



Cyber Physical Systems for Europe

CPS4EU

Project Overview

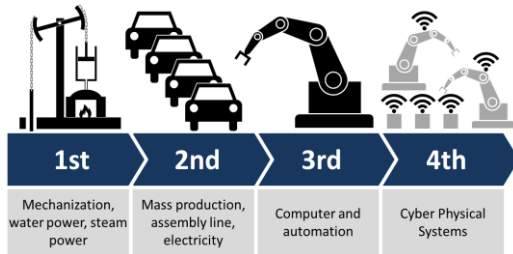
November 2020

Cyber Physical Systems in brief

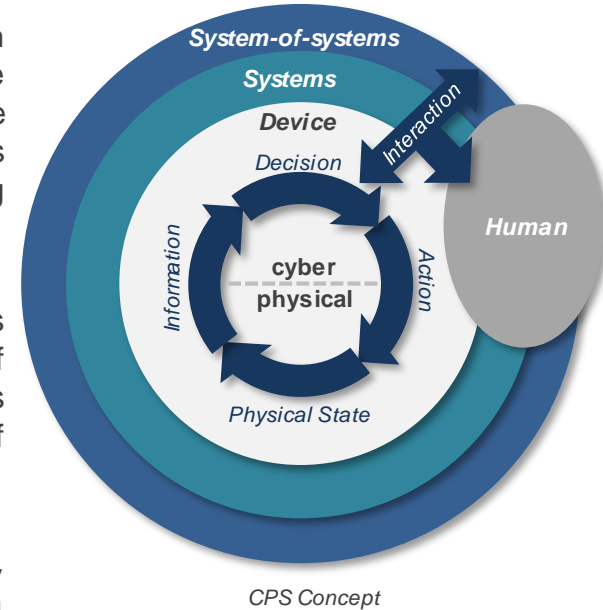


Cyber Physical Systems (CPSs) are systems that link the physical world (eg. through sensors or actuators) with the virtual world of information processing. They are composed from diverse constituent parts that collaborate together to create some global behaviour. These constituents will include software systems, communications technology, and sensors/actuators that interact with the real world, often including embedded technologies.

A CPS presents a collection of challenges not always found in a classical business information system or embedded system. To construct a CPS, a combination of different engineering competencies is required, spanning the technical domains as well as the corresponding application sectors, in the form of a new discipline of systems engineering.



Cyber Physical Systems (CPS) are key infrastructures for our modern society and represents one of the key factors of Industry 4.0. They can improve the quality of life of citizens and the competitiveness of European industry.



