

# Integrated Tool Chain for Model-based Design of Cyber-Physical Systems: INTO-CPS



Coordinator: Professor Peter Gorm Larsen  
Department of Engineering, Aarhus University



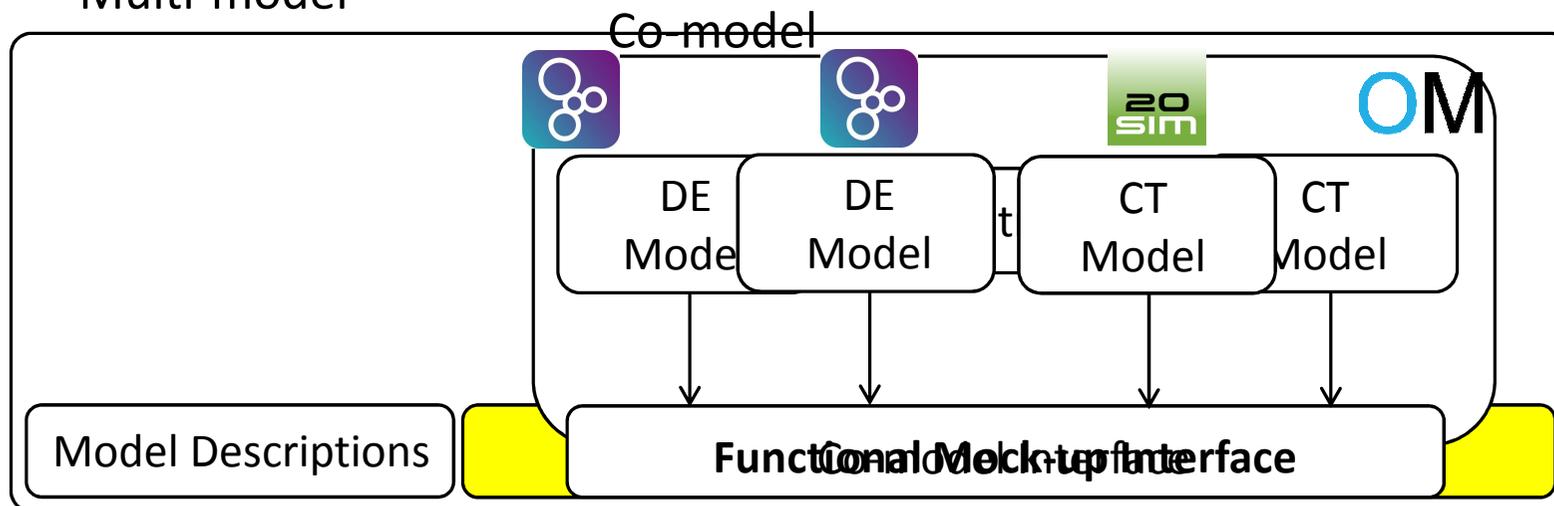
Linköping University



# Co-modelling to Multi-modelling



Multi-model



**Modelio**

SysML  
modelling



**Overture**

Discrete-event  
modelling



**20-sim**

Continuous-time and physical-  
