g. by jointly organised workshops, conference participation, etc.). Also, the collaboration with various domains such as manufacturing (e.g. close relations to the FoF-CSA Connected Factories), transportation, health and energy would be useful to stimulate.

All the established collaborations will have a positive effect on the CPS community in terms of identity, coherence and common vision. The work achieved by the consortium will provide a strong impulse for continued constituency building going far beyond the duration of the Platforms4CPS project.