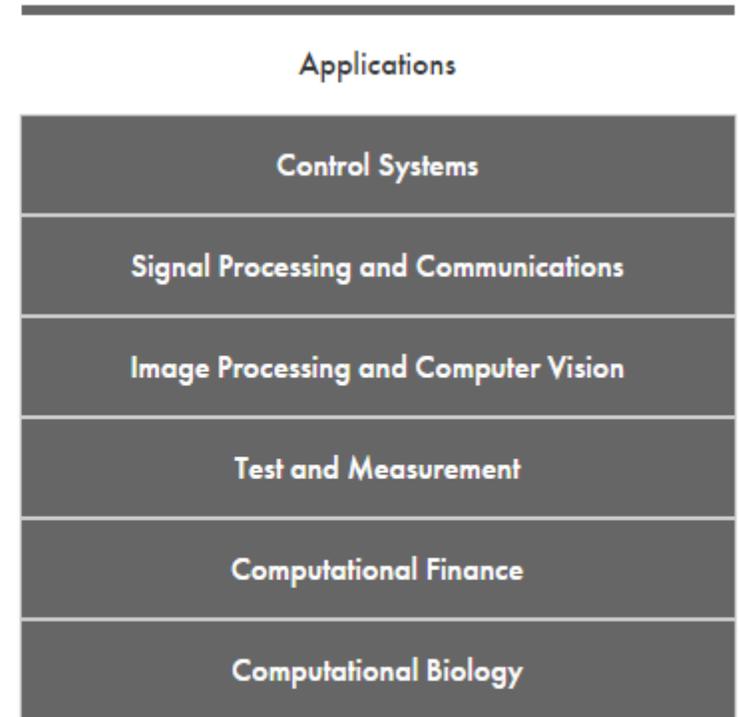
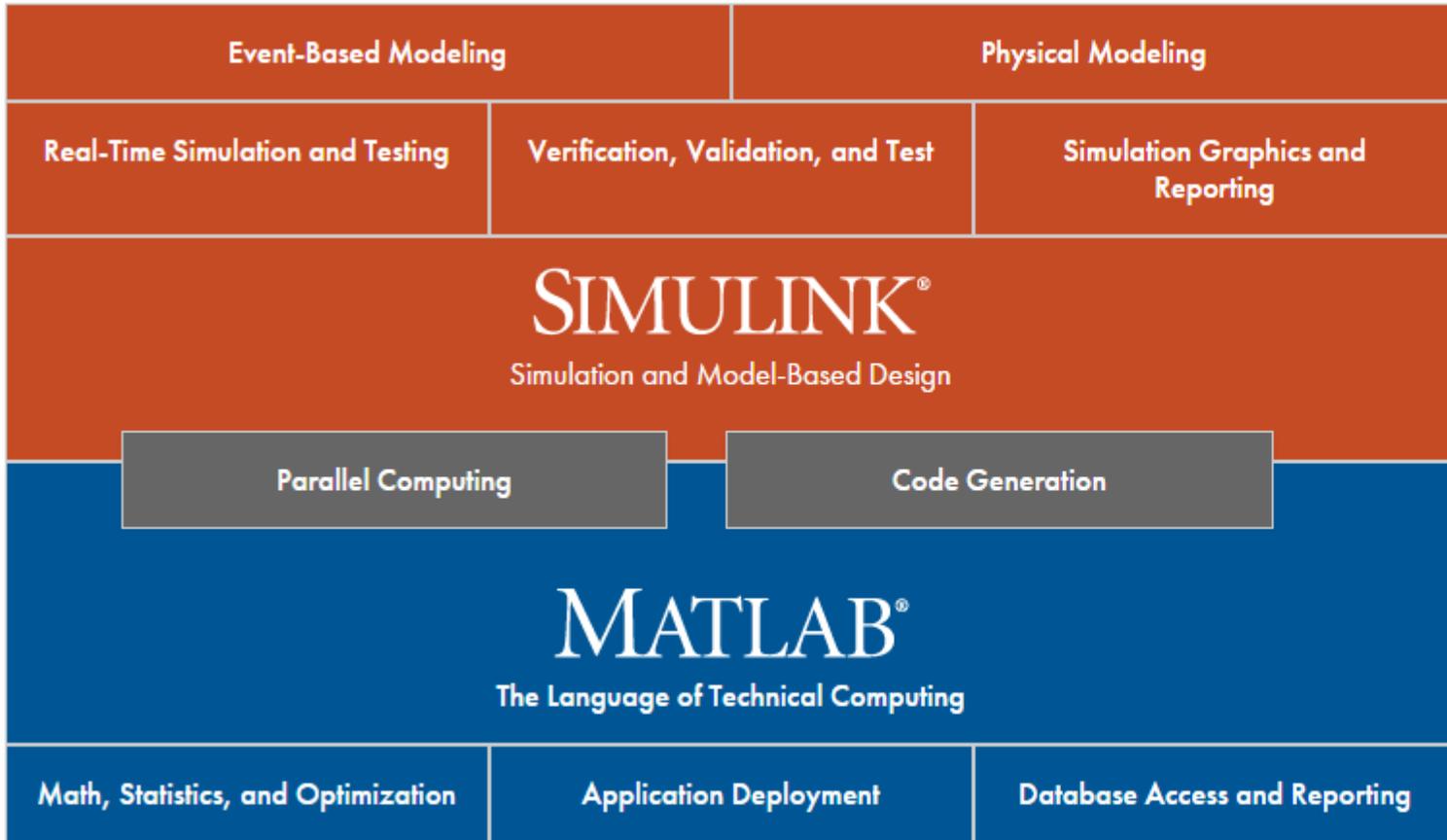


