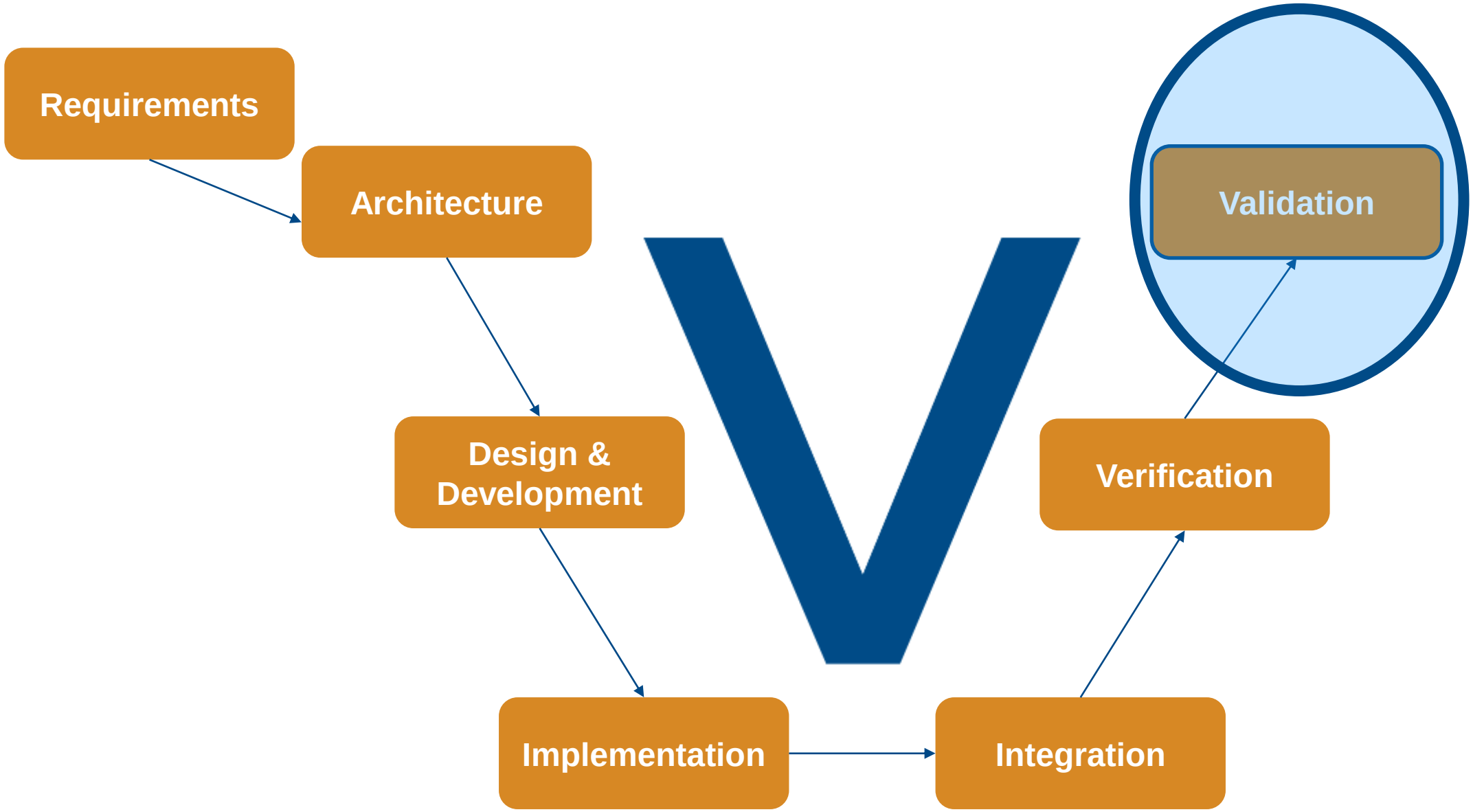
MathWorks
AUTOMOTIVE CONFERENCE 2022
North America

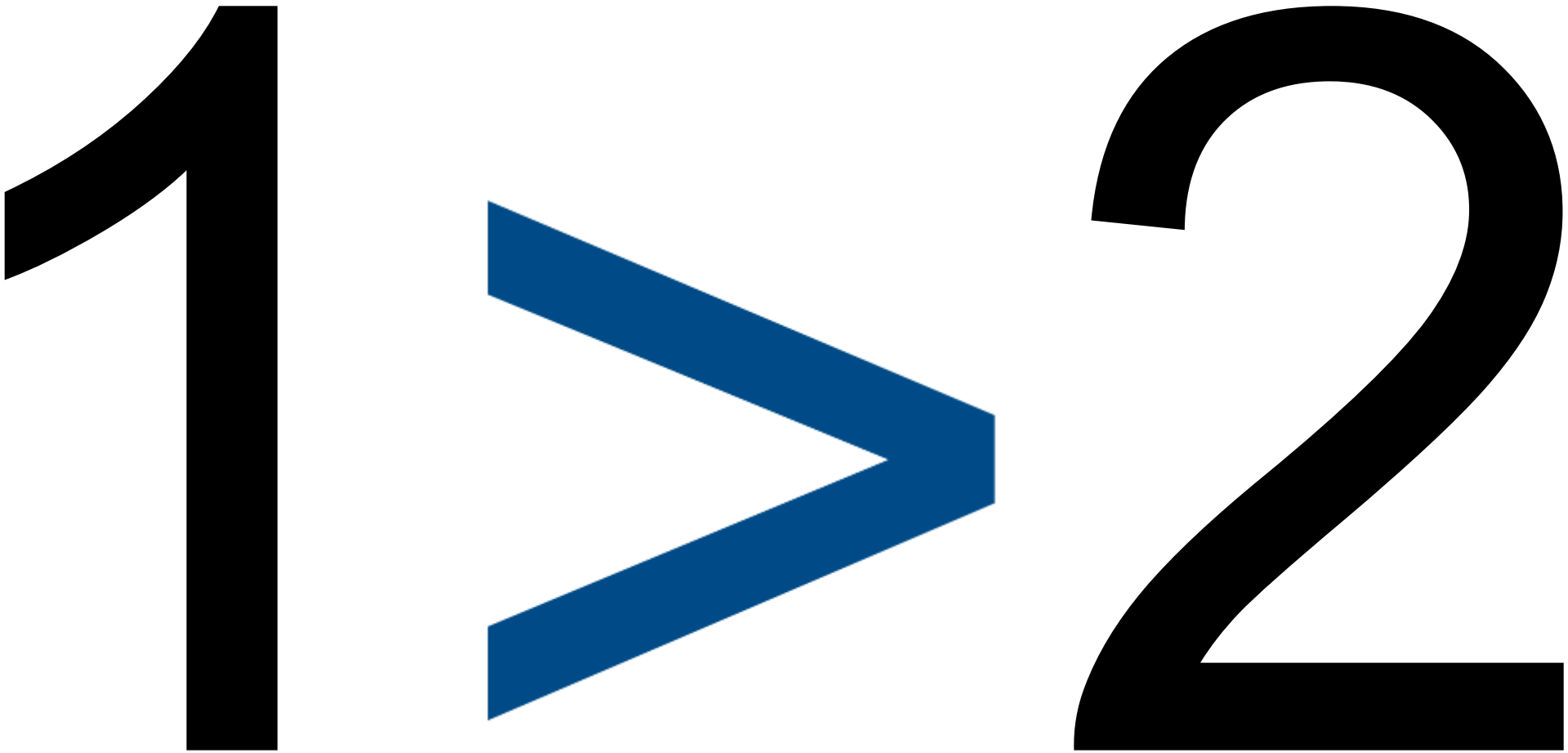
Turning the Tables on Validation with Agile Model-Based Design

