What’s New in Simulink in R2015b and R2016a

Ruth-Anne Marchant
Application Engineer
Event-Based Modeling | Physical Modeling
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Real-Time Simulation and Testing | Verification, Validation, and Test | Simulation Graphics and Reporting

**SIMULINK®**
Simulation and Model-Based Design

Parallel Computing | Code Generation

**MATLAB®**
The Language of Technical Computing

Math, Statistics, and Optimization | Application Deployment | Database Access and Reporting

Applications
- Control Systems
- Signal Processing and Communications
- Image Processing and Computer Vision
- Test and Measurement
- Computational Finance
- Computational Biology
Summary of Major New Capabilities for Model-Based Design

- Modelling
- Control Design
- Simulation and HW Testing
- Automatic Code Generation
- Verification and Validation Activities
MODELLING

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Interact with your Simulation Using Scopes

New Interface for Scopes
Modelling Physical Systems

New simulation technology accelerates simulation and permits tuning of Simscape block parameters

What is this update about?

- Simulation speed improvements
- Run-time parameter capability
- Updates to the Simscape language
- Additional fluid modelling capabilities (in Simscape Fluids)
- Add-on product re-naming
Model and Simulate Discrete-Event Systems
SimEvents – Completely Redesigned for Model-Based Design

What is this update about?
- Develop custom queues, SimEvents blocks, and visualization
- Launch functions directly from within SimEvents
- Advance debugging
- Agent-based simulation

Why is this redesign important?
- SimEvents now supports the Model-Based Design Workflow
CONTROL

Event-Based Modeling
Real-Time Simulation and Testing

Physical Modeling
Verification, Validation, and Test
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Important Tools
Application Deployment
Database Access and Reporting

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State-Machine Design and Simulation
Enhance development with new editing features in Stateflow

What is this update about?
- Smart editing cues
- Intelligent chart completion
- Messages to communicate within and between Stateflow charts

Why are these features important?
- Build charts faster with automatic addition of default transitions
- Model asynchronous operations in state machines
Design Control Algorithms Through Apps

New & Redesigned Apps to tune SISO and MIMO controllers, and create reduced-order models

What is this update about?
- Redesigned Control Systems Designer App
- Updated Control System Tuner App
- New Model Reducer App

Why are these features important?
- Interactively simplify complex, high-order models
- Discover and learn functionality through apps
SIMULATION AND HARDWARE TESTING
### Develop, Manage, and Execute Simulation-Based Tests

**Simulink Test Released in R2015a**

<table>
<thead>
<tr>
<th>Test Harness</th>
<th>Test Sequence Block</th>
<th>Test Manager</th>
</tr>
</thead>
</table>
| • Synchronized, simulation test environment | • Test Inputs and assessments  
  • Based on logical, temporal conditions | • Author, execute, manage test cases  
  • Review, export, report |

![Diagram of Test Harness and Test Sequence Block](image1)

![Diagram of Test Manager](image2)

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**Simulation and HW Testing**

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[Image 1]

[Image 2]
Develop, Manage, and Execute Simulation-Based Tests
Capabilities to enhance full testing workflow

What is this update about?
- Real-time testing capability added
- verify Statement to verify simulation behaviour
- External test harness creation for subsystem or model testing

Why is this feature important?
- Provides a full workflow from simulation to real-time testing
- Closes a gap for test authoring and management for real-time testing
CODE GENERATION

Event-Based Modeling
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- Simulation Graphics and Reporting

Physical Modeling
- Parallel Computing
- Code Generation

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Application Deployment
Database Access and Reporting
Generate code from MATLAB cell arrays

What is this update about?
- Generate C code from MATLAB code that uses cell arrays
- Detect and report run-time errors while testing generated standalone libraries and executables

Why is this feature important?
- Cell array use is frequently used
- New capability means cell arrays will work out-of-the-box

myCell = {1, 2, 3;
  'text', ran
VERIFICATION AND VALIDATION
Increase Team Productivity
Three-way model merge for graphically resolving conflicts between revisions within a Simulink project

What is this update about?
- Resolve conflicts in model files under source control
- Scalable report generation

Why is this feature important?
- An interactive comparison report with the two conflicting designs along with the original base model
- Helpful when working in a team environment
- Faster generation of large reports
Detect Software Defects Including Security Vulnerabilities

What is this update about?
- Detect more types of software defects with 80 new checks – C++ specific, resource management
- View analysis results as they are produced
- Complete MISRA C:2012 support

Why is this feature important?
- New security specific checks to detect security vulnerabilities
- Be more productive and minimise work disruption
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More Information