6th UCAAT User Conference on Advanced Automated Testing

ETSI

Integration and evaluation of MBT in a platform based software development process

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TKI Automotive

Agenda

- Presenters Introduction
- Goals
- Challenges:
  - Usage in different platforms
  - Usage in different vehicle types
- Spreading MBT over different V-Model testing stations

Presenters and Authors

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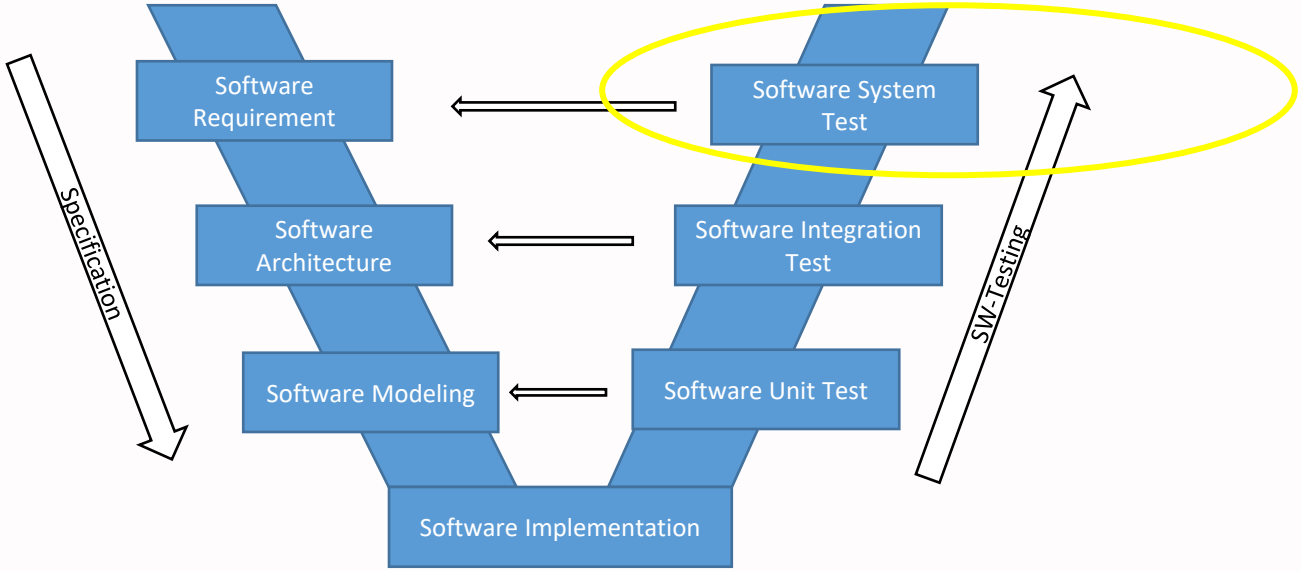
Technical Lead (HiL & Test Automation)

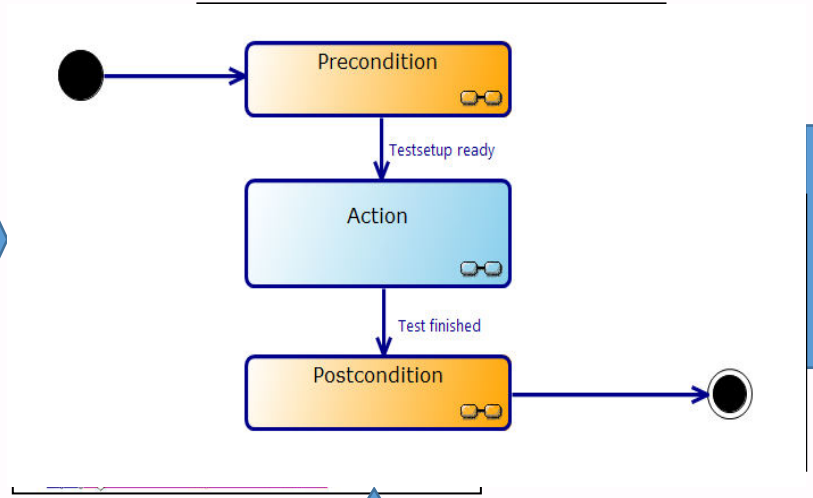
Introducing V-Model for model-based Software Development