Jim Ross, MathWorks

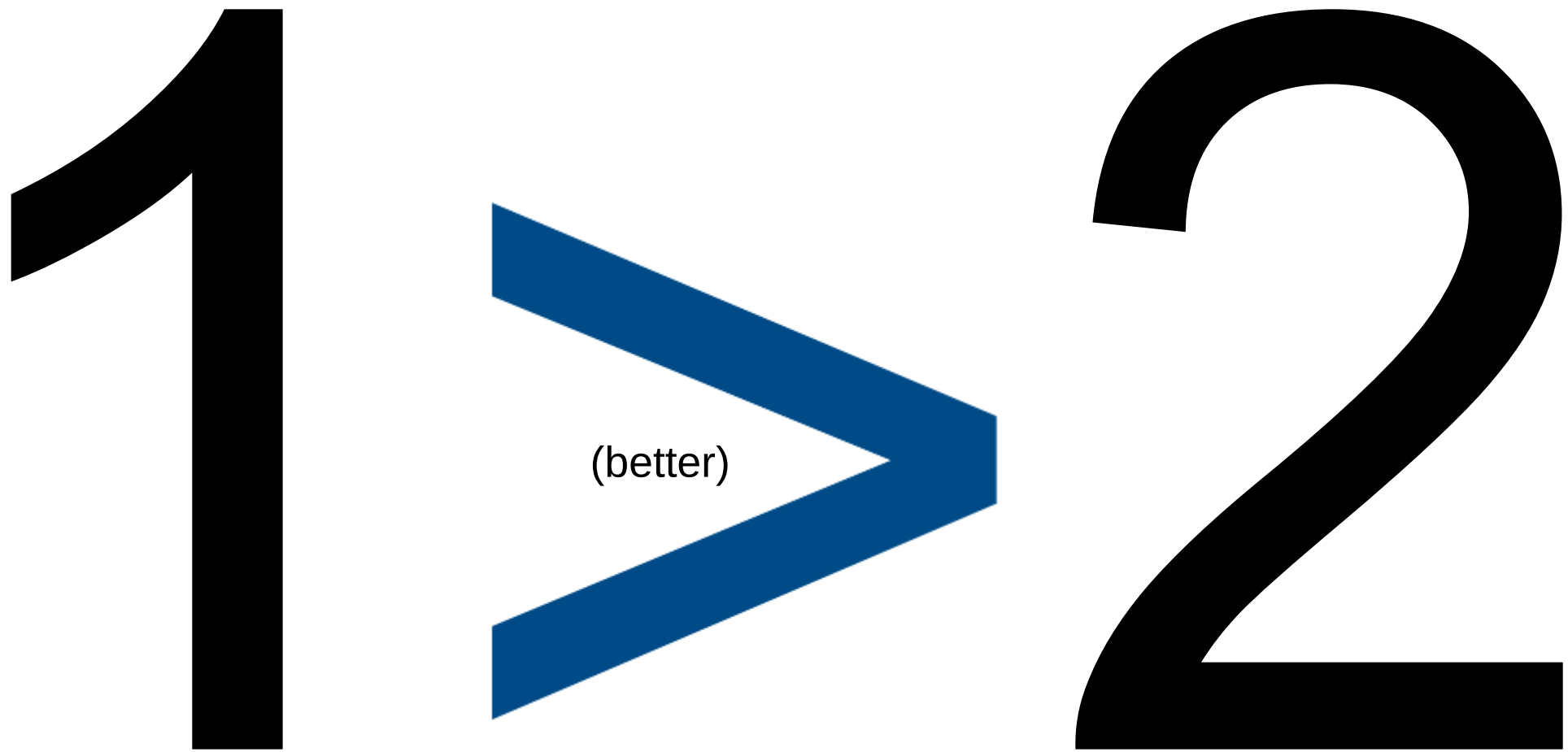
MathWorks®

Simplicity--the art of maximizing the amount of work not done--is essential.


Requirements
Architecture
Design & Development
Implementation
Integration
Verification
Validation



Simplicity--the art of maximizing the amount of work not done--is essential.