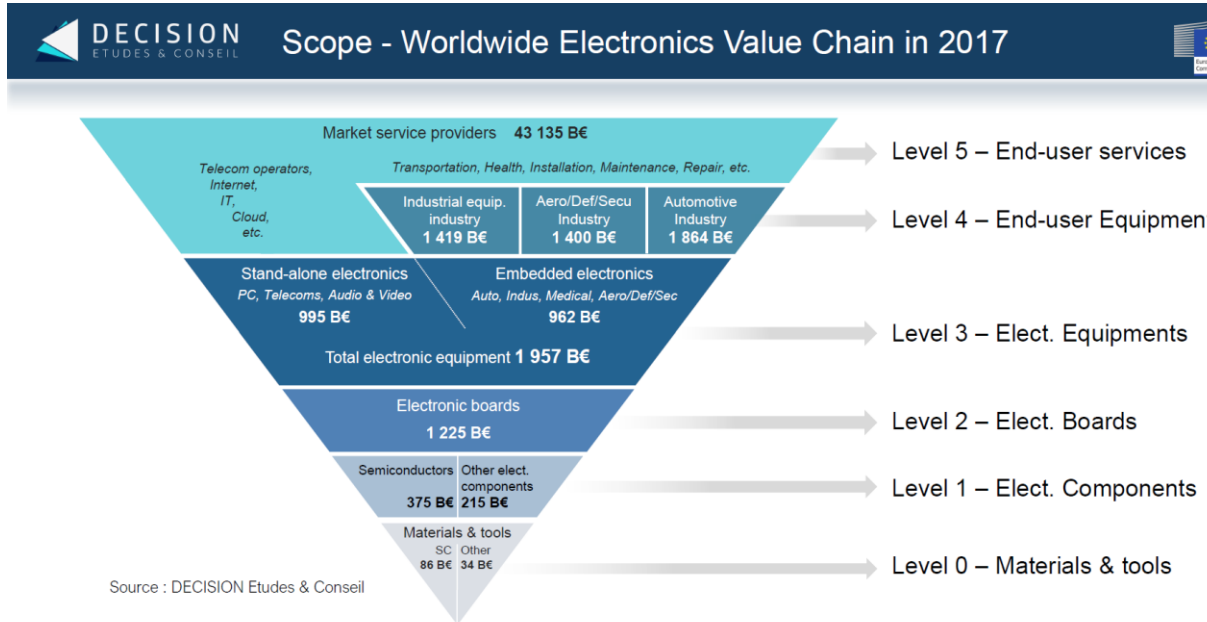
CPS Concept

World wide components and systems production



KEY TREND: Digitalisation of products and services: +110 B€ by 2020 ⁽²⁾

Source DEI, Digital Single Market- March 2018



← Europe

Level 5 – End-user services

Level 4 – End-user Equipments

← 20% of World Production

Level 3 – Elect. Equipments

← 15% of World Production

Level 2 – Elect. Boards

Level 1 – Elect. Components

← 5% of World Production

But

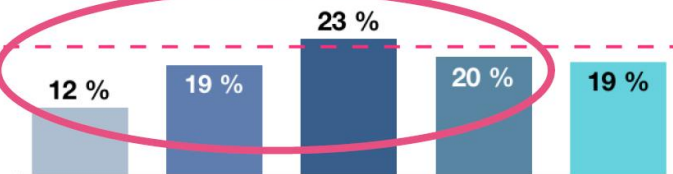
- 55% of Automotive
- >50% of energy and security
- > 40% of Automation/Industry

¹ The semiconductor industry is very internationalized and the different production steps of a semiconductor systematically occurs in different countries. As a consequence, the production in Europe in this diagram corresponds to the share of the world production made by companies whose nationality of principal shareholder is European.

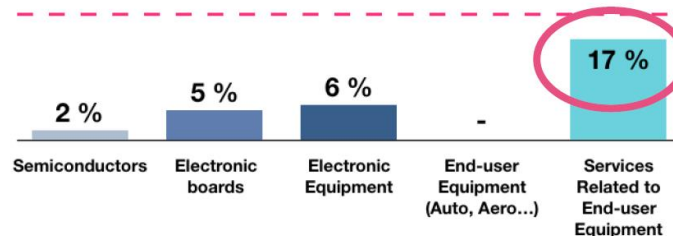
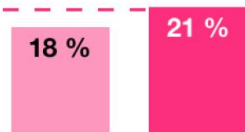
The share of the European production in the global electronic value chain (EU%World)

