MISSION STATEMENT

UnCoVerCPS provides methods for a faster and more efficient development process of safety- or operation-critical cyber-physical systems in (partially) unknown environments.

Cyber-physical systems are very hard to control and verify because of the mix of discrete dynamics (originating from computing elements) and continuous dynamics (originating from physical elements).

We present completely new methods for de-verticalisation of the development processes by a generic and holistic approach towards reliable cyber-physical systems development with formal guarantees.

In order to guarantee that specifications are met in unknown environments and in unanticipated situations, we synthesise and verify controllers on-the-fly during system execution. This requires to unify control and verification approaches, which were previously considered separately by developers. For instance, each action of an automated car (e.g. lane change) is verified before execution, guaranteeing safety of the passengers.

We will develop completely new methods, which are integrated in tools for modelling, control design, verification, and code generation that will leverage the development towards reliable and at the same time open cyber-physical systems. Our approach leverages future certification needs of open and critical cyber-physical systems.

CONSORTIUM

Technische Universität München (TUM) - *Coordinator*
Germany

Université Joseph Fourier Grenoble 1 (UJF)
France

Universität Kassel (UKS)
Germany

Politecnico di Milano (PoliMi)
Italy

GE Global Research Europe
Germany

Robert Bosch GmbH
Germany

Esterel Technologies
France

Deutsches Zentrum für Luft- und Raumfahrt (DLR)
Germany

Tecnalia
Spain

R.U.Robots Limited
United Kingdom

UnCoVer CPS

Unifying Control and Verification of Cyber-Physical Systems

UnCoVerCPS

More information about the project is available online.
Please visit **http://cps-vo.org/group/UnCoVerCPS**

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HORIZON 2020

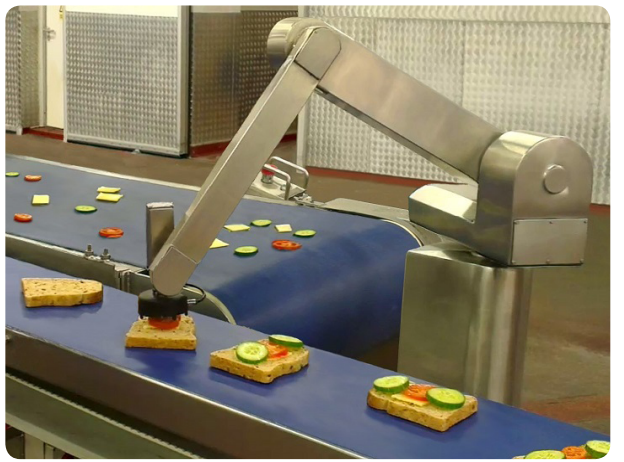
OBJECTIVES

- Novel on-the-fly control and verification concepts.
- Ground-breaking methods for unifying control and verification to quickly react to changing environments.
- Seamless integration of modelling and conformance testing.
- A unique tool chain that makes it possible to integrate modelling, control design, formal verification, and automatic code generation.
- Prototypical realisations of the novel methods in automated vehicles and human-robot collaborative manufacturing.
- Analysis of the benefits of formal methods on wind turbines and smart grids case studies.
- A new development process that reduces development time and costs for critical cyber-physical systems to strengthen European companies which design or produce cyber-physical systems.

DEMONSTRATORS

Automated Vehicles

Wind Turbines



Human-Robot Collaboration

Smart Grids