Goal

Battery- and Plugin Hybrid electric vehicles (BEV, PHEV)

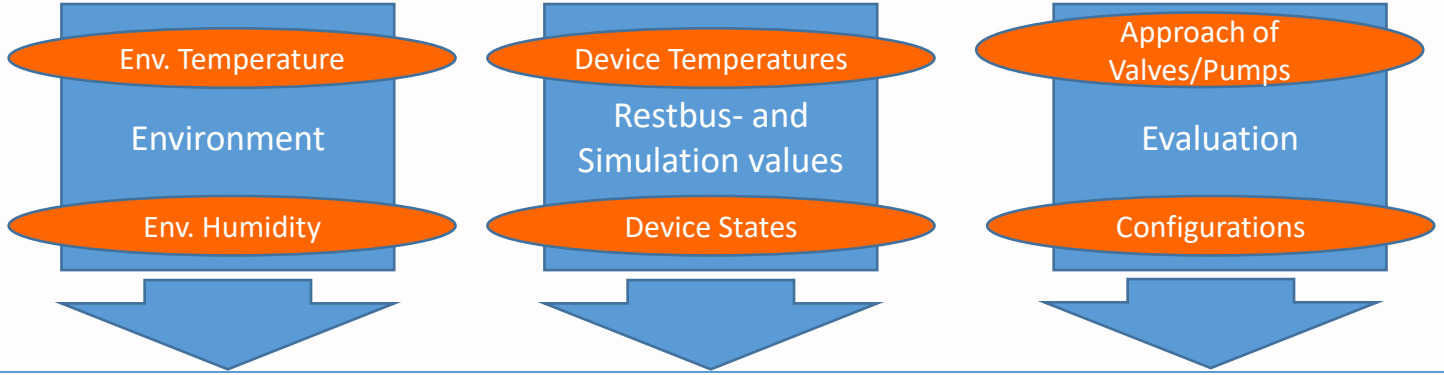
Complex thermal manage-ment systems



Goal

To find synergies in order to use the same MBT usage Model

Hybrid Vehicles Challenge: Multiple Variants



Challenge solved by reading parameter values dynamically from ECU Data sets!!!

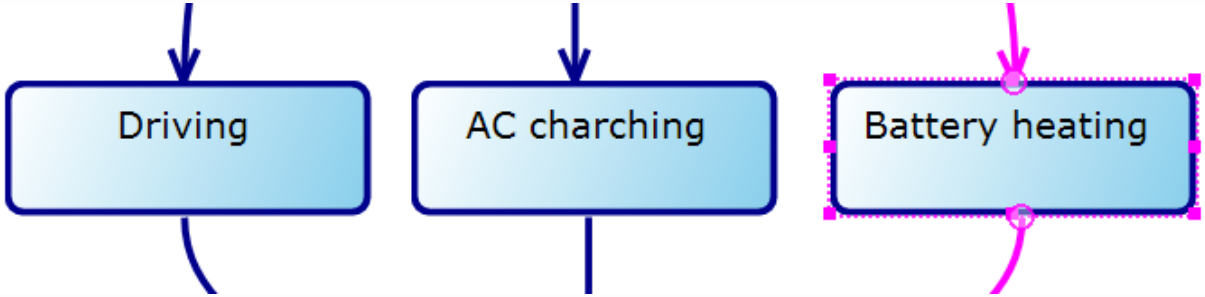
Process

1. Read parameters (e.g. threshold value) via calibration software
2. Parameterize the test globally with these values (e.g. cooling demand)
3. Implement values (e.g. temperatures, test evaluation) based on the read parameter

Challenge: Plugin Hybrid → Electrical Vehicle

Additional functions should be tested
→ Battery Heating
→ Thermo Management Controller Fault Reaction

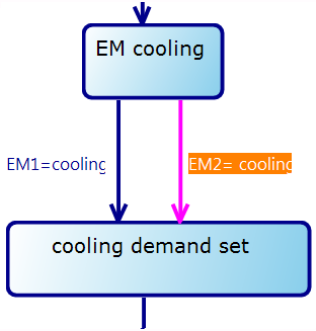
→Extend the Model Structure with new states and transitions