Electronics value chain

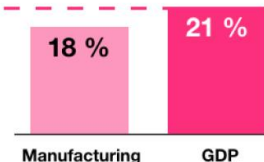
Macro-economic data



Embedded electronics



Stand-alone electronics

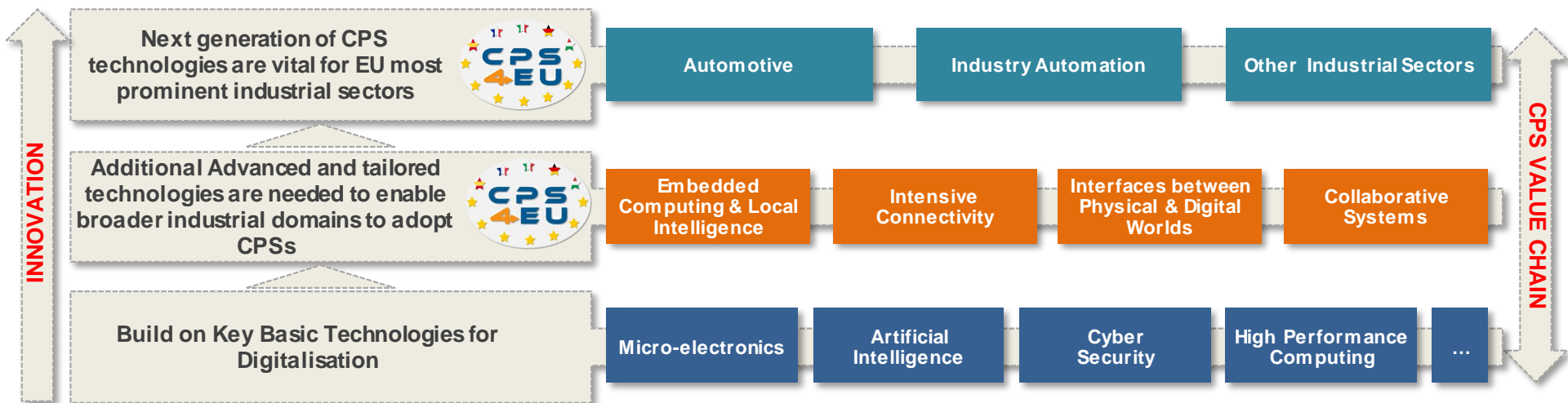


Source : DECISION Etudes & Conseil

CPS: the Answer to Digitalization Game Changer



Leveraging on the key basic technologies enabling digitalisation, a new generation of CPS enabling technologies are required for prominent industrial sectors



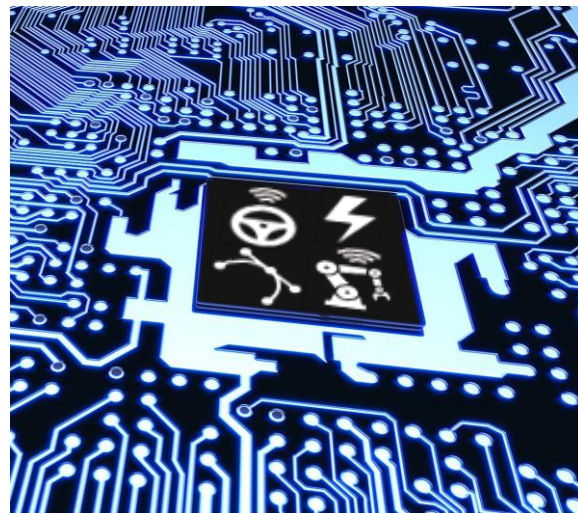
«CPS will be pivotal in the upcoming industrial revolution» (Y. Gigase, ADTC 2019)

What is at stake with the CPS4EU Project ?

- Transition from linear eco-systems to networked eco-systems
- Digitization, AI, CPS/IOT, Edge computing, Connectivity, 5G, Software updates Over The Air
- Safety, Security (Cyber-), Privacy, Ethics, Export rules
- Low power consumption, SWAP*
- Seamless development process (Digital twins, Model-based engineering, Security by design)
- Management of project complexity

CPS4EU is about:

- Innovations in Cyber Physical Systems
- Components and Tools for 5 Pre-Integrated Architectures
- 16 Practical Use Cases
- New way of working and doing business with partners



(*) SWAP: Size Weight And Power



Major innovations to provide key CPS technologies:

- 3 computing modules devoted to master **real-time systems (WP1)**
- 2 connectivity modules to master **dynamic communication (WP2)**
- 2 **innovative interfaces with the physical world** through the integration of sensors and actuators towards the autonomous system paradigm **(WP3)**
- A **collaborative systems** to master multi-scale modeling and behavior prediction **(WP4)**
- 5 **pre integrated architectures** and **CPS tools** to handle the explosion of the complexity of CPS systems **(WP5-6)**.

... that will be double validated, by:

- **technology providers** through their products catalogue evolution **(WP 1-4)**
- **large companies** through 15 demonstrators **(WP7-9)**.

... and widely disseminated.