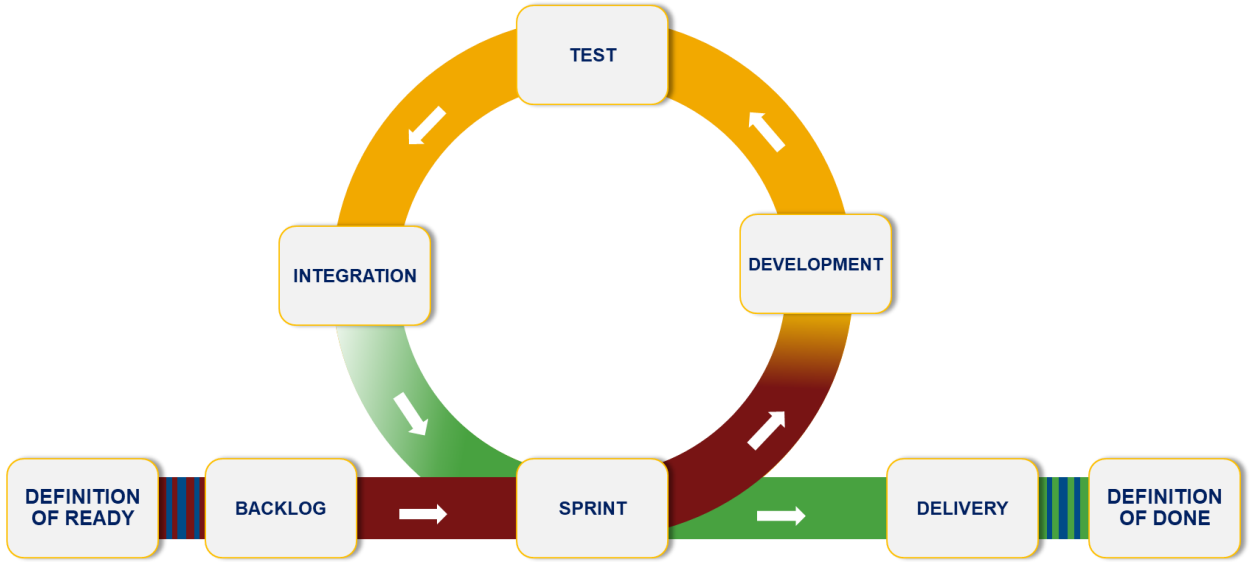


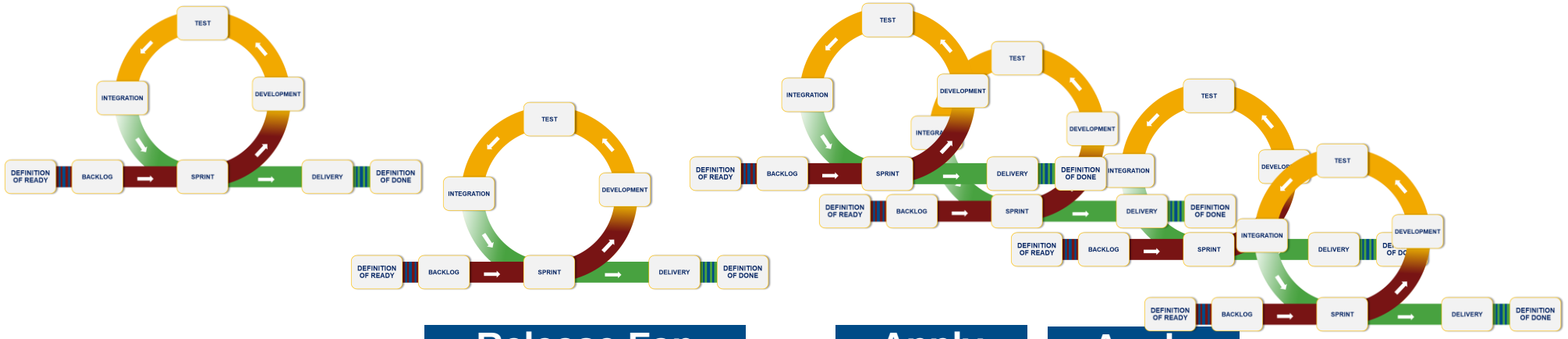
1 (time) > 2 (times) > 3 (times) > …

Have you ever had a problem that kept you awake at night?
I want to tell you about one time that happened to me.

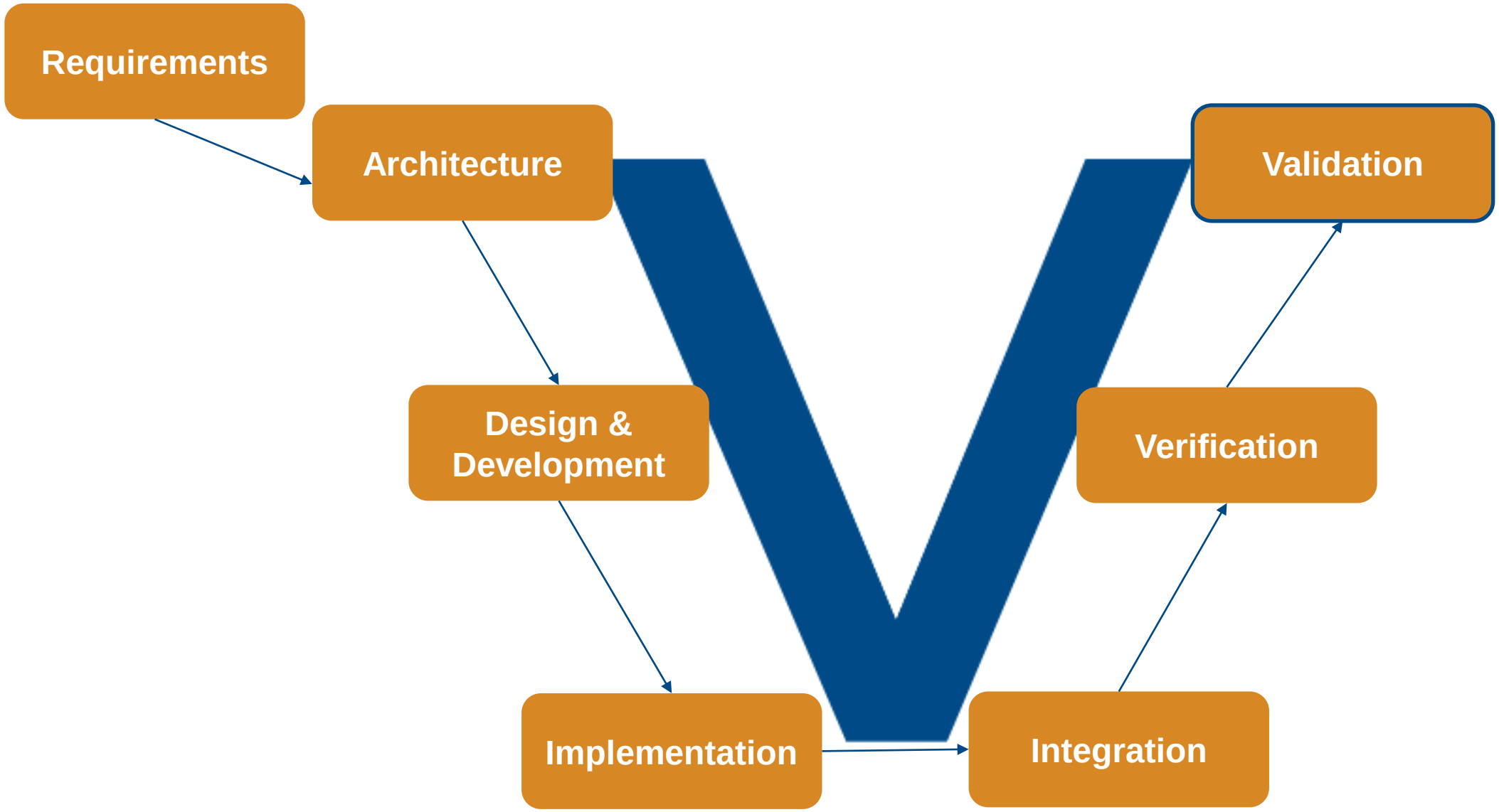
Have you ever had a problem at work keep you awake at night?
I want to tell you about one time that happened to me.

Let’s see if an Agile twist can help this story.





