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
- Discrete-Event Systems
- Physical Modelling
- State Machines
- Function and Object-Oriented

MATLAB EXPO 2017
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
Integrating Your Code

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
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
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

MAT file → MATLAB → MAT file
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
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
"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