



INTO-CPS

An Integrated Tool chain for Cyber-Physical Systems

Zoe Andrews

Newcastle University



Aims

The aim of INTO-CPS project is to create an **integrated** "tool chain" of existing industry-strength tools for comprehensive Model-Based design of Cyber-Physical Systems (CPSs).

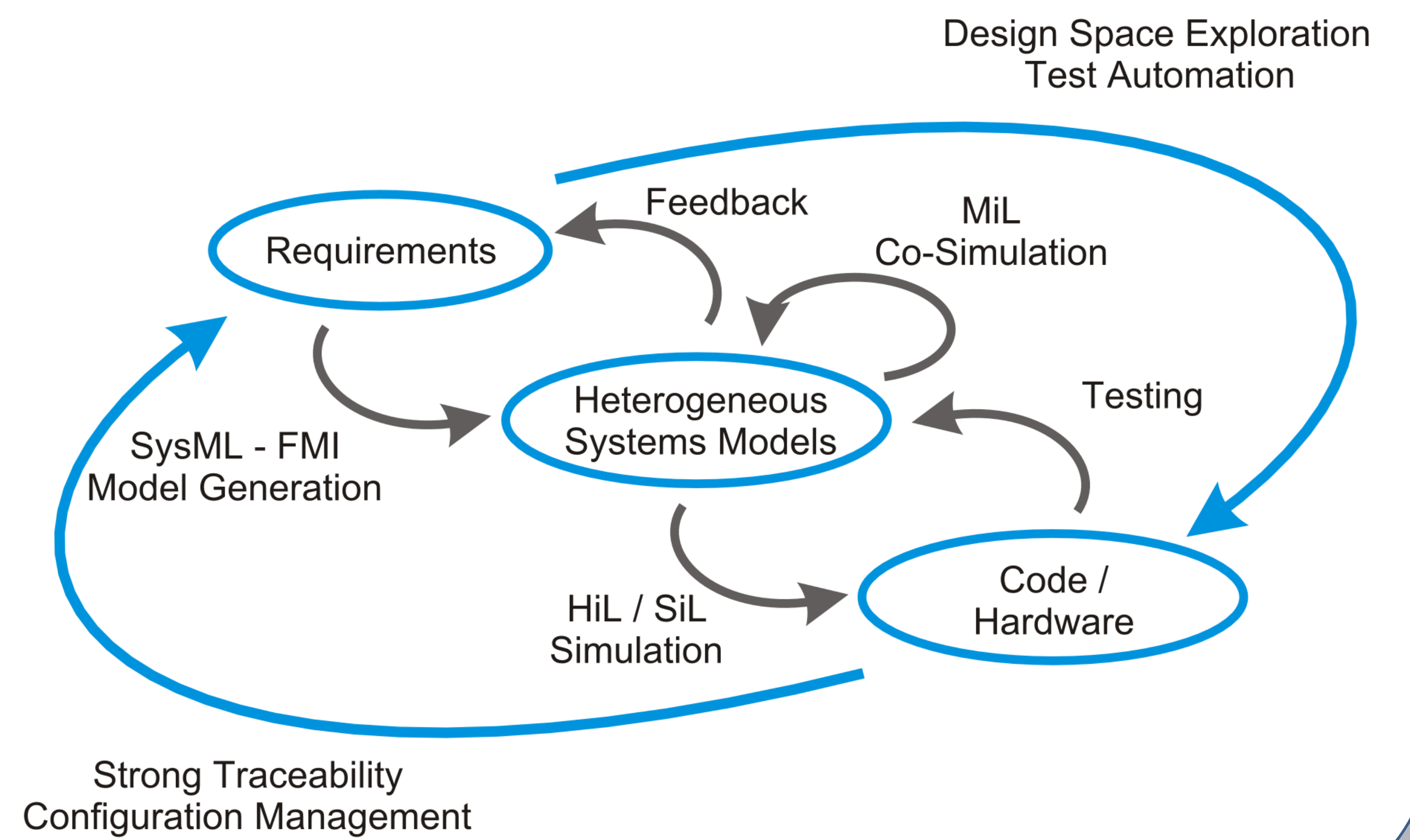
The tool chain will support:

- multidisciplinary, collaborative CPS modelling from **requirements**, through **design**, to **realisation**;
- **traceability** at all stages of the development;
- **holistic CPS modelling**, allowing models to be built and analysed not possible using standalone tools

The tool chain will provide powerful analysis techniques for CPSs, including: **connection to SysML**; **model checking**; **Hardware-in-the-Loop (HiL)** and **Software-in-the-Loop (SiL)** simulation; **code generation**; **Test Automation (TA)** and **Design Space Exploration (DSE)**.

The tool chain will be underpinned by **well-founded semantic foundations** ensuring analysis results can be trusted, and a comprehensive set of **method guidelines**, lowering entry barriers for CPS development.