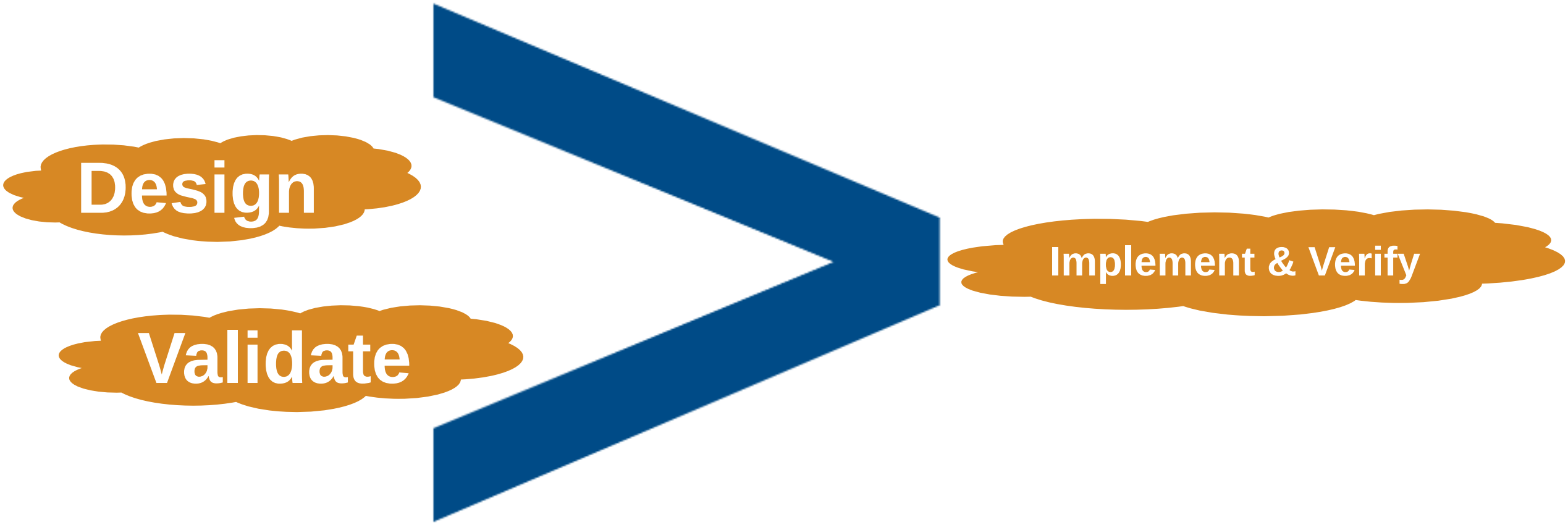
Release Fan Control Software → **Apply Fan Control** → **Apply Fan Control**


Requirements
Architecture
Design & Development
Implementation
Integration
Verification
Validation

Design

Validate

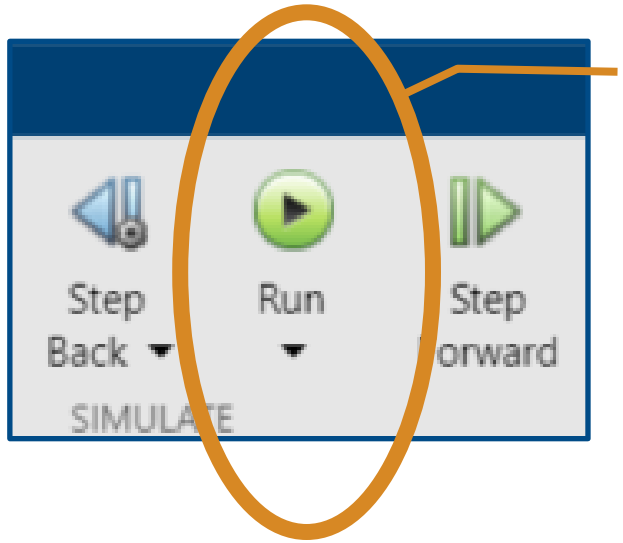
Implement & Verify


Design
Validate
Implement & Verify

The BIG Question
How do I validate early?

The big question – how do I validate early?

SIMULATION

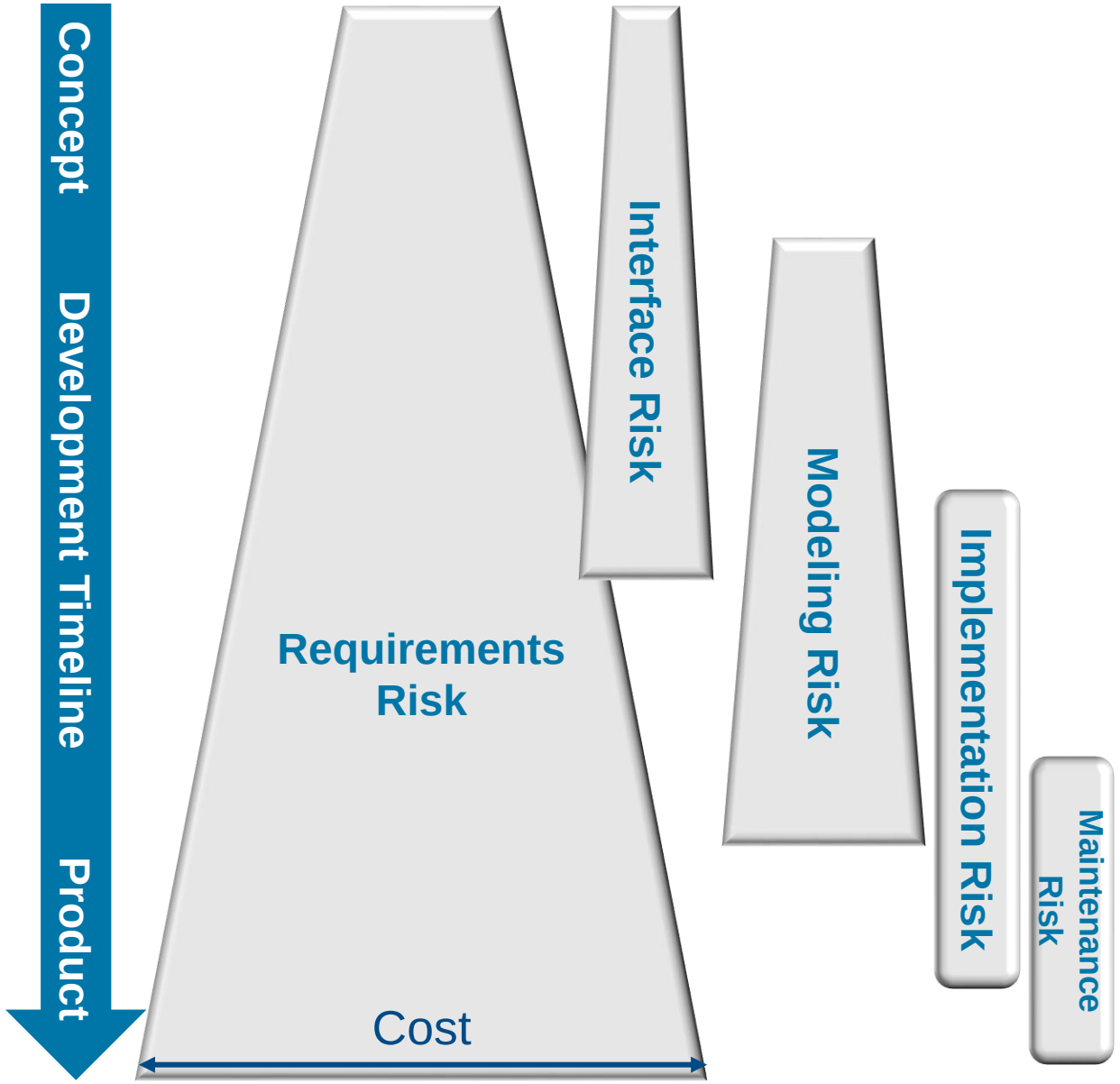


“The most valuable button in Simulink”