The strong impact of CPS4EU

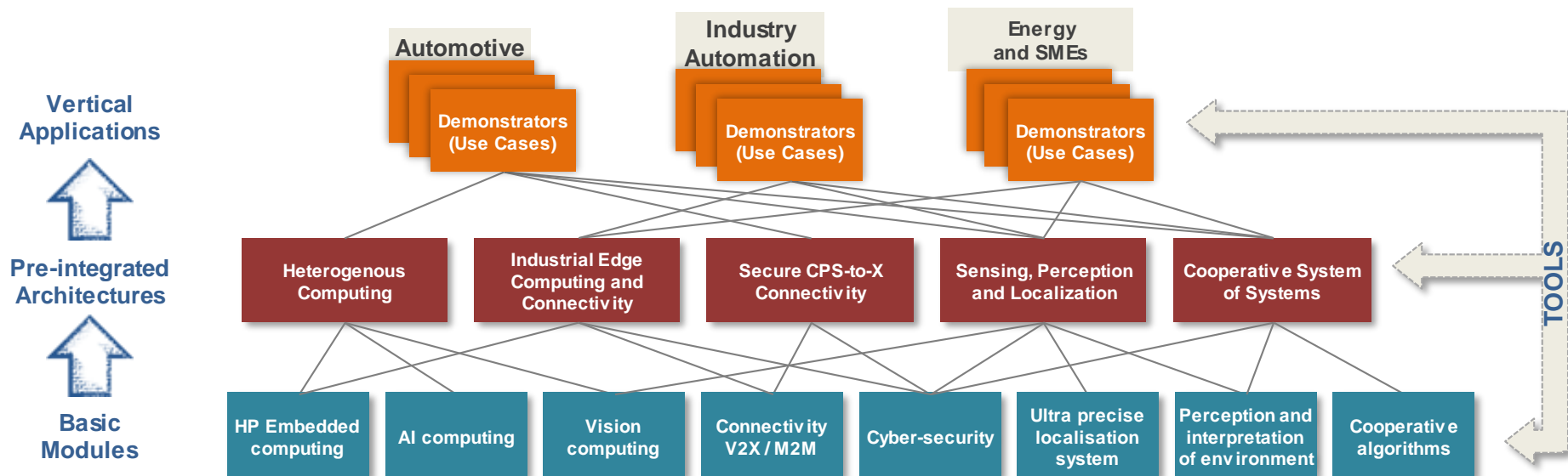


- Strengthening the overall CPS value chain by:
 - Fostering world class European technology providers, in particular SMEs (14 SMEs participate to CPS4EU project)
 - Creating high potential of development and clear leadership possibilities for all CPS4EU countries.
- Maintaining the EU leadership of CPS technologies by:
 - Enabling the creation of innovative European CPS products, able to strengthen leadership and competitiveness of both LEs and SMEs
 - Facilitating the use of CPS technologies in diversified sectors through relevant demonstrators
 - Allowing diversified industrial sectors to benefit from the same CPS modules and architectures, a major step towards standardizations.
- Ensure CPS technology sovereign procurement for European large enterprises
 - Enabling strong cooperation between CPS technology providers and CPS users.
- Strong dissemination plan to reach at least 1,000 European SMEs enabling Better CPS awareness and usage for all industrial sectors

From Basic Modules to Vertical Applications...