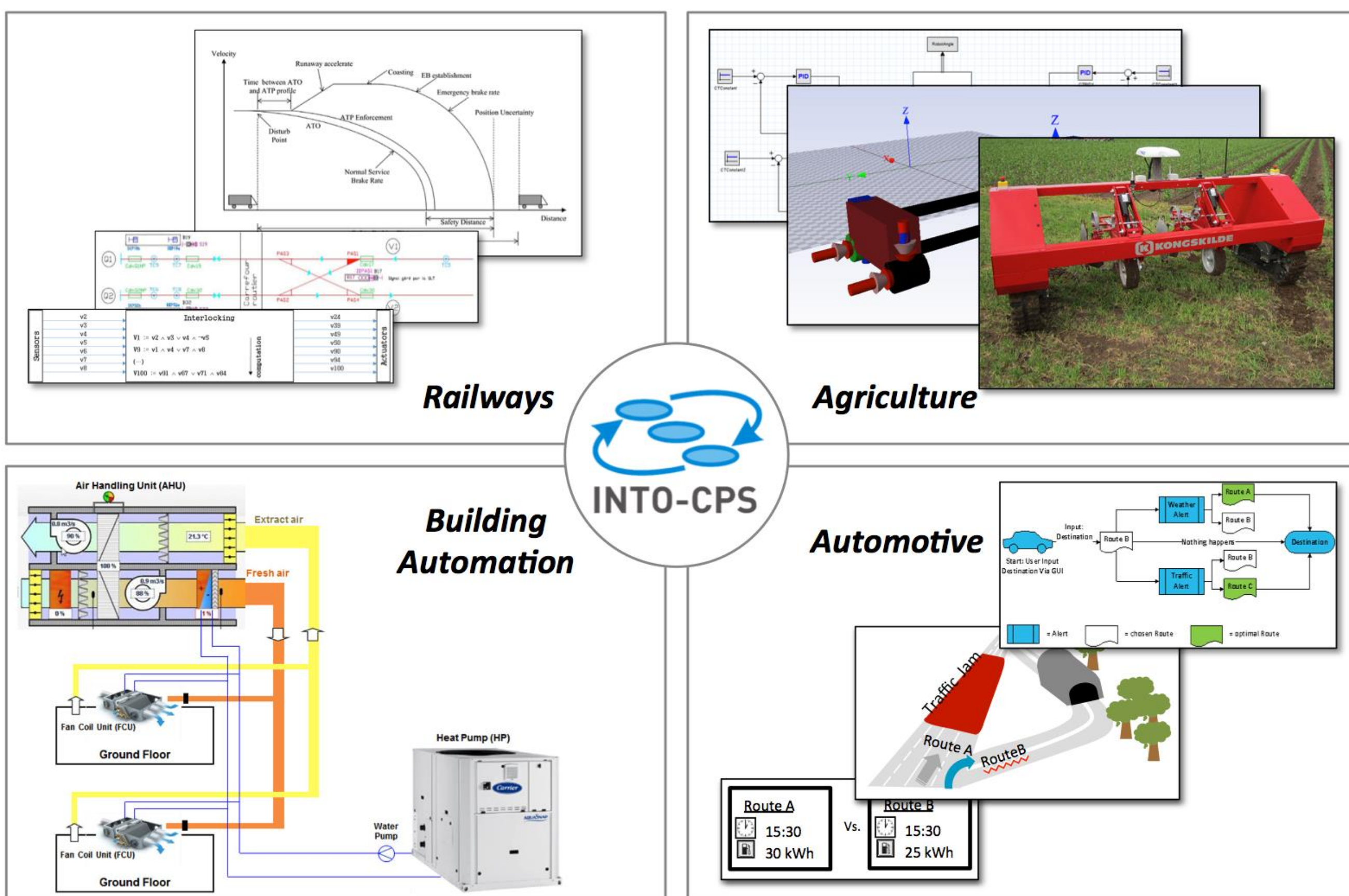
Connections in the INTO-CPS Tool Chain



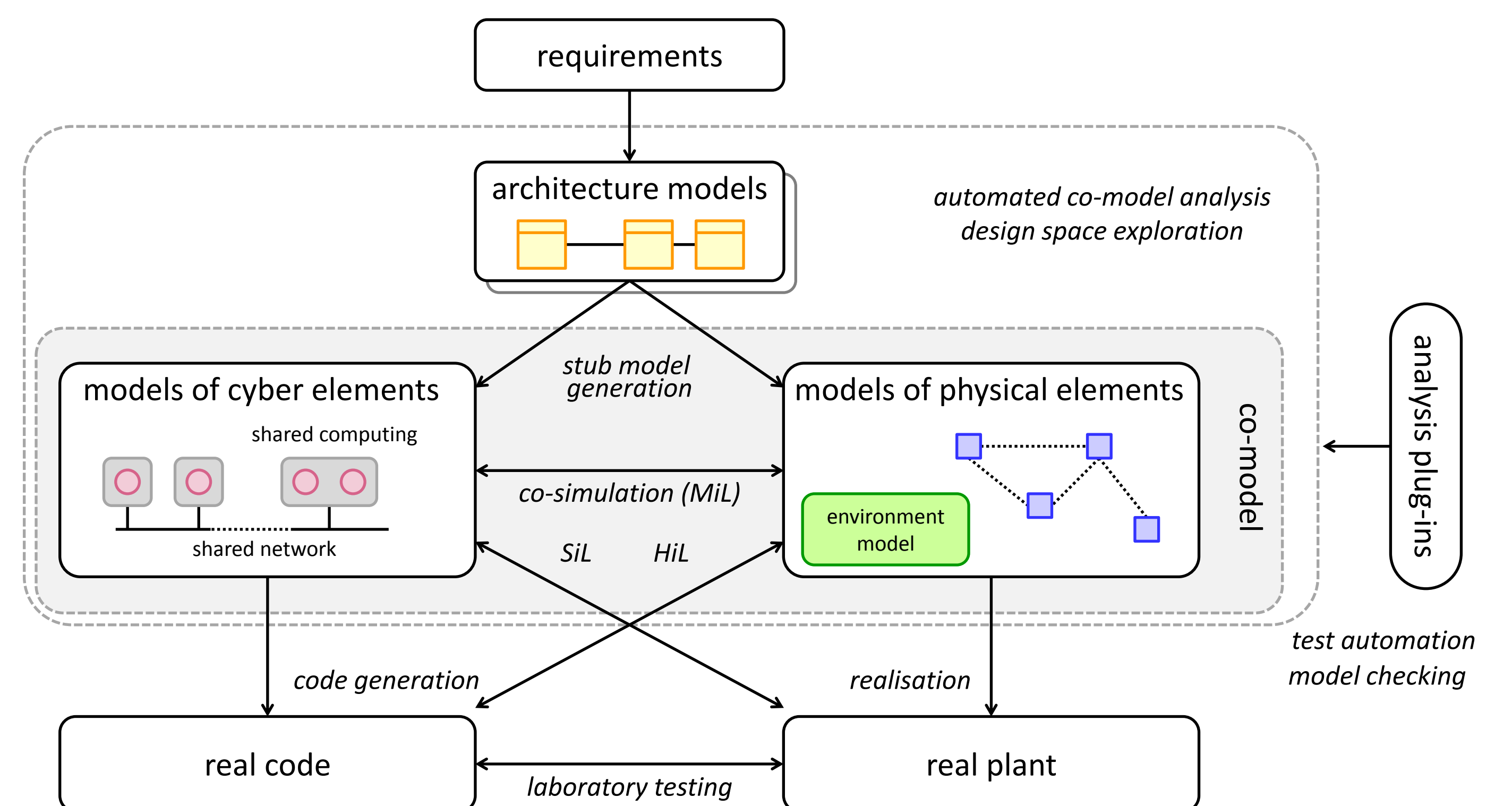
Case Studies

To ensure that the INTO-CPS technology is applicable to as wide a number of value chains as possible, the four case studies have been selected from four distinct domains: **railways**, **agricultural**, **building automation** and **automotive**. The focus in the execution of the case studies will be the evaluation of the INTO-CPS technology.

They are all different by nature with different **technical objectives** (distributed railway interlock, ensuring an efficient seeding, running reliable air-cooling facilities, reducing energy consumption and emissions).



The INTO-CPS Architecture



Interest Follower Group Members

- AGCO, Denmark
- Alcatel-Lucent, Ireland
- Almende, Netherlands
- Altran, UK
- Bachmann Electronic, Netherlands
- Bakker Sliedrecht Electro Industrie, NL
- Bombardier, Germany
- Carrier, France
- CeTIM, Netherlands
- Chemring Technology Solutions, UK
- Conpleks Innovation, Denmark
- Danish Aviation Systems ApS, DK
- Denso Corporation, Japan
- Dredging International, Belgium
- DSTL, UK
- EDF, France
- ESA, European Space Agency, NL
- Farmertronics BV, Netherlands
- GN Resound, Denmark
- Goodrich, UK
- Grundfos, Denmark
- HMF, Denmark
- Huisman Equipment, Netherlands
- Irmato Industrial Solutions, NL
- Jaguar, UK
- MAN Diesel & Turbo, DK
- National Institute of Informatics, JP
- Onera, France
- Polar Electro, Switzerland
- Rockwell-Collins, France
- Rolls-Royce plc, UK
- Seluxit, Denmark
- Siemens, Sweden
- Terma, Denmark
- Thales, France
- TTTech Computertechnik, Austria
- UTC Aerospace Systems, UK
- West Consulting, Netherlands

INTO-CPS Baseline Technologies



Acknowledgements & Contact Details

Newcastle Lead: Professor John Fitzgerald
 CT modelling/DSE/Traceability: Dr Carl Gamble
 Architecture modelling: Dr Richard Payne
 DE modelling/Workflows: Dr Kenneth Pierce

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