Sarah Dagen
MathWorks

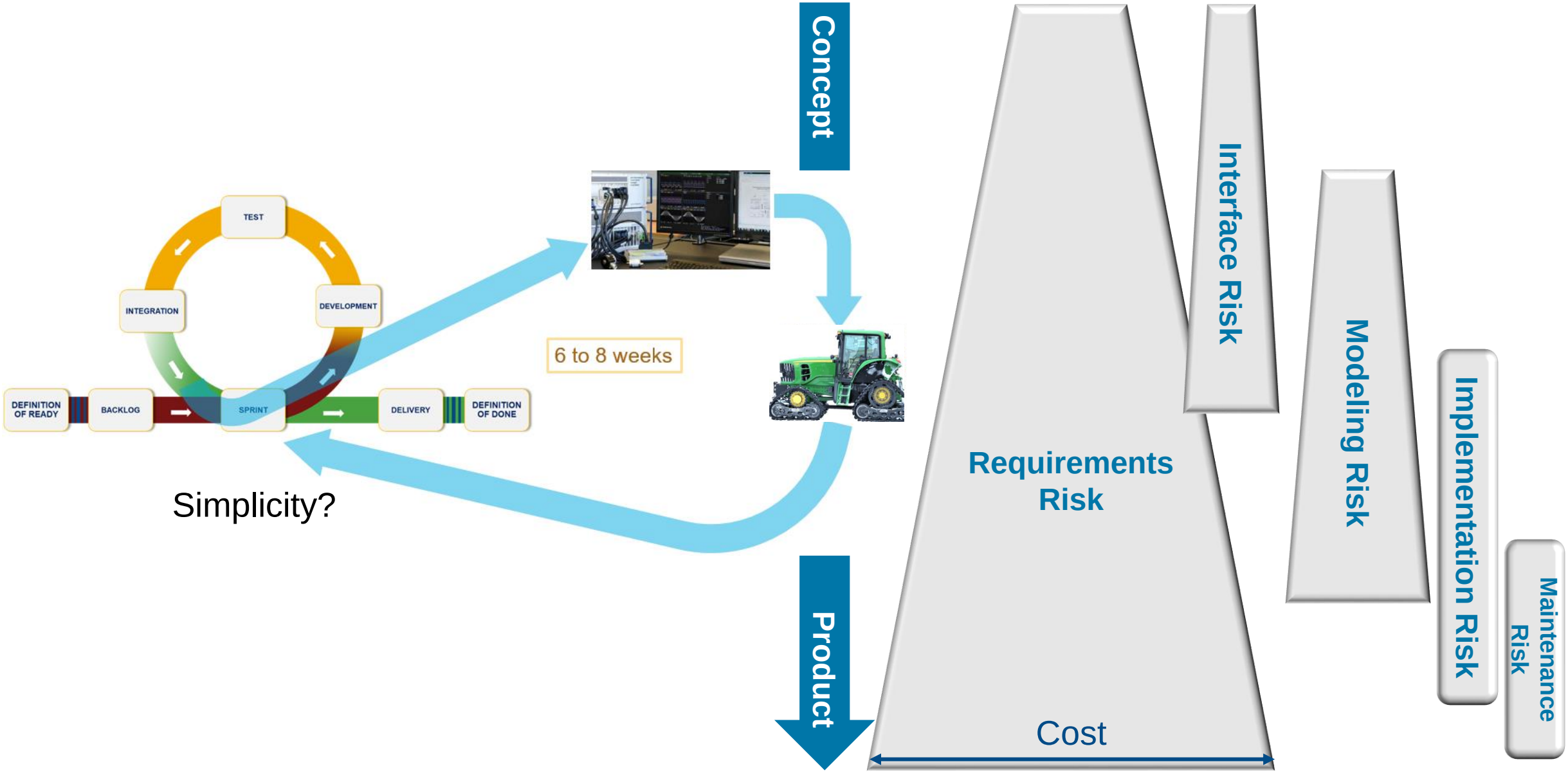
Verification and Validation activities are intended to reduce risk.

- Modeling Risk
- Implementation Risk
- Interface Risk
- Requirements Risk
- Maintenance Risk