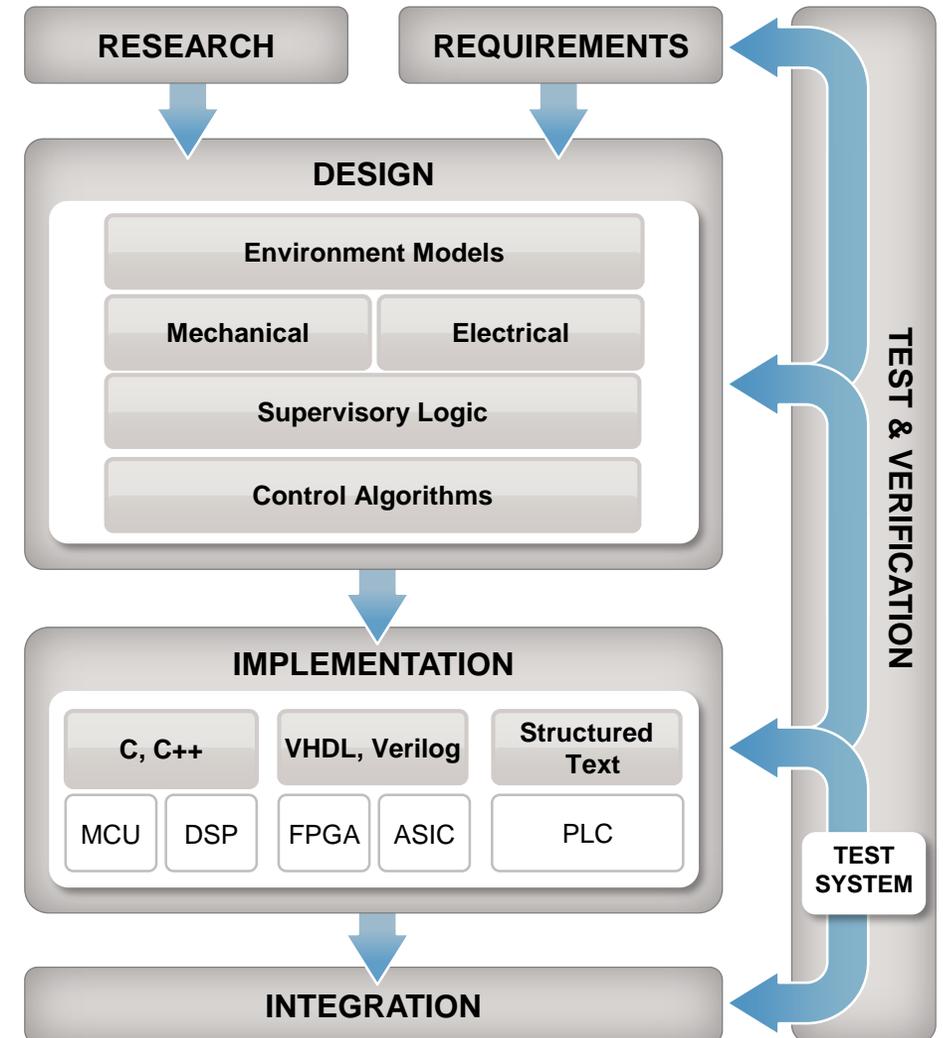
# What's New in Simulink in R2015b and R2016a

