



Challenges in Model Based Development

Mathworks Automotive Conference

April, 17th 2018

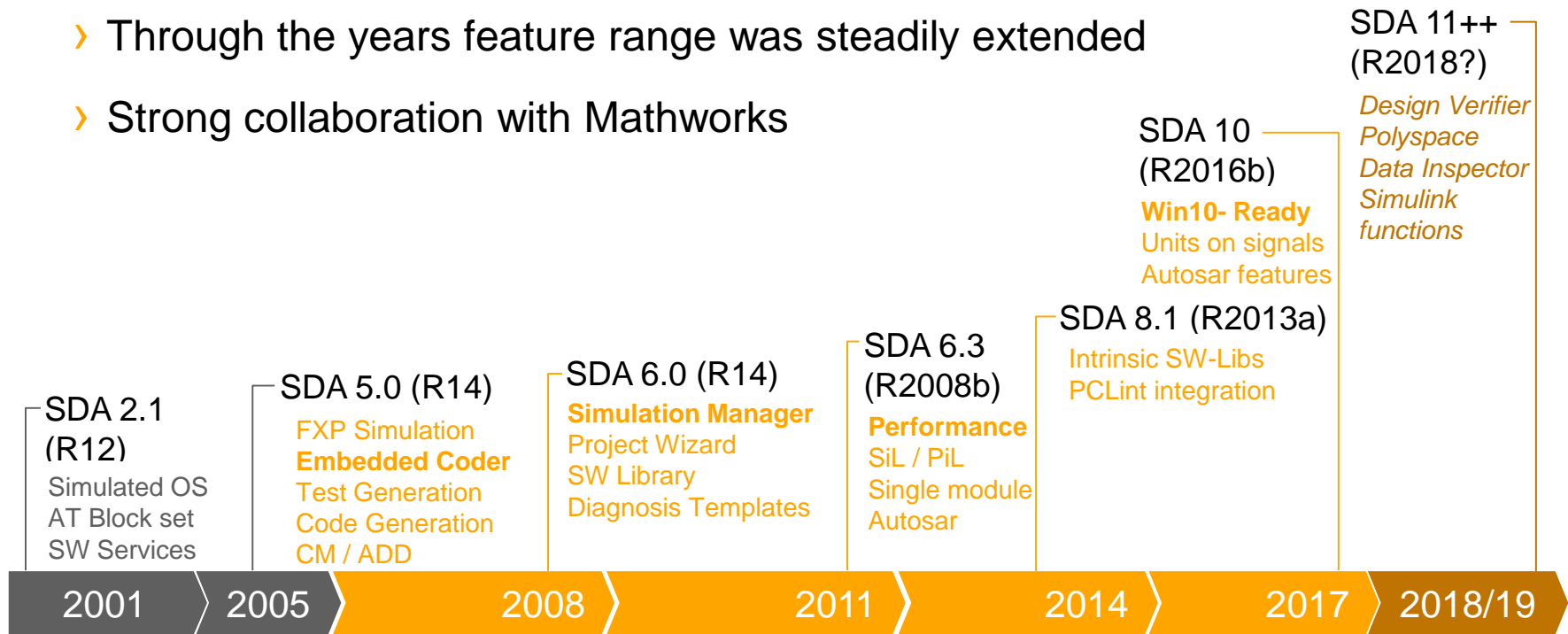
Outline

- › History of Model Based Design at Continental Powertrain Engine Systems
- › System Design Automation (SDA) – our MBD tool chain
- › Future strategy
- › Architecture Centric Development (ACD)
- › From V–Cycle to agile development
- › Conclusion

MBD at Continental Powertrain Engine Systems

With Close Technical Partnership Since 17 Years...

- › First version of System Design Automation (SDA) in 2001
- › Through the years feature range was steadily extended
- › Strong collaboration with Mathworks