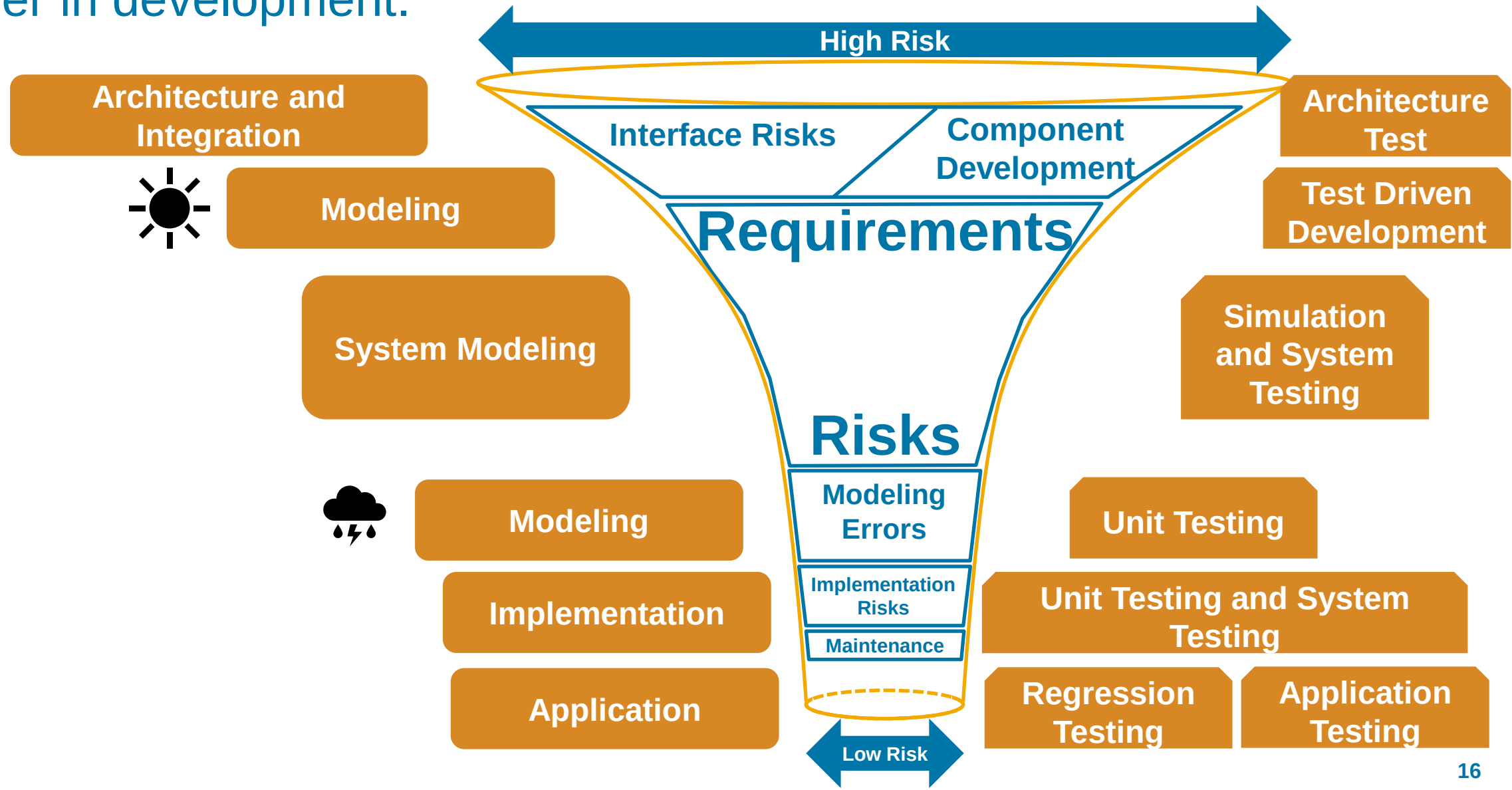


Another Agile Principle
Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.

An Agile approach might address these risks along the timeline.



Agile Model-Based Design allows you to address the biggest risks earlier in development.



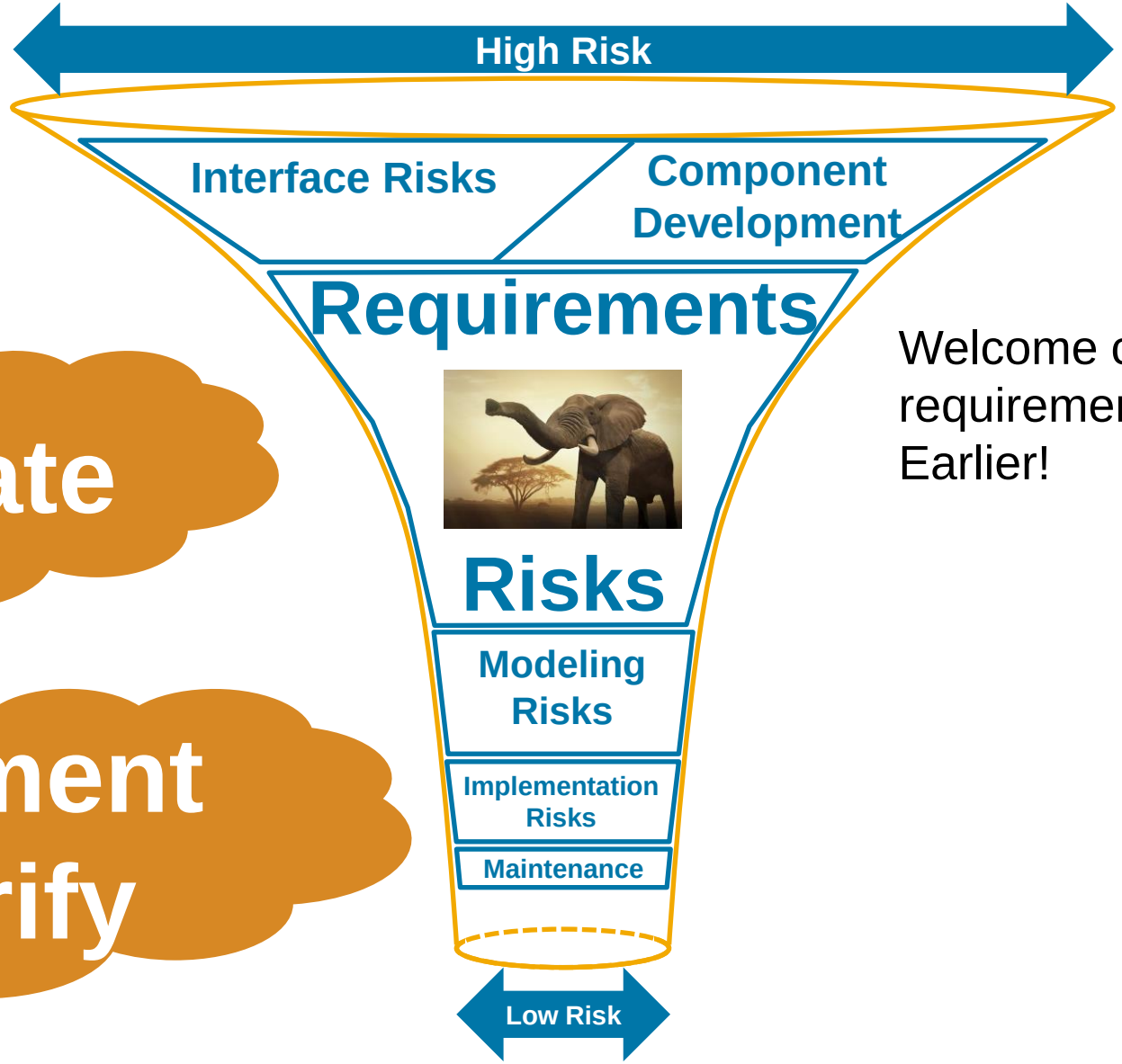
Agile Model-Based Design means up-front and continuous validation.