**Ruth-Anne Marchant**  
**Application Engineer**

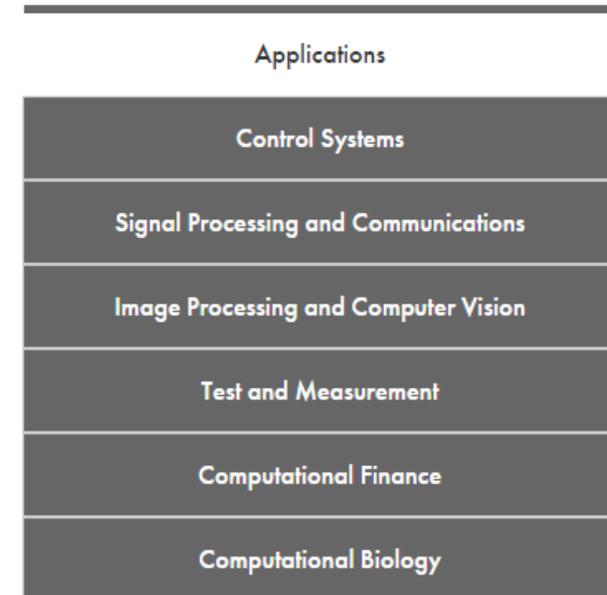
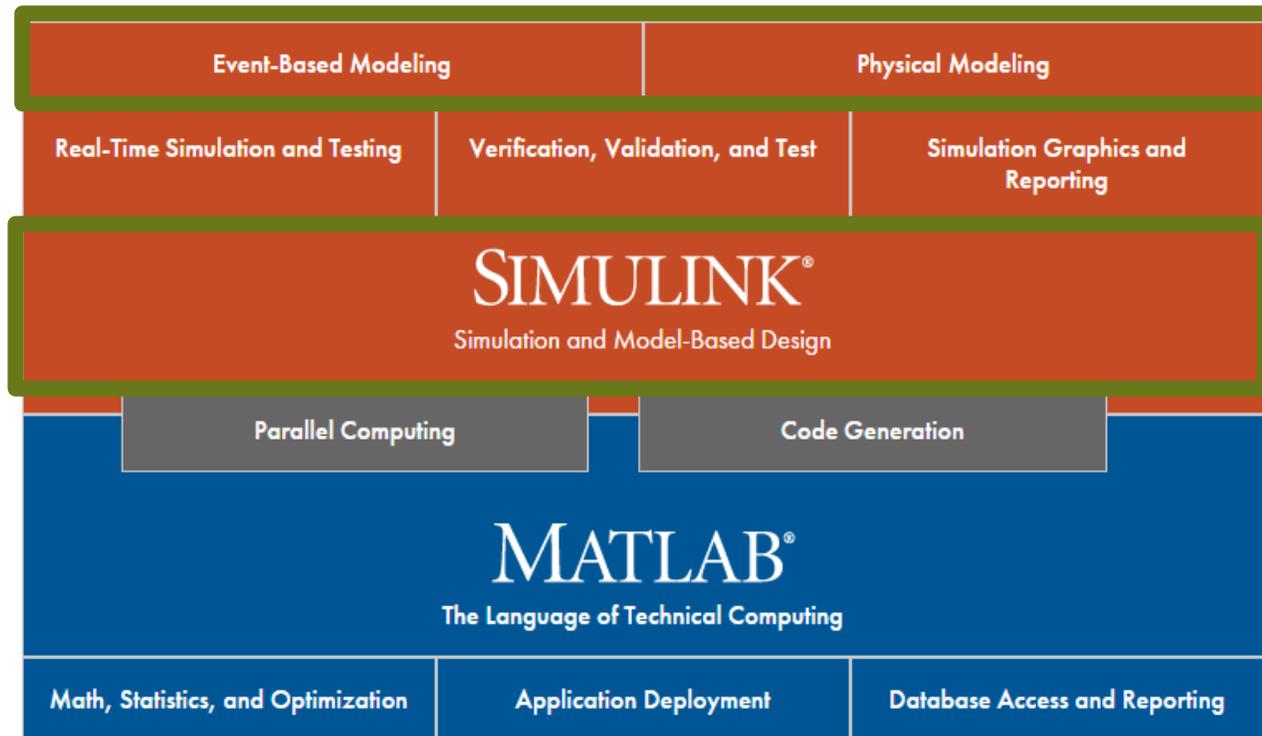