systems modelling



**OpenModelica**



**Crescendo**

Co-simulation solutions



**TWT**

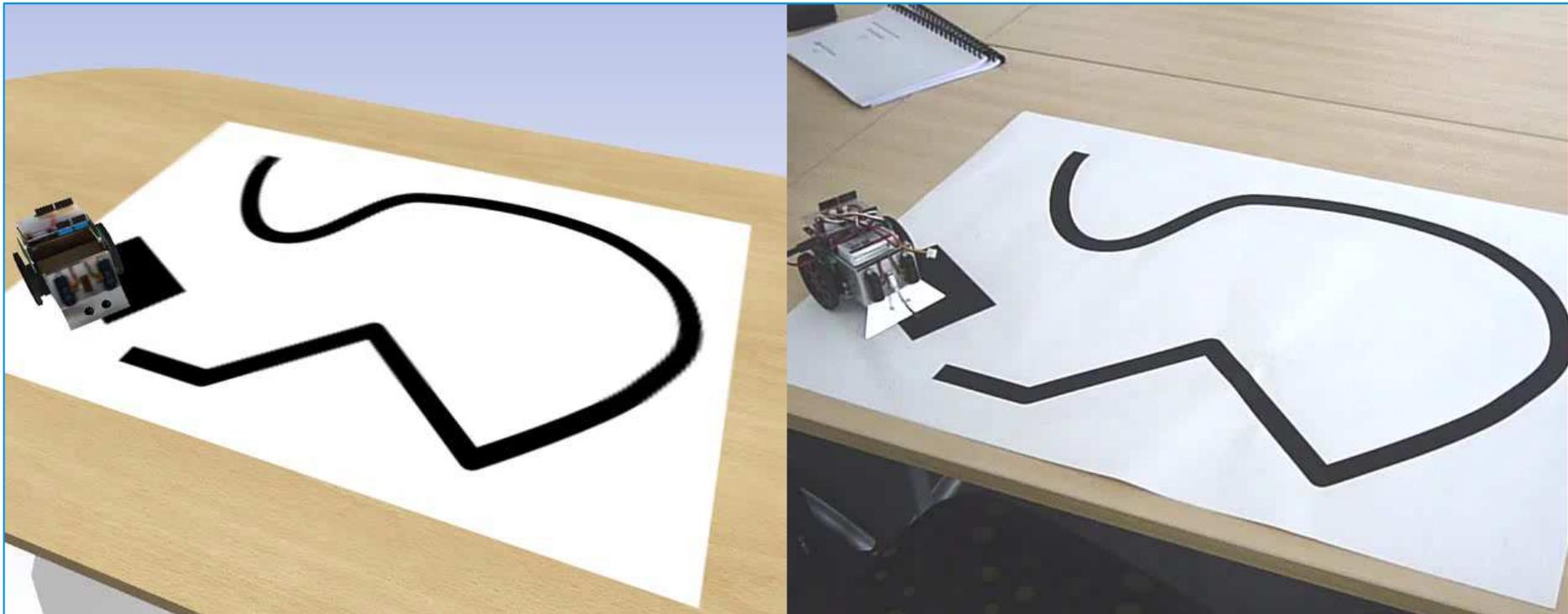
**TWT Engine**



**RT-Tester**

Test automation /  
model checking

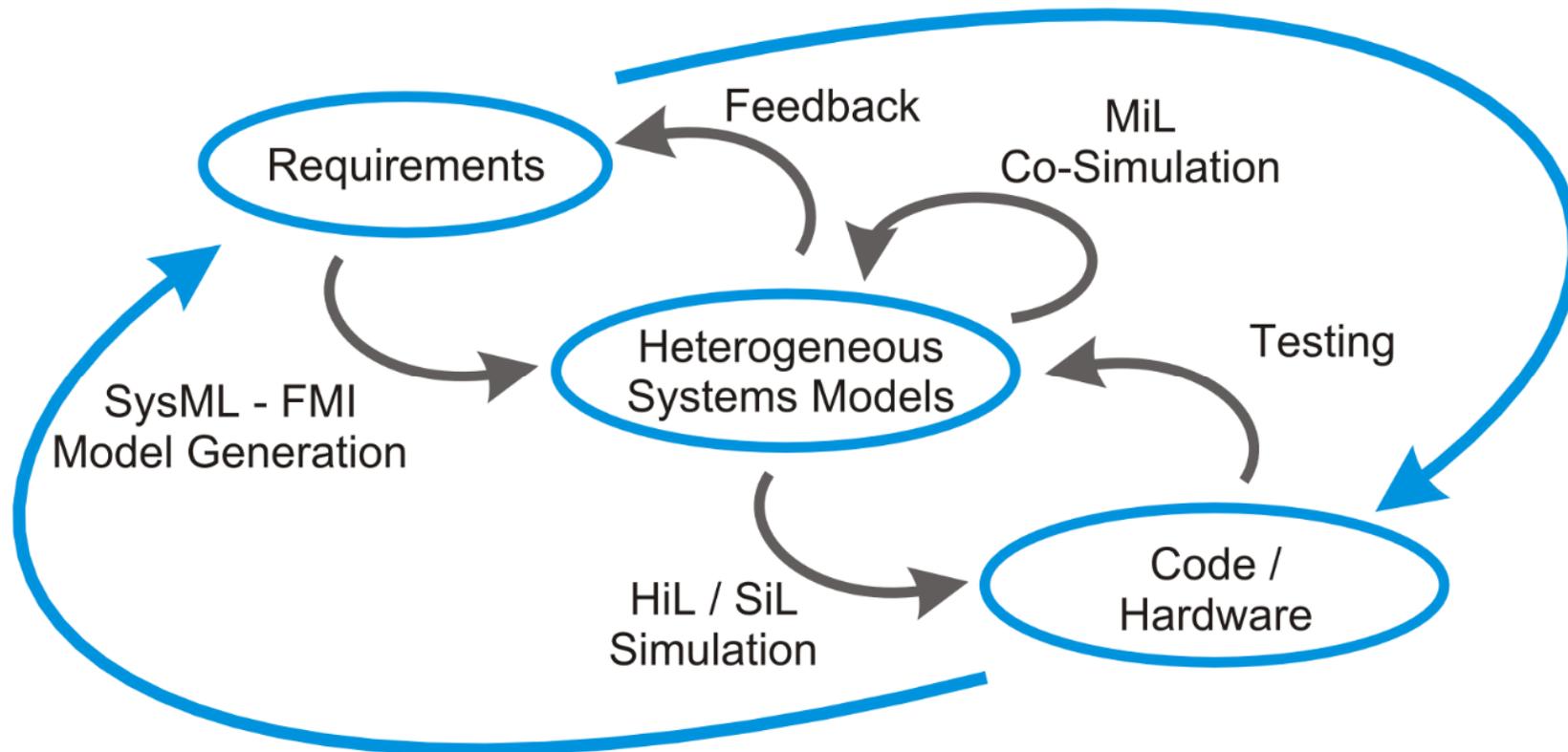
# Comparing Co-model Outputs



# A New Toolchain for CPS Design

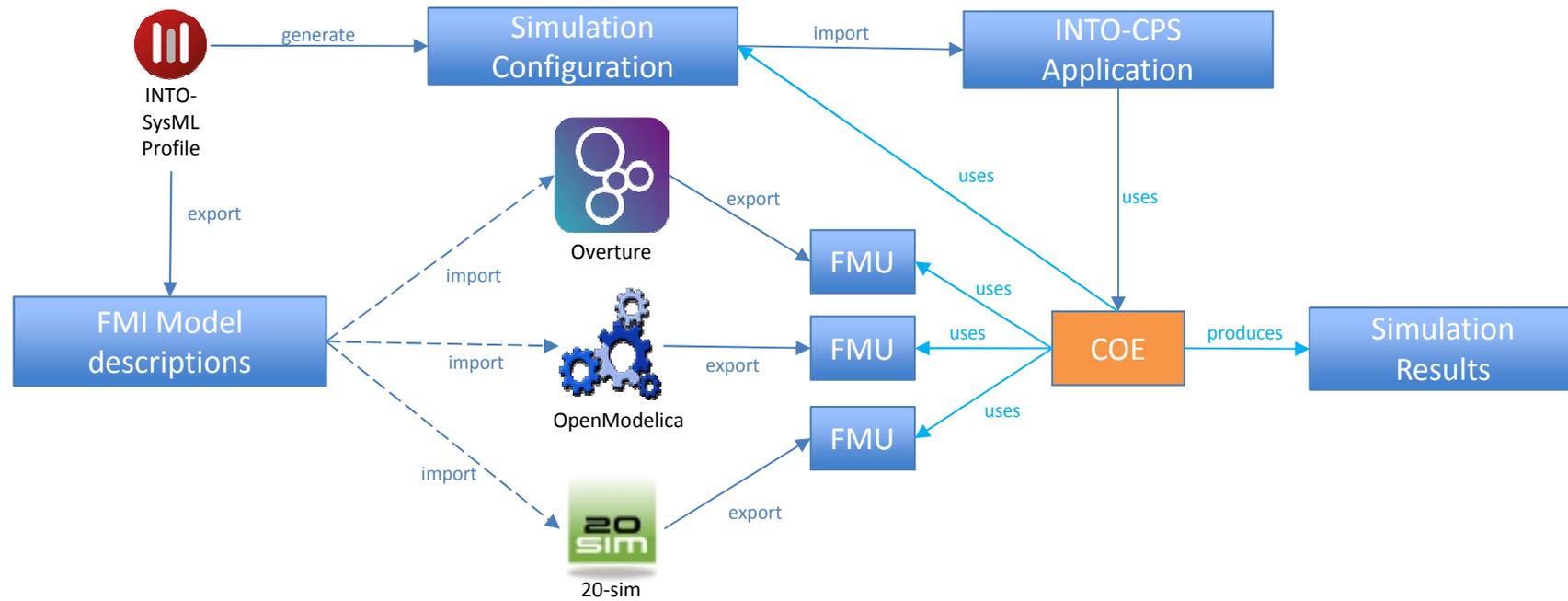


Design Space Exploration  