Design

Validate

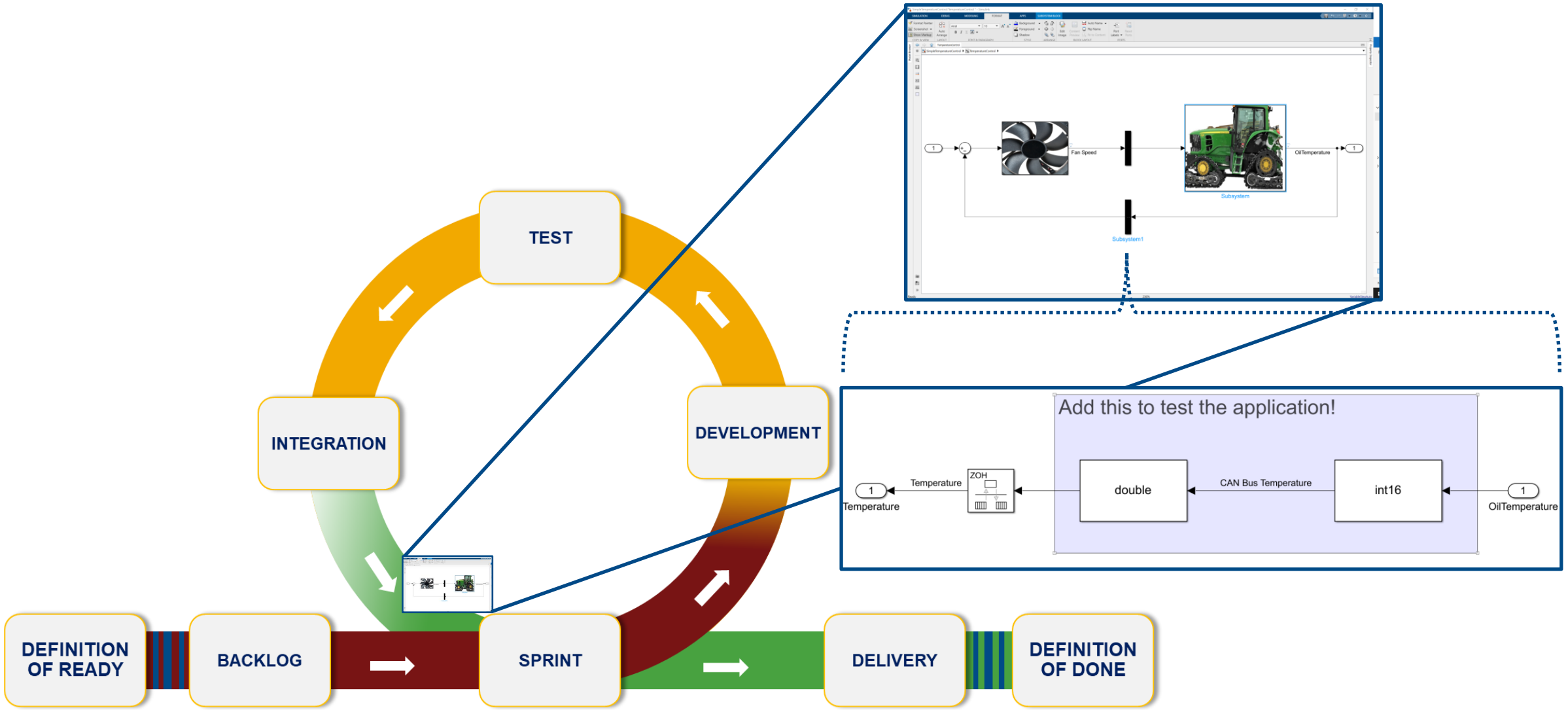
Implement & Verify

Simplicity!

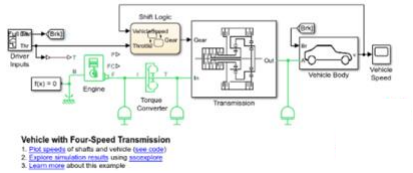


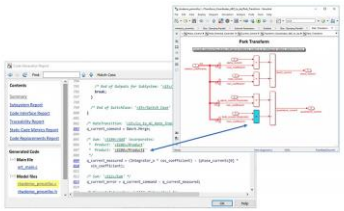
Welcome changing requirements. Earlier!

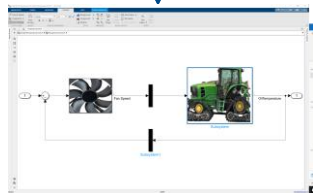
Let’s re-imagine that tractor with Agile Model-Based Design.



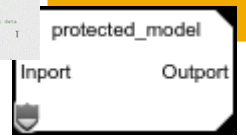
What issues might arise along the way?



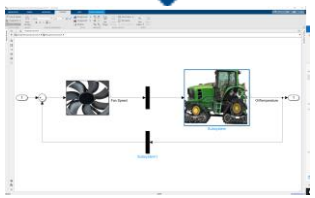




Other Tools



Older Versions

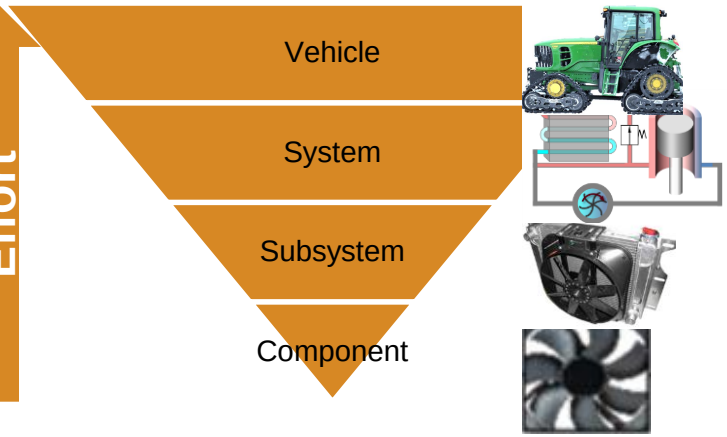


Plant Modeling	Legacy Code
Co-Simulation	Scale

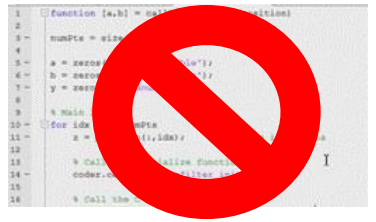
System Modeling

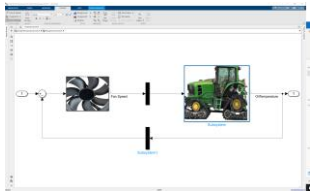
Value

Effort

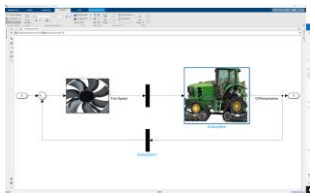


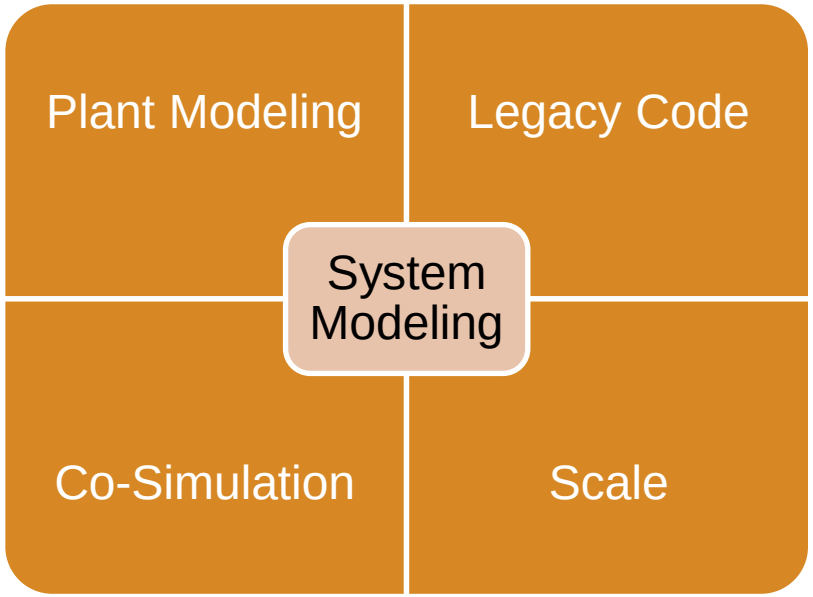
Let's consider some methods for overcoming these barriers. First, remember that Agile principle: Simplicity