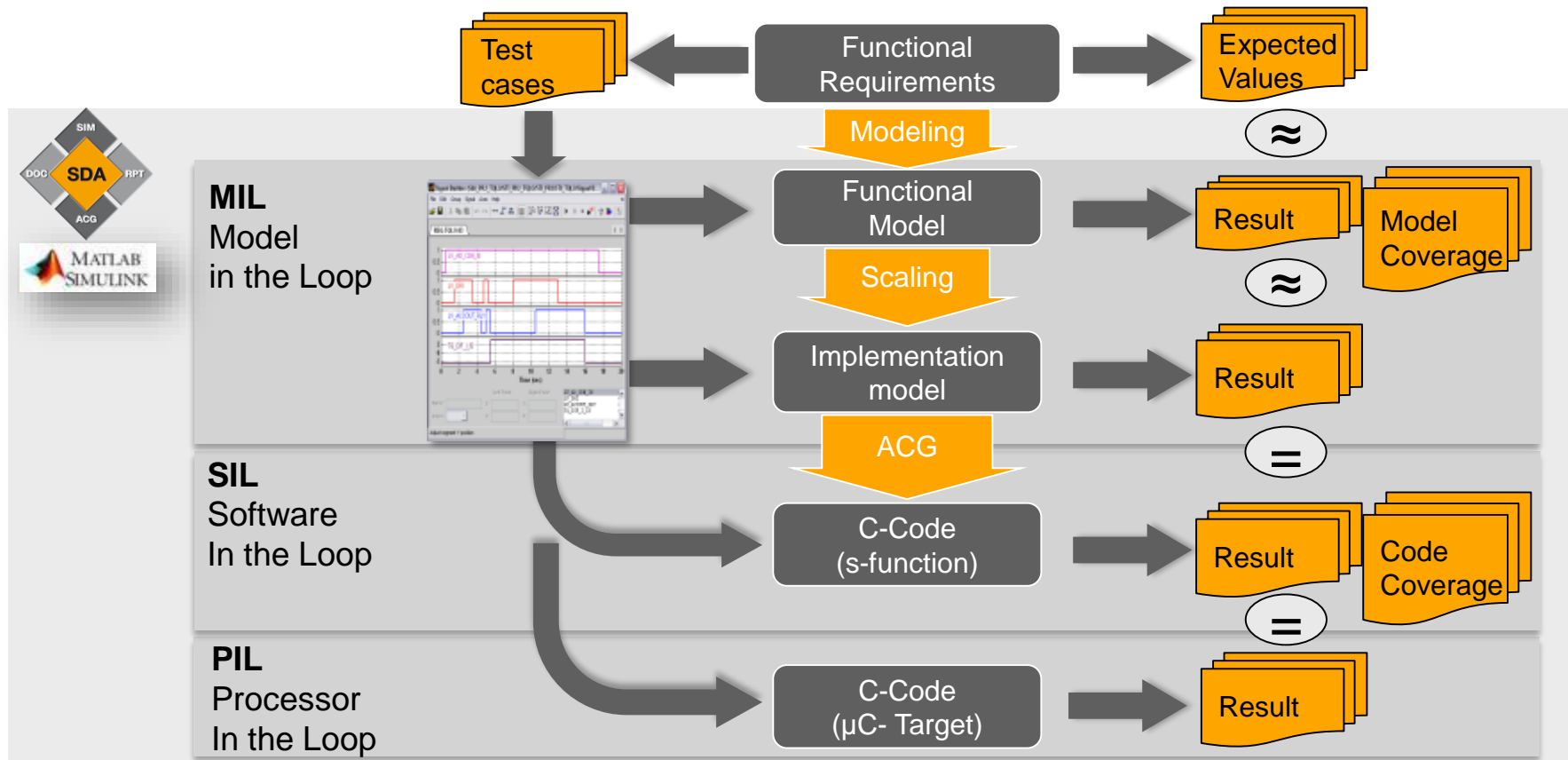


... to increased efficiency and usability



System Design Automation

Guide Easily From Functional Requirements...