Test Automation

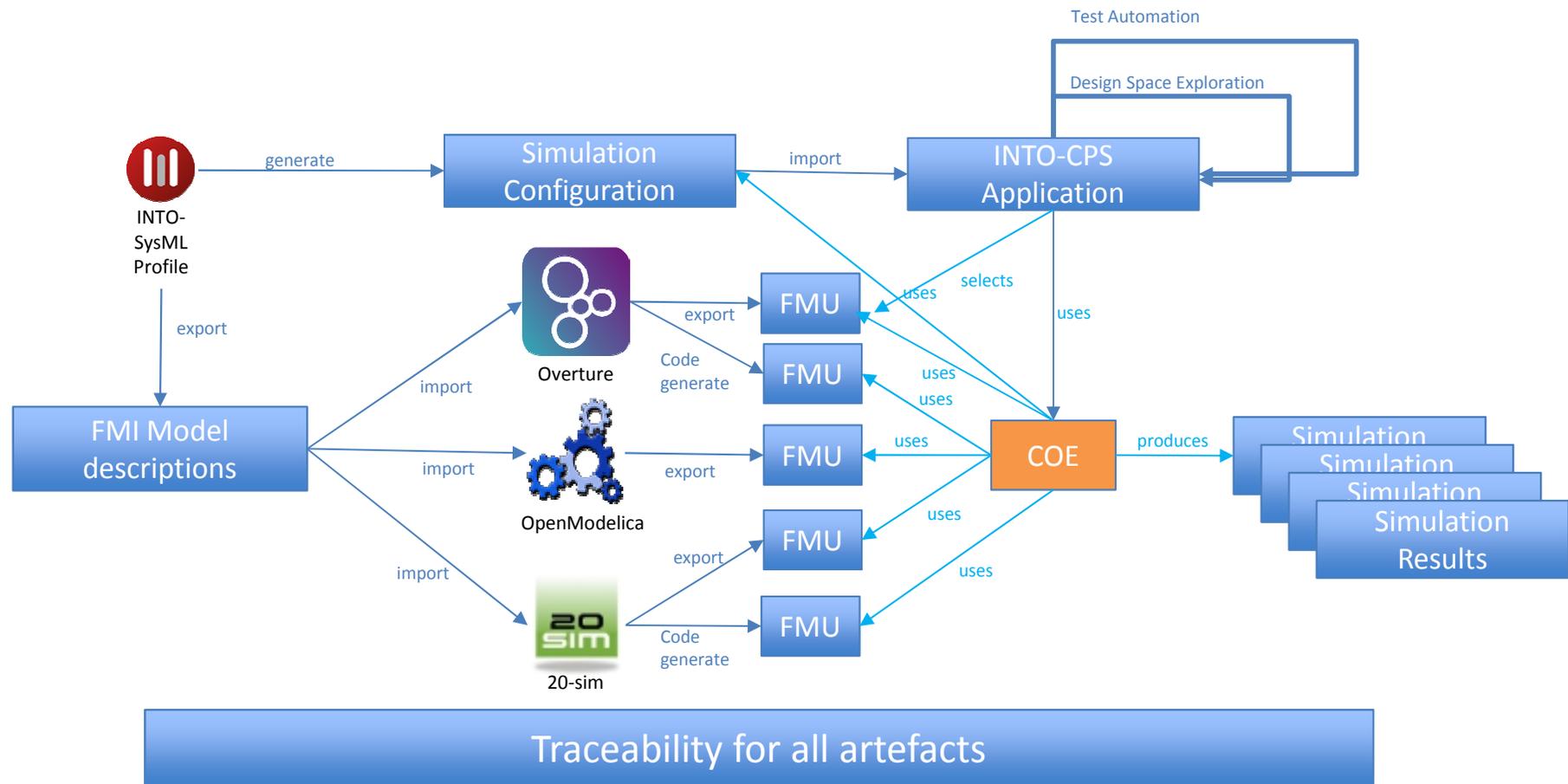


Strong Traceability  
Configuration Management

# Current INTO-CPS Tool Chain

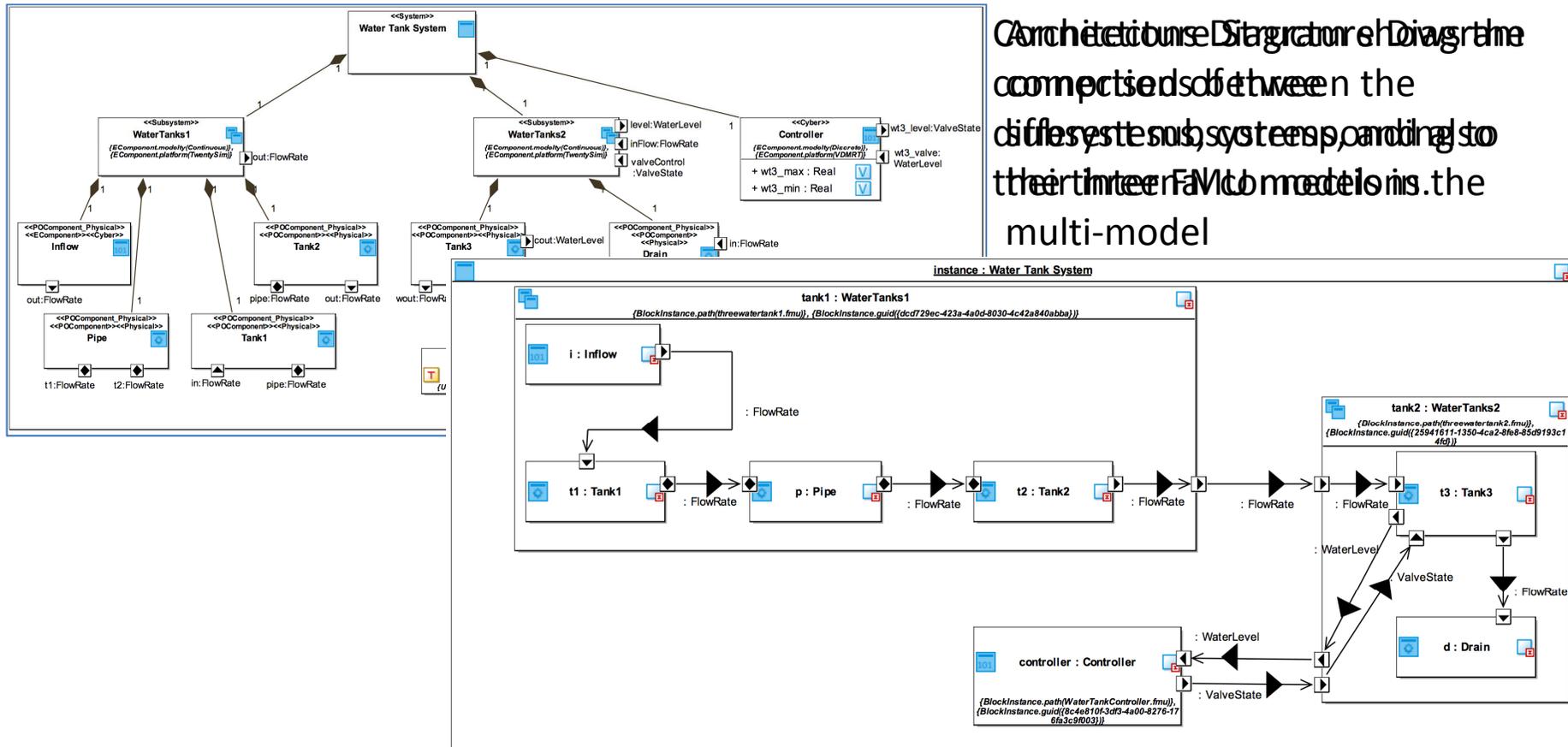


# Future INTO-CPS Tool Chain



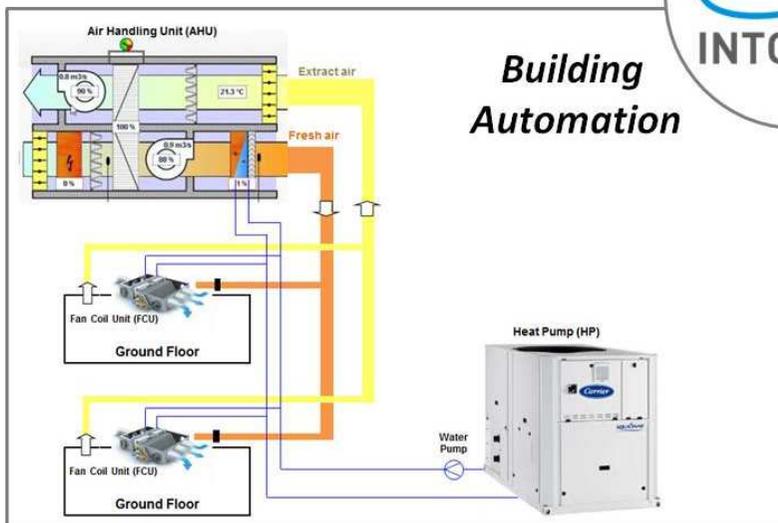
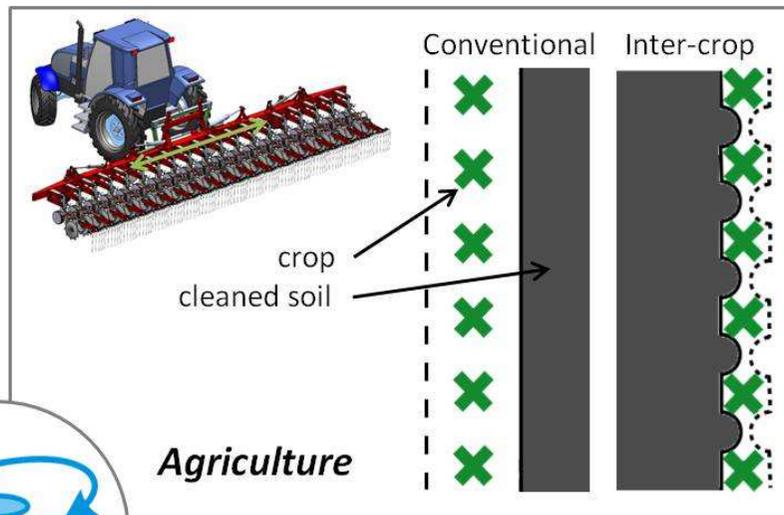
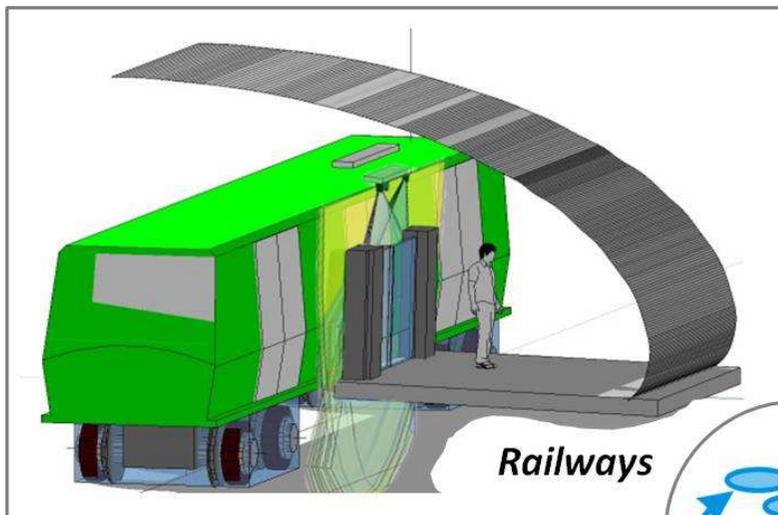
# INTO-CPS SysML CPS Profile

- Three-tank Water Tank : INTO-CPS technology
