CPS towards 2020 and beyond

Cyber-Physical Systems (CPS) Roadmap Workshop

10/2017

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#DigitiseEU

ICT-05-2017: Customised and low-energy computing

ICT-01-2016: Smart Cyber-Physical Systems

ICT-01-2019: Computing technologies and engineering methods for cyber-physical systems of systems

Call deadline: 28/03/2019
Budget: 38M€ (RIA) + 2M€ (CSA)

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CPS + computing in 2018-2020

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ICT-05-2017: Customised and low-energy computing

ICT-01-2016: Smart Cyber-Physical Systems

ICT-07-2018: Electronic Smart Systems (ESS)

ICT-16-2018: Software Technologies

ICT-01-2019: Computing technologies and engineering methods for cyber-physical systems of systems

ICT-09-2019-2020: Robotics in Application Areas

ICT-26-2018-2020: Artificial Intelligence


... and others... (including FoF – Factories of the Future)

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"The new Industrial Policy Strategy we are presenting today will help our industries stay or become the world leader in innovation, digitisation and decarbonisation" (J.C. Juncker, Sept 2017)
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**Catalogue of DIH**

**Digital opportunity scheme**
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<th>Implementation</th>
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<td><strong>Coordination</strong> of European, national &amp; regional initiatives</td>
<td><em>Round Tables (a.k.a. &quot;meetings of the Platform of National Initiatives), Working groups, Stakeholder Forum 2018</em></td>
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| **Digital Innovation Hubs** (DIHs) | *Horizon 2020 (2018-2020): 300M€*  
I4MS Phase 4, Smart Anything Everywhere Phase 3, Robotics |
| **Partnership & Platforms** and large scale pilots | *Horizon 2020 (2018-2020): 3200M€*  
- **PPP** (Big Data, Photonics, 5G networks, Cybersecurity)  
- **Platforms and pilots** (connected smart factory) |
| **Digital Skills & Jobs** | *Digital Skills and Jobs Coalition, Europe's Digital Progress Report (EDPR), Cross-border digital work experience (Digital Opportunity Scheme).* |
| **Regulatory Framework** | *Digital Single Market (e.g. Free Flow of Data Initiative)* |
Building on and expanding successful actions (examples)

145M € of EU funding - 16 large projects
125 DIHs/competence centres
450 experiments: 80% cross-border dimension
560 contractors. Out of which 406 industrial:
84% SMEs and mid-caps, 50% users,
65% new in EU R&I Programmes
29 Members States and Ass. Countries

Interactive map http://i4ms.eu/regional_hubs/map.php

58.5M € of EU funding - 11 projects
100 DIHs/competence centres
285 experiments: 75% cross-border dimension
248 contractors. Out of which 203 industrial:
70% SMEs and mid-caps, 40% users,
55% new in EU R&I Programmes
19 Members States and Ass. Countries
29 DIHs coached so far – 14 EU countries
1.45M € (up to 50k per participant) in I4MS for most promising regional competence centres for developing their case for becoming a DIH
Coordination: I4MS Growth and XS2I4MS

18 coached hubs participated in the latest I4MS call, 8 successfully

Smart Factories in Central and Eastern Europe (EU13) - 1.8M € from the European Parliament to support the implementation of DIHs in the selected countries and regions where uptake and adoption of digital technologies has been so far limited
Call open until 22 October – https://ec.europa.eu/eusurvey/runner/ApplicationForm
Final selection of 30 DIHs by early December
Coordination: PWC and Oxford University Innovation

± 8M € for widening the SAE and I4MS networks towards industrial regions which are so far underrepresented (WP18-20)

Tentative call deadline: 2 April 2019

http://dih.i4ms.eu/
Stimulate the development of the next wave of products with digital technologies inside

A network of Digital Innovation Hubs in the following 4 areas:

- Area 1: Cyber-physical and embedded systems
- Area 2: Customised low energy computing powering CPS and the IoT
- Area 3: Flexible and Wearable Electronics
- Area 4: Widening Digital Innovation Hubs

Innovation Actions up to 8 million €.

www.smartanythingeverywhere.eu
Facilitate and accelerate a broad uptake and integration of robotic technologies

A network of Digital Innovation Hubs in the following 4 areas:

- Healthcare
- Infrastructure Inspection and Maintenance
- Agri-Food
- Agile Production

Innovation Actions up to 16 million €.

Disclaimer: Preliminary information, work programme has not been approved yet
ICT Innovation for agriculture - Digital Innovation Hubs for Agriculture

- To accelerate the adoption of ICT-based solutions for more productive and sustainable agriculture systems.

Innovation Action up to 10M €

Topic published under the Societal Challenge 2 Work Programme "Food Security, sustainable agriculture and forestry, marine, maritime and inland water research and the bio economy".

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Digital Innovation Hubs in year 2020

- DT-ICT-03-2020: I4MS (phase 4) - uptake of digital game changers and digital manufacturing platforms
- DT-ICT-04-2020: Photonics Innovation Hubs
- DT-ICT-05-2020: Big Data Innovation Hubs

INFO:
http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/other/competitive.html

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Further information

- **ICT Proposers' Day**
  - Budapest, 9-10 Nov 2017
- Report from Working group on Digital Innovation Hubs
- Catalogue of Digital Innovation Hubs


One option the Commission is considering is the full outsourcing of projects...
ACPS 2030 vision

The context – from CPS to Autonomous CPS

**Strong market position** of EU companies in complex electronic systems interacting with the physical world (cyber-physical systems - CPS) and large systems of systems (SOS).

**High value added** markets: industrial automation, medical, railway systems, ships, ports and airports, road and air vehicles, manufacturing and logistics systems.
Total global value: **472B€** in 2015, of which 30% in EU

Includes sectors where **EU autonomy is strategic** for peace and security.

CPS are evolving towards more and more autonomy: from Cyber-Physical to **AUTONOMOUS Cyber-Physical Systems**

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ACPS 2030 vision

The trends

Complex, heterogeneous architectures:
- CPU, GPU, FPGA, DFP, TPU, QPU...

Every system is a system-of-systems

Fully autonomous systems:
- no human needed
- CPS becomes ACPS

Cyber-security a major cross-cutting concern
ACPS 2030 vision

The mission: **autonomous** cyber-physical systems that people can **trust**

Pillar 1: trust

**Make people trust** complex autonomous systems: reduce (10x) number of **bugs**, increase **usability** and human-like behaviour, harden against **cyber-attacks**, provide the technical foundations for **explainable AI** technologies which can be trusted by humans.

Pillar 2: productivity

Increase **productivity of EU companies** by supporting tools for software development, addressing the reference markets: CPS, autonomous systems, robotics, artificial intelligence, and delegating **complexity management** to AI-enabled tools.

Pillar 3: energy

Deliver **orders of magnitude** improvement in computing energy efficiency, enabling on one side **exascale** high-performance computing and on the other side "**no-battery**" applications in the Internet of Things domain.
Digitising European Industry

https://ec.europa.eu/futurium/en/content/implementing-digitising-european-industry-actions

or: bit.ly/futuriumdei

https://ec.europa.eu/digital-single-market/digitising-european-industry

or: bit.ly/europadei

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