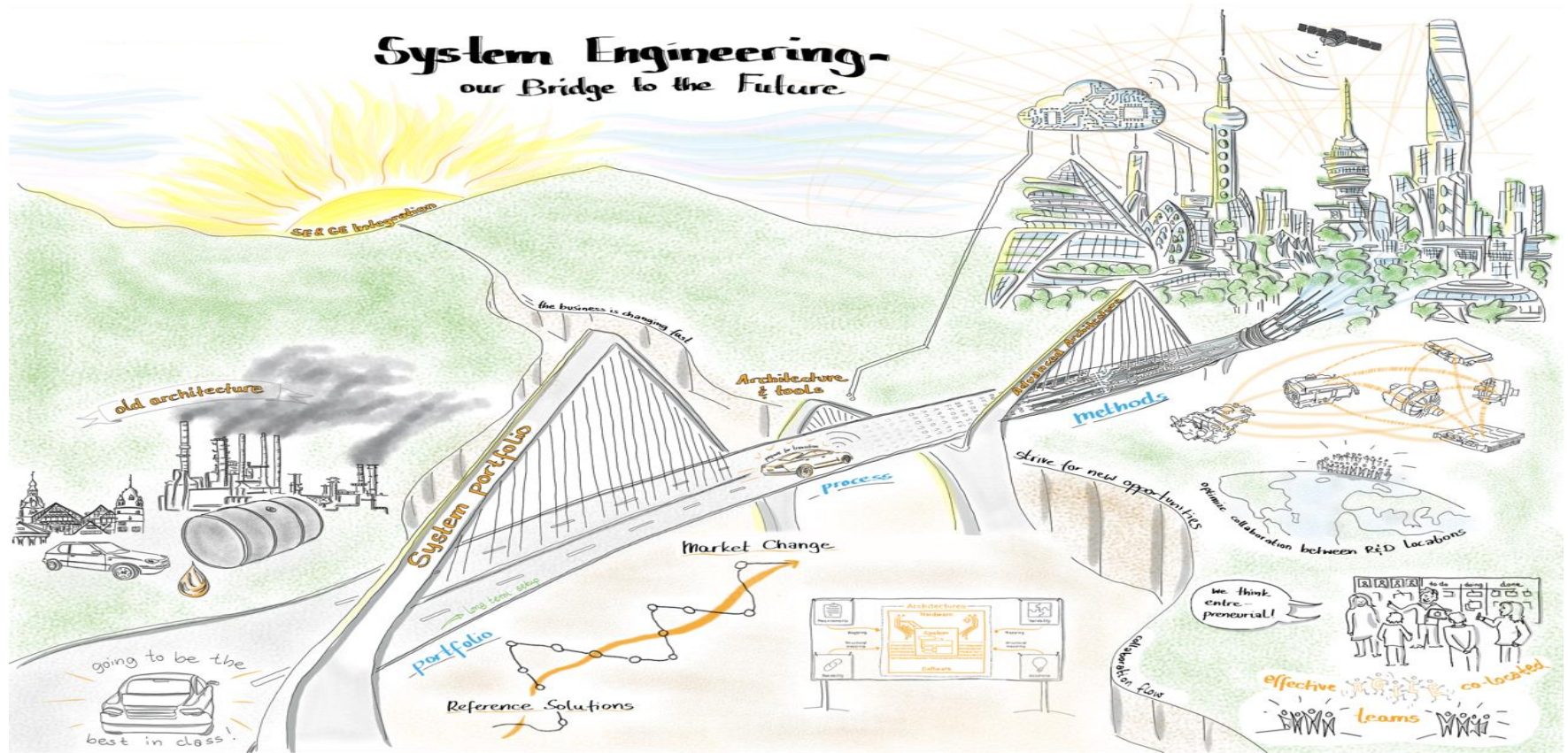


... to validated code in one single integrated environment



System Engineering Strategy

Architecture With Processes, Methods And Tools...



... are the pillars of the bridge to our future



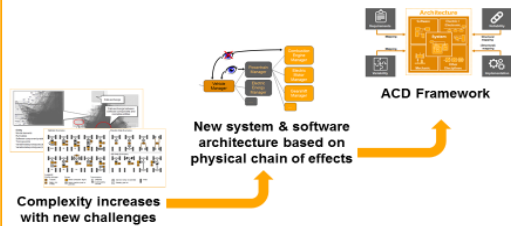
The Next Steps

Establish New Methods...

1) ACD Authoring Framework

Introduction

From Needs for Architecture...



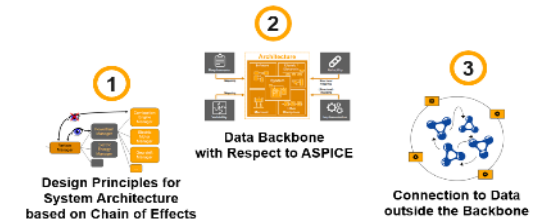
Close the gap from MBSE to MBD

...to the Architecture Centric Development Framework

2) Architecture Design Rules

ACD Framework

The Framework Provides...

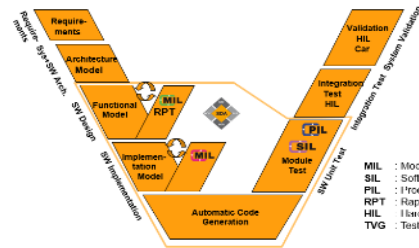


...the Common Boundaries for our Development



Model Based Development Process

Seamless MBD workflow...



Use latest Simulink features

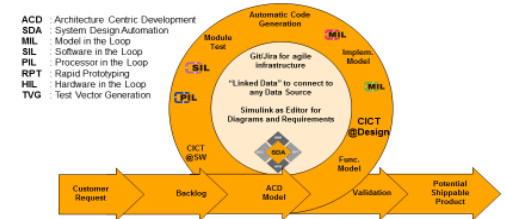
3) Optimize From Classical Process...