  - Design architecture using INTO-CPS profile

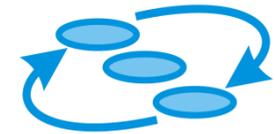


Architecture Diagram shows the connections between the different subsystems according to the inter-FA models in the multi-model

# Industrial Case Studies



# Industrial Follower Group

**INTO-CPS**

AGCO, DK

Alcatel Lucent, Ireland

Almende, NL

Altran, UK

Bachmann Electronic, NL

Bakker-Sliedrecht, NL

Bang&amp;Olufsen, DK

Bombardier, Germany

Bosch, Germany

Carrier, France

CeTIM, NL

Chemring Technology, UK

Compleks Innovation, DK

Danish Aviation, DK

Denso Corporation, Japan

Dredging International, BE

DSTL, UK

EDF, France

European Space Agency, NL

Farmertronics, NL

Goodrich, UK

Grundfos, DK

GN Resound, DK

Holonix, Italy

HMF, DK

Huisman Equipment, NL

IBM, Israel

Ikergune, Spain

Inestec, Portugal

Irmato, NL

Jaguar, UK

MAN Diesel &amp; Turbo, DK

MFAtch, UK

NII, Japan

ONERA, France

Polar Electro, CH

Rockwell-Collins, France

Rolls-Royce, UK

Santer Reply, Italy

Seluxit, DK

Siemens, Sweden

Tecnalia, Spain

Terma, DK

Thalès R&amp;T, Germany

TTTech, Austria

UTC Aerospace, UK

West Consulting, NL

**In total: 47**

# Kick-off Meeting Participants