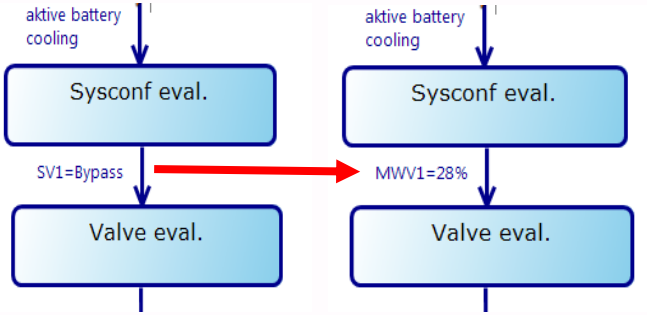
Challenge: Plugin Hybrid → Electrical Vehicle

Additional CAN-Bus, LIN-Bus and ECU internal Signals
→ More Electronical devices
→ Different Systemconfigurations

Precondition>Coolingdemand

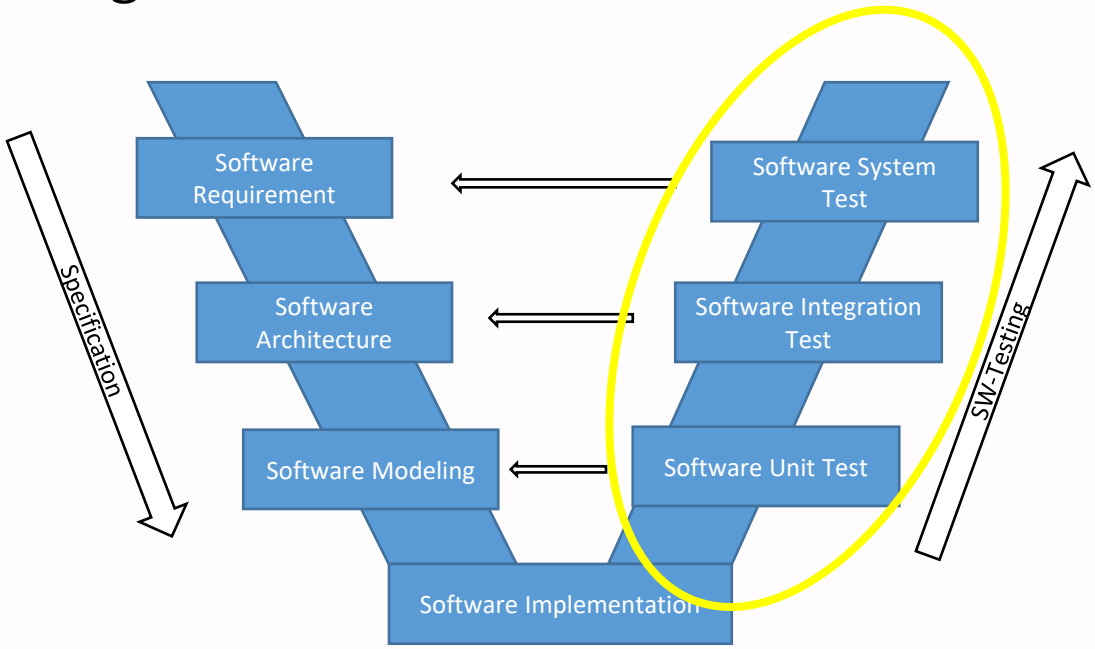


Postcondition>Cooling>Driving

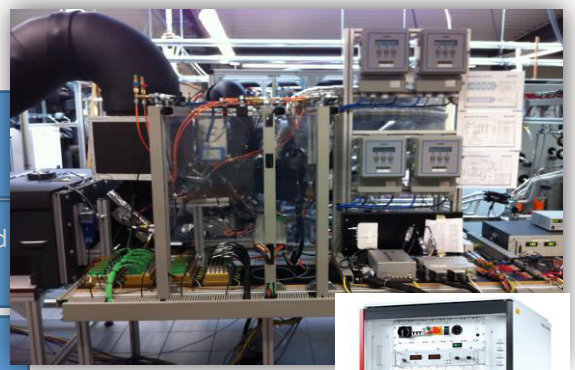


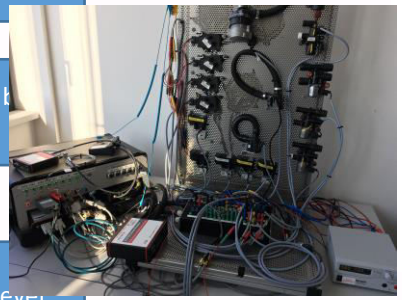
Challenge solved by extending the model to cover all possible variants (Super Set Model)!!!