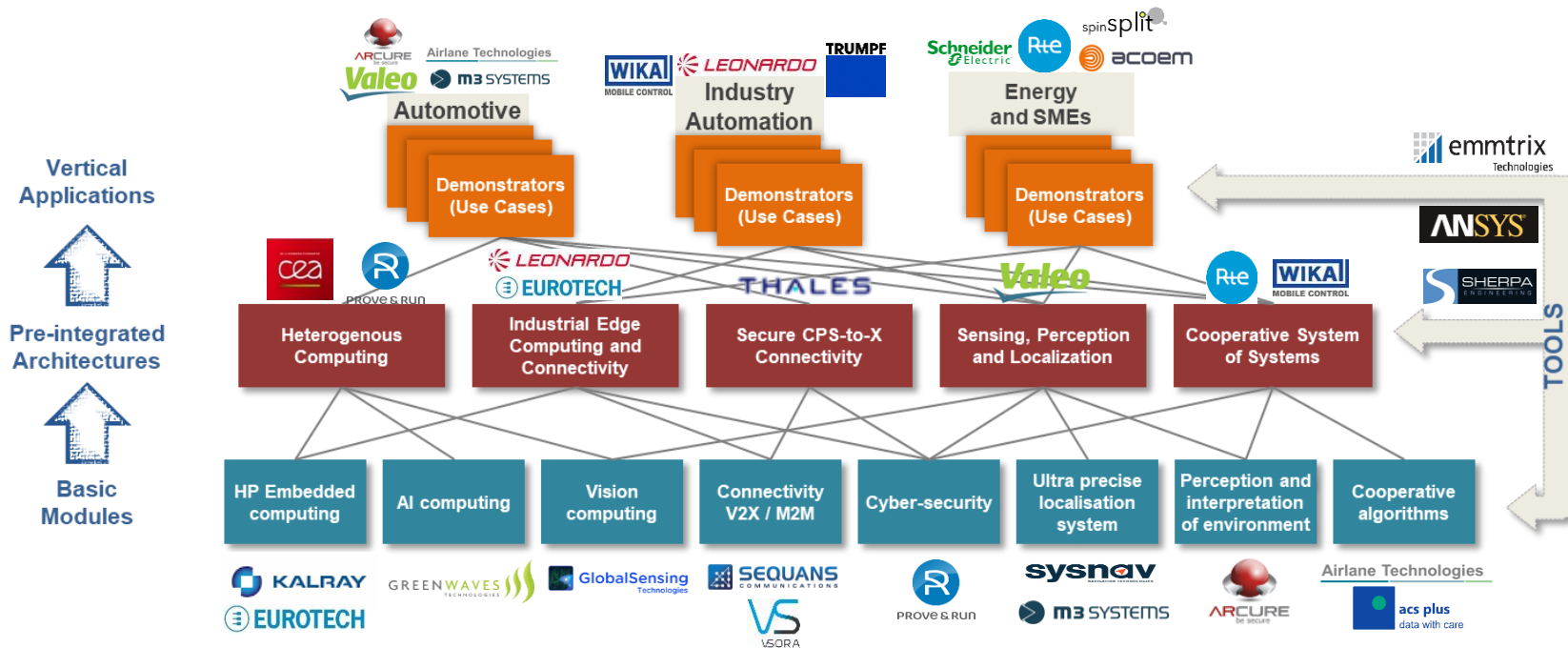
- CPS modules are developed by SMEs to ensure **sovereign procurement**.
- Pre-integrated architecture allow basic CPS modules to be used in **different industrial sectors**.
- The pre-integration concept allows an efficient **reuse approach** with drastic **reduction of implementation effort** for both CPS module providers and users.
- 16 **demonstrators** cover Automotive, Industry Automation, Energy, and other SME use cases



Strong and Balanced Consortium



- 36 Partners from 5 European Countries, equally distributed among Large Enterprises, SMEs and Academics



Strong and Balanced Consortium



The Consortium is represented by 36 partners from 5 European countries involving 14 SMEs/Midcap:

France

- [VALEO VISION SAS \(Coordinator\)](#)
- [ACOEM](#) (01dB-Metravib)
- [AIRLANE TECHNOLOGIES](#)
- [ANSYS FRANCE](#)
- [ARCURE](#)
- [CAPTRONIC \(JESSICA FRANCE\)](#)
- [CEA](#)
- [CNRS](#)
- [EMBEDDED FRANCE](#)
- [GLOBALSENSING TECHNOLOGIES](#)
- [GREENWAVES TECHNOLOGIES](#)
- [INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET AUTOMATIQUE](#)
- [KALRAY](#)
- [M3 SYSTEMS](#)
- [PROVE&RUN](#)
- [RTE](#)
- [SCHNEIDER ELECTRIC FRANCE](#)
- [SEQUANS COMMUNICATIONS](#)
- [SHERPA ENGINEERING](#)
- [SYSSNAV](#)
- [THALES RESEARCH & TECHNOLOGY](#)
- [UNIVERSITE GRENOBLE ALPES](#)
- [VSORA](#)

Germany

- [ACS plus](#)
- [emmtrix](#)
- [Technische Universität Clausthal](#)
- [TRUMPF Ditzingen](#)
- [University Augsburg](#)
- [WIKA Mobile Control GmbH](#)

Hungary

- [Budapest University of Technology and Economics](#)
- [Spinsplit Technical Research and Development Ltd Liability Company](#)

Italy

- [Leonardo S.p.A.](#)
- [EUROTECH S.p.A.](#)
- [Università degli Studi di Salerno](#)

Spain

- [Instituto Tecnológico de Informática](#)
- [Tecnologías, Servicios Telemáticos y Sistemas, S.A.](#)

Legend:

■ [SMEs/Midcap](#)

■ [LE](#)

■ [Non Profit, Academics/RTO](#)

THANK YOU FOR YOUR ATTENTION