... to cope with future challenges

Establish CI/CT already in design phase

Agile Model Based Development Process

Use Matlab Simulink Environment ...



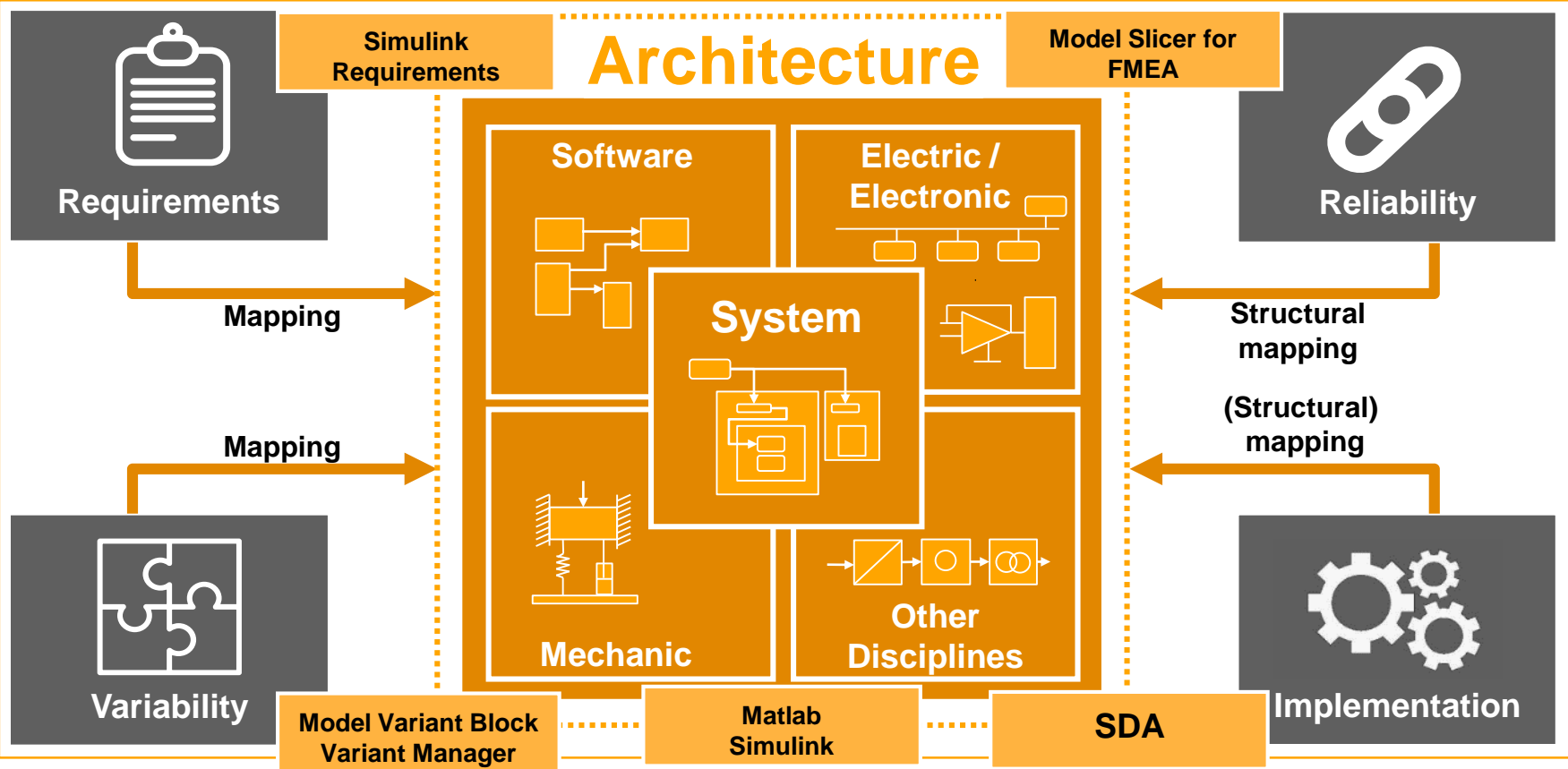
...to Integrate ACD, MBD and Agile Development

... down to Lean Agile Development



Backbone with Intrinsic ASPICE Capability

System Architecture as...