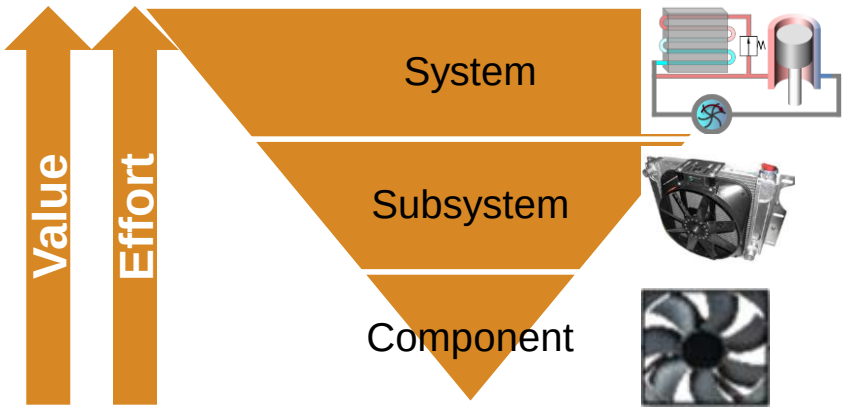




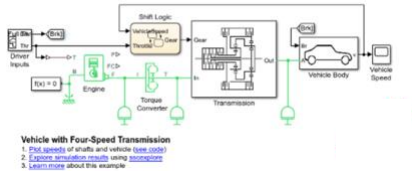
$$\tau = I\alpha$$

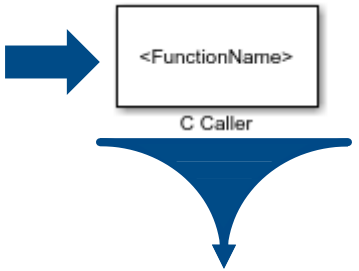


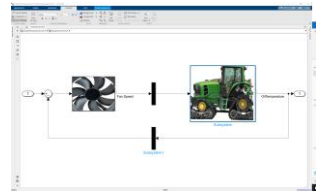


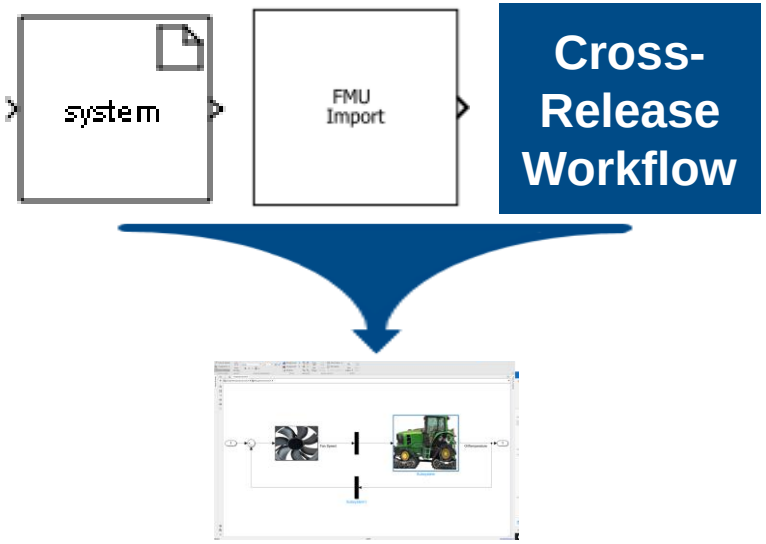


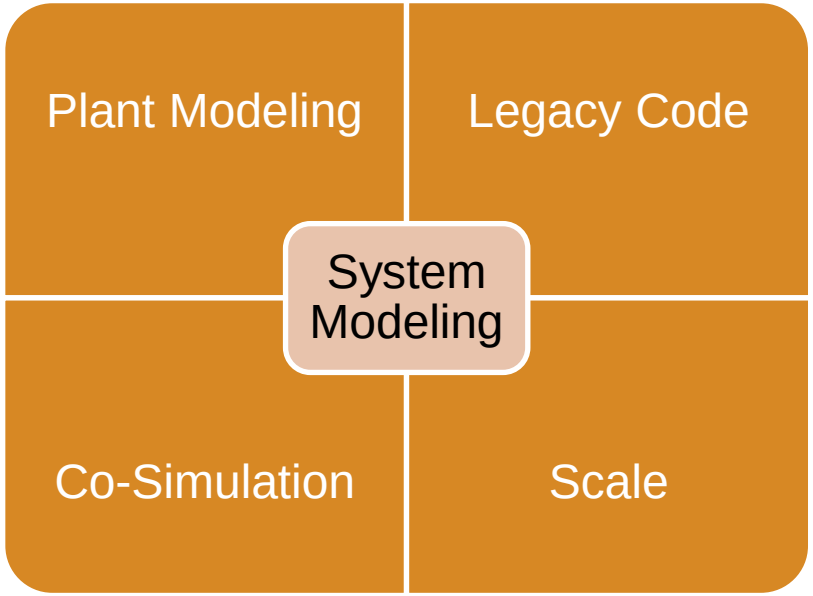
Look to MathWorks for help.

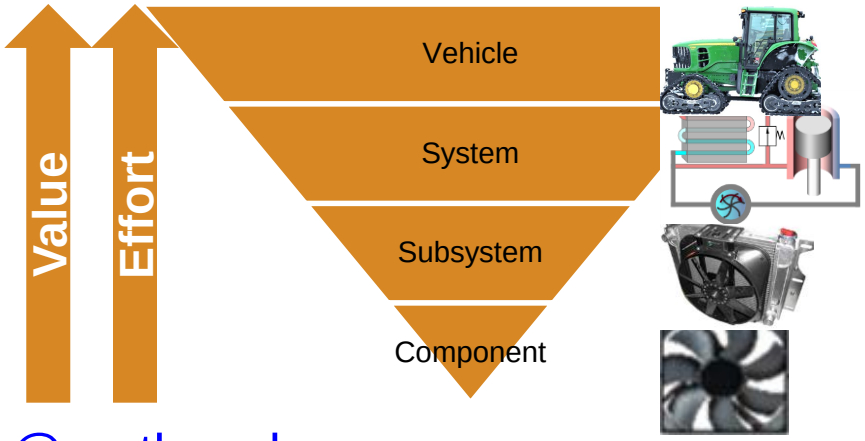












See MathWorks Consulting or contact me: jimr@mathworks.com

MathWorks
AUTOMOTIVE CONFERENCE 2022
North America

Thank you