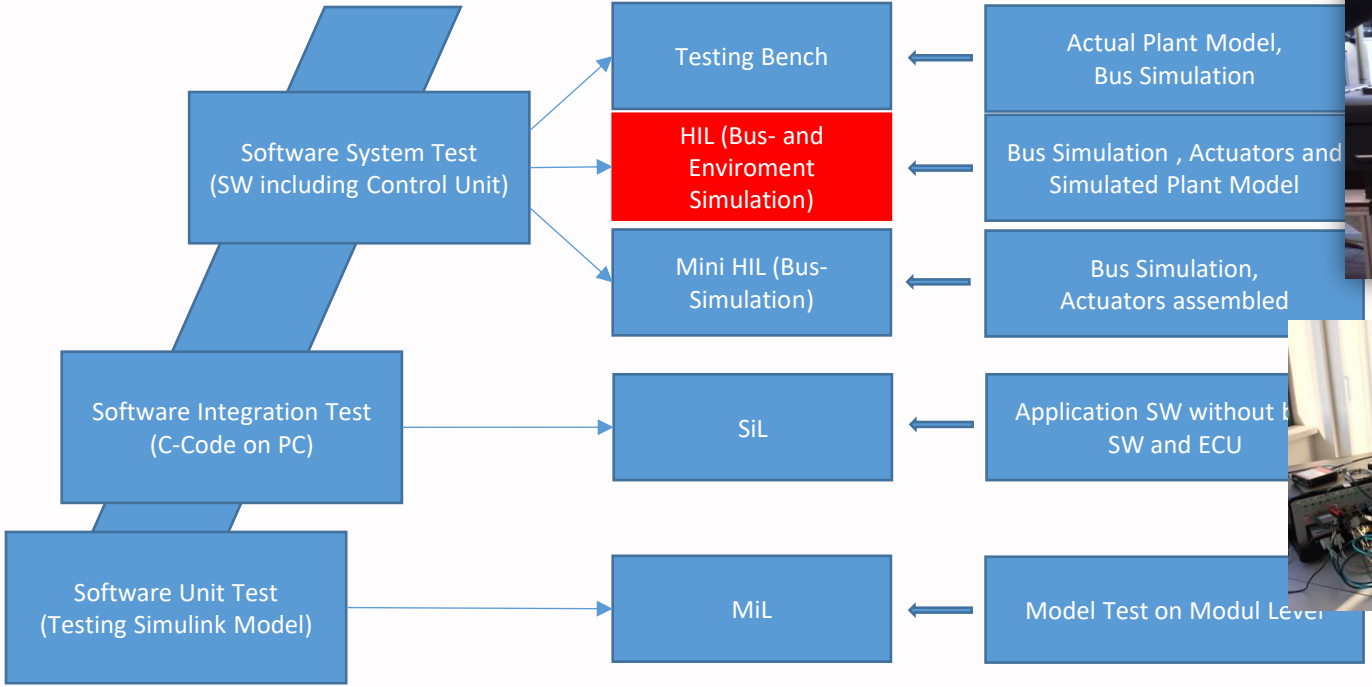
Spreading MBT over different V-Model testing stations