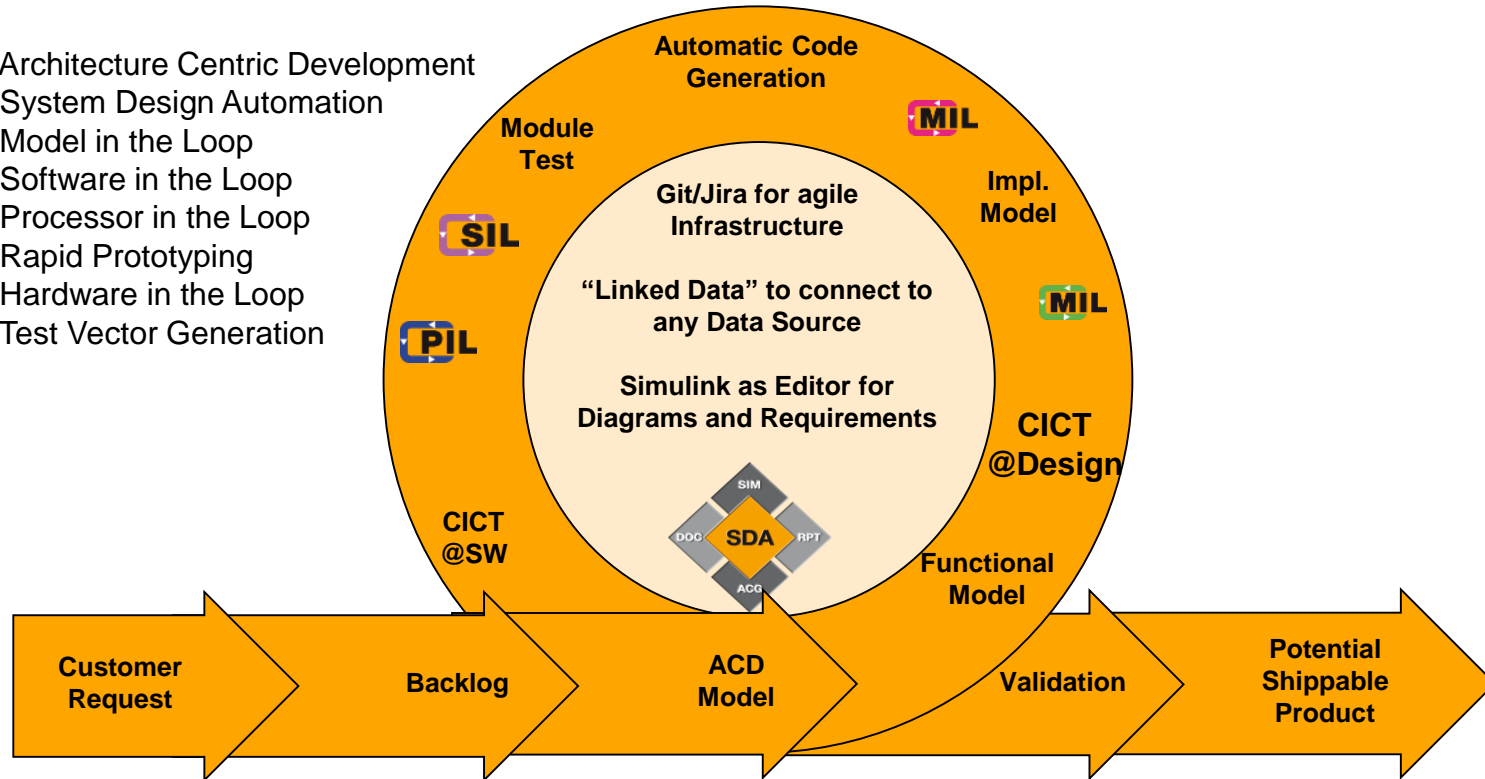


... connecting element for the entire product description 

Agile Model Based Design Process

Use Matlab Simulink Environment ...

- ACD** : Architecture Centric Development
- SDA** : System Design Automation
- MIL** : Model in the Loop
- SIL** : Software in the Loop
- PIL** : Processor in the Loop
- RPT** : Rapid Prototyping
- HIL** : Hardware in the Loop
- TVG** : Test Vector Generation



... to integrate ACD, MBD and agile development



Conclusion

Feature Extensions And Tool Improvements Needed...

- › Seamless tool chain for Model Based Design established
- › Future task:
 - › Extend area of application to Systems Engineering and architecture
 - › Introduce concept of Architecture Centric Development
 - › Integrate agile methods for Model Based Design
- › For these tasks we need extended and modern features towards
 - › System architecture
 - › Decentralized CM systems
 - › Integration with Continuous Integration (CI) and Test (CT)

... to efficiently master future challenges



Thank you
for your attention!