Simulink as Your Enterprise Simulation Platform

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Stephan van Beek
Manager, Applications Engineering Group
Why simulation?
Hyperloop
Hyperloop is a revolutionary concept for a new type of rapid, low-energy transport system using magnetic levitation, which would be capable of transporting people and goods through extremely low-pressure tubes at speeds of up to Mach .98, or 750 mph/1,200 kmh.
Enterprise Simulation Platform

**Enterprise:** connects complete product development process

**Simulation:** evaluating system behavior through computation

**Platform:** connects all relevant domains for modelling and simulation
Enterprise Simulation Platform Enablers

- Multi-Domain Modelling
- Integration
- Scalability
Multi-Domain Modelling

Integration

Scalability
Multi-Domain Modelling in Simulink

Dynamic Systems

Physical Modelling

State Machines

Discrete-Event Systems

Function and Object-Oriented
Need for Multi-Domain Simulation
Need for More Multi-Domain Simulation
Multi-Domain Model
State Charts and System Dynamics
Physical Modeling
Discrete-Event Modeling
Domain-Specific Extensions

Simulink has numerous domain-specific capabilities, for example:

- Aerospace
- Computer Vision
- Digital Signal Processing
- Automotive Powertrains
- Robotic Applications
- +More
Multi-Domain Modelling
Integration
Scalability
Integration Challenges

Your IP exists in many forms and in many locations, making integration difficult.
Integrating by Sharing Models

Quick File Packaging

Model Protection (IP Management)

Reporting and Documentation
Multiple ways to reuse your legacy code with Simulink
Integrating Third-Party Simulation Tools

Mature and extensive APIs for third-party tool integration

- Tire behavior assessment
- Vehicle dynamics modeling
- Thermo-fluid system simulation
- 1D / 3D engine/exhaust simulation
- Virtual test driving

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ADAS System Level Simulation – Lane Keeping Support at TASS

Benefits

• Use virtual driving scenario instead of real car
• Riskless test of new ADAS functions
• Analyze different environmental conditions
Multi-Domain Modelling
Integration
Scalability
Scalability Challenges

Performance

Team Workflows
Performance Scalability

Easy scalability to multicore or cluster/cloud computation environment
Performance Scalability

Big data workflow
- Processing large amount of simulation inputs / outputs
Complex Design Development through Componentization

- Improving performance
  - Incremental loading and code generation
  - Simulation speed
  - Memory usage

- Supporting team workflows
  - Faster modular development
  - More effective verification
  - Increased reusability
Capabilities Enabling Team Workflows

- Source control
- Design comparison and merging
- Dependency analysis
- Task automation
Source Control Integrations

Microsoft Team Foundation Server (TFS) integration available now from MathWorks File Exchange
Integrating Work from Different Engineers via Merge

- Supports concurrent engineering
- Lets you concentrate on design
## Dependency Analysis – Modular Development

### Simulink Project - Elevator System

#### Project Shortcuts

### Projects: Elevator System

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Dependency Analysis – Modular Development

Show model structure

List products required

Highlight issues
Task Automation – Configuring Project Environment

- Robustly configure the team environment
- For everyone
- Automatically
Simulink Addressing Scalability Challenges

Performance

Team Workflows
"No other tool gives us the multidomain simulation capability and block diagram environment in a way that is scalable to represent complex systems. That is why we use Simulink."

Andrew Pollard
Tessella
How to get started?

- Model-Based Design
- Stateflow
- Simscape

Public

On-Site