# Summary of Major New Capabilities for Model-Based Design

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



# MODELLING



# Interact with your Simulation Using Scopes

## New Interface for Scopes

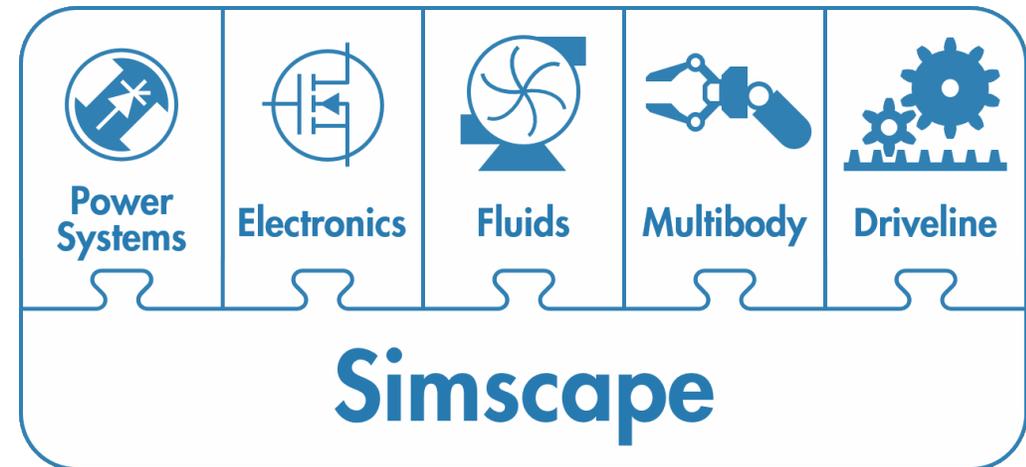


# Modelling Physical Systems

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