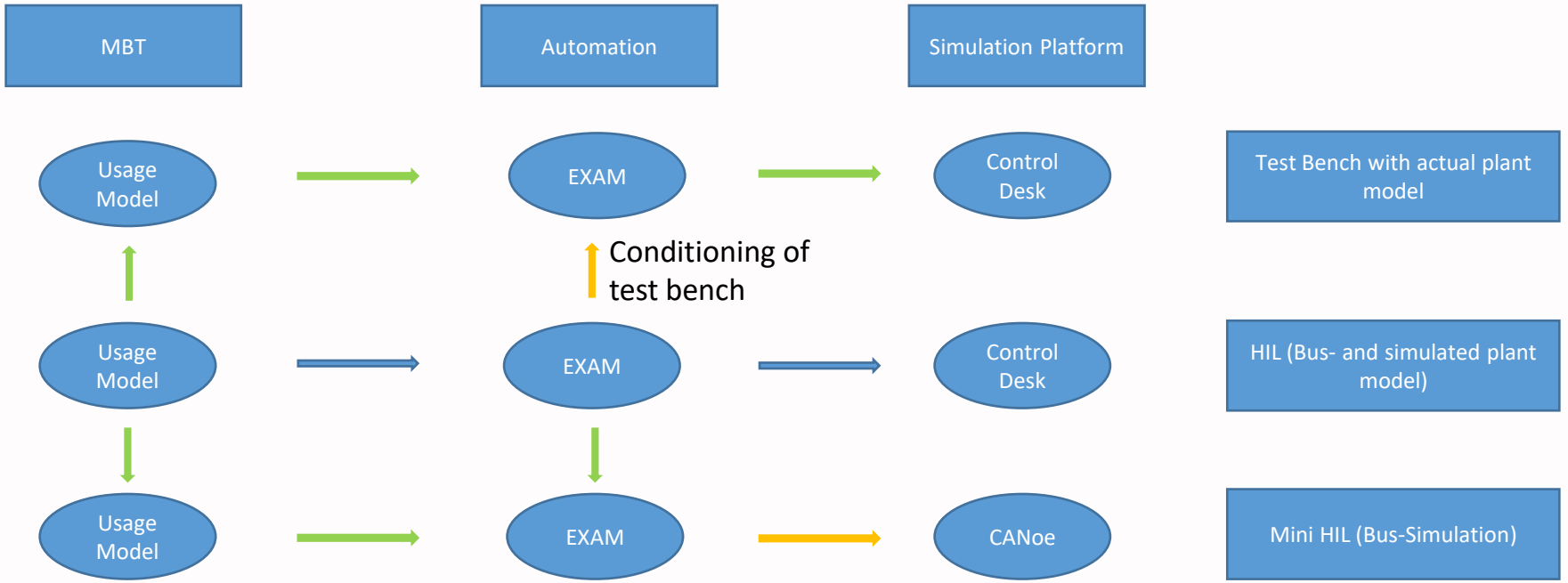
Difference in Testing Level



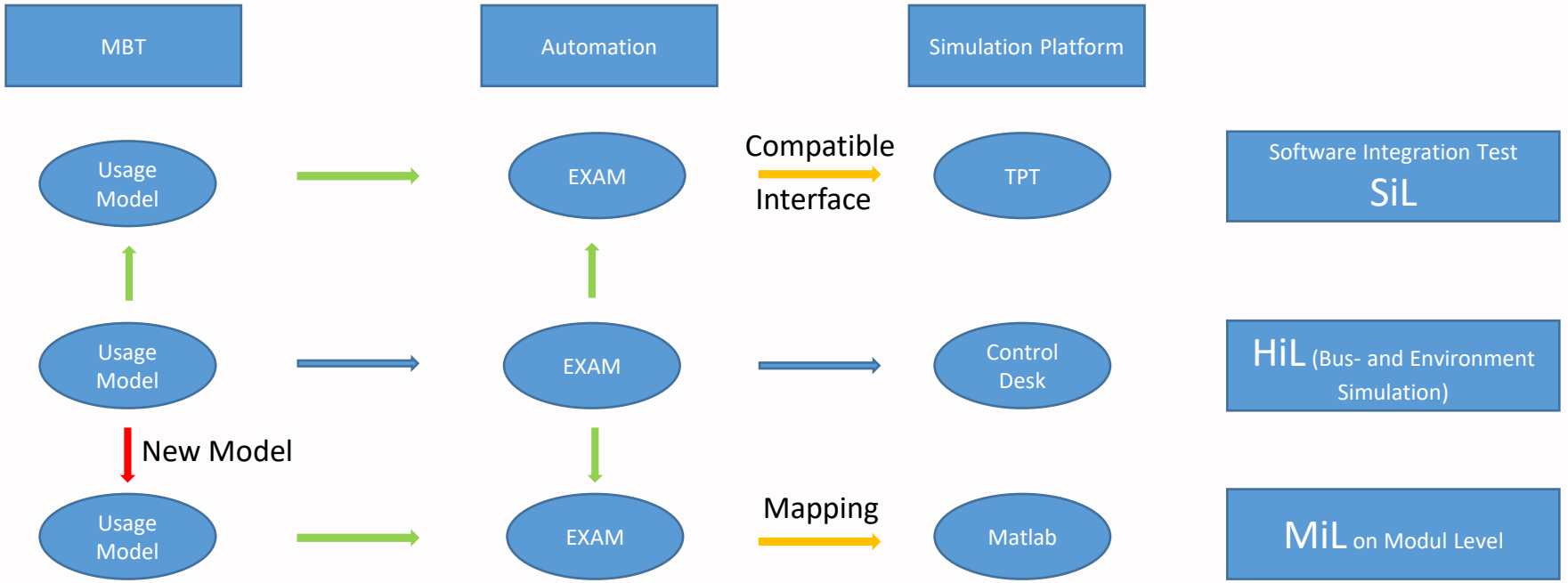




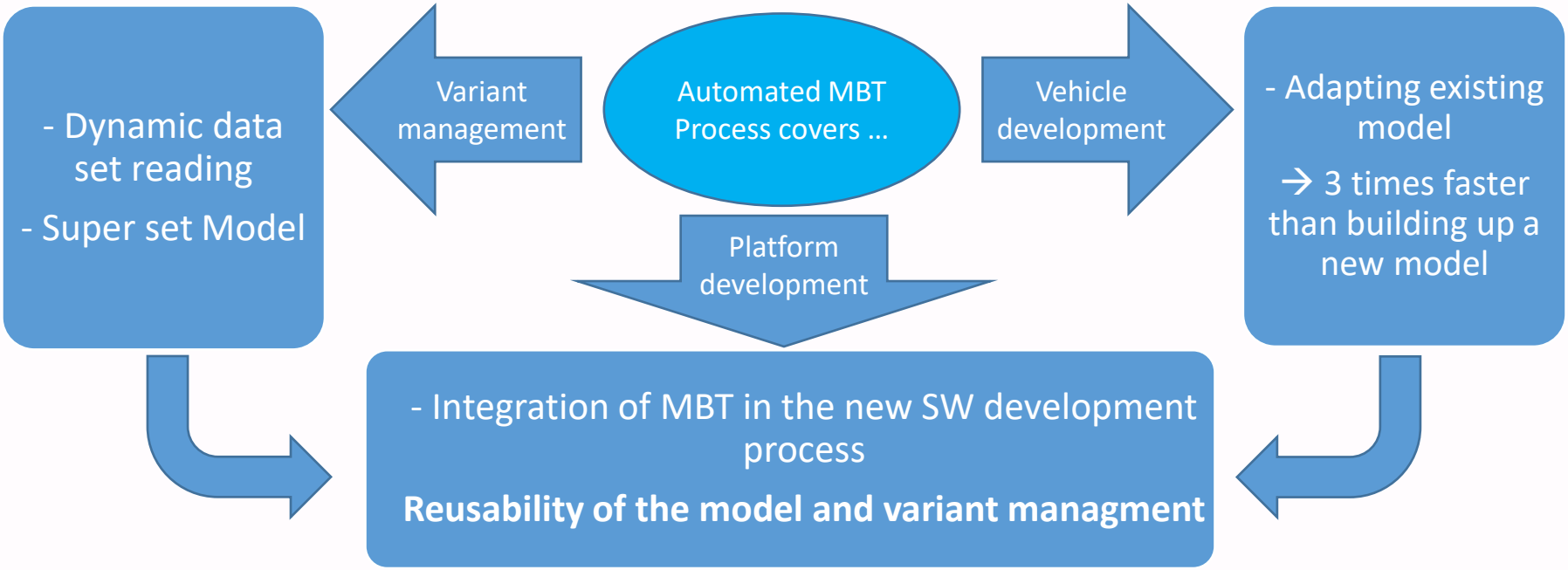
Spreading MBT over all HIL testing levels



Spreading MBT over MiL & SiL testing levels



Summary


- Dynamic data set reading
- Super set Model
Variant management
Automated MBT Process covers …
Vehicle development
- Adapting existing model
→ 3 times faster than building up a new model
Platform development
- Integration of MBT in the new SW development process
Reusability of the model and variant managment

Thank you for your attention!

Q&A Time!

Time for Questions and hopefully also for some Answers…

Special Thanks to our Colleagues from Assystems, Audi (EK-4, EE-I3), dSPACE and Micronova