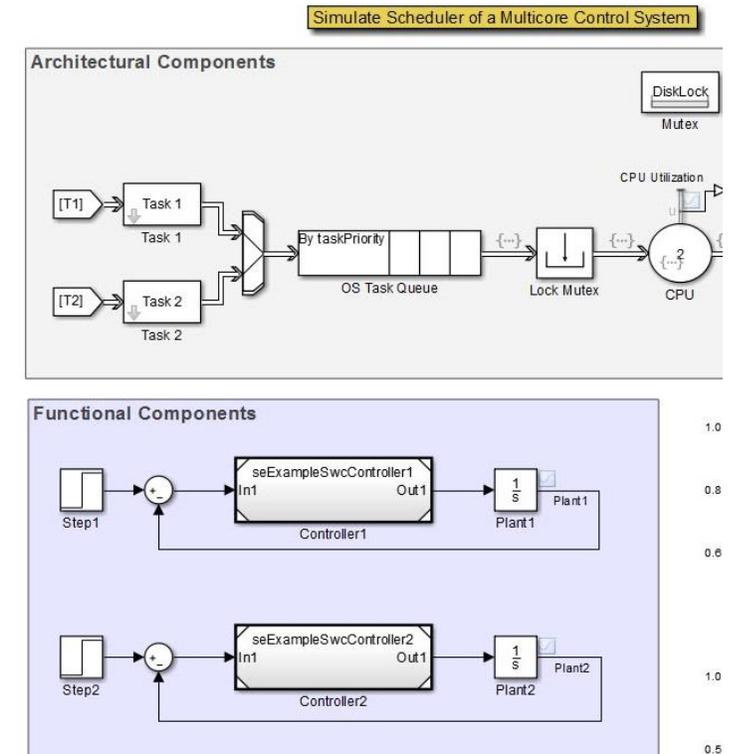
## SimEvents – Completely Redesigned for Model-Based Design

### What is this update about?

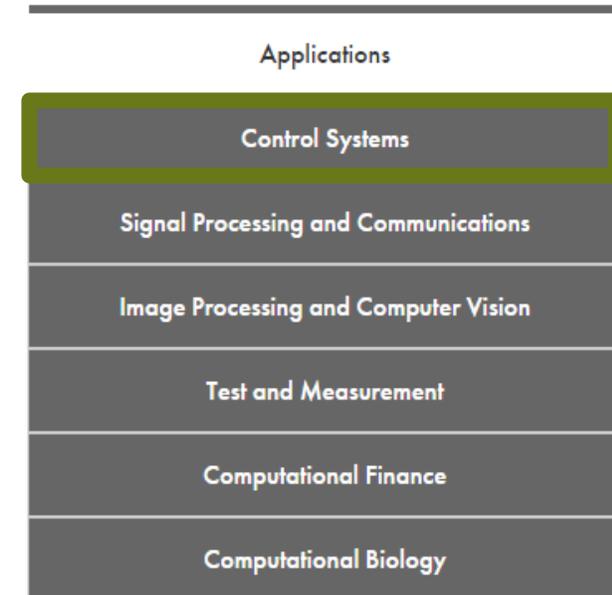
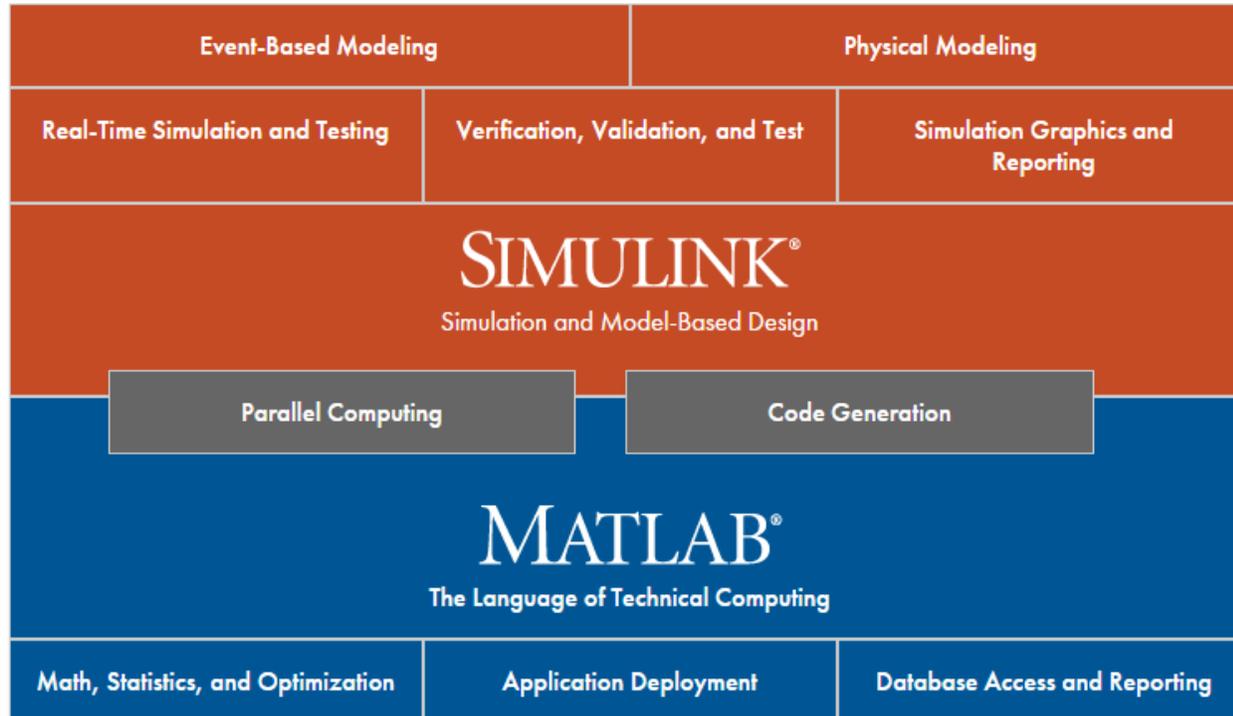
- Develop custom queues, SimEvents blocks, and visualization
- Launch functions directly from within SimEvents
- Advance debugging
- Agent-based simulation

### Why is this redesign important?

- SimEvents now supports the Model-Based Design Workflow



# CONTROL



# State-Machine Design and Simulation

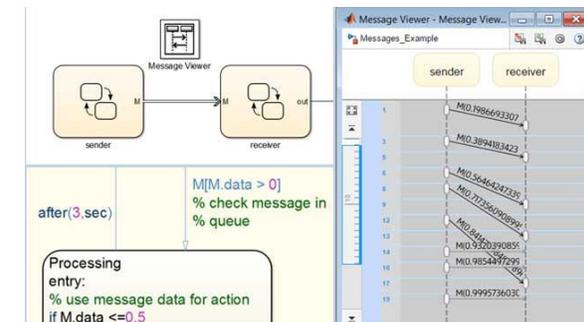
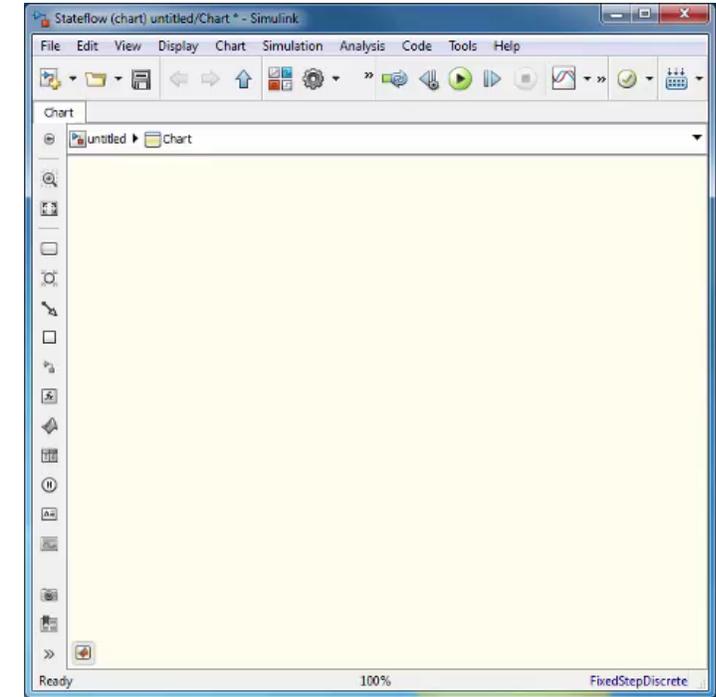
Enhance development with new editing features in Stateflow

## 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

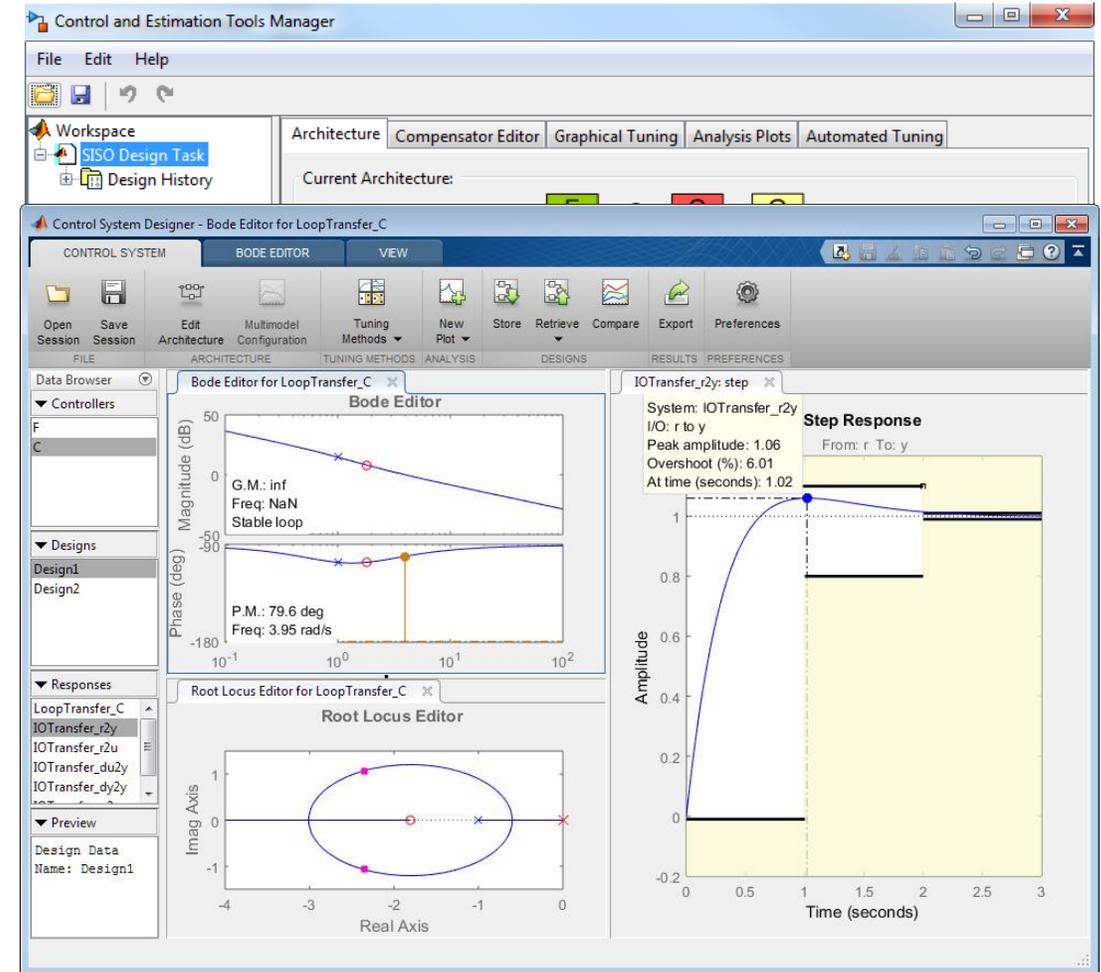
New & Redesigned Apps to tune SISO and MIMO controllers, and create reduced-order models

## What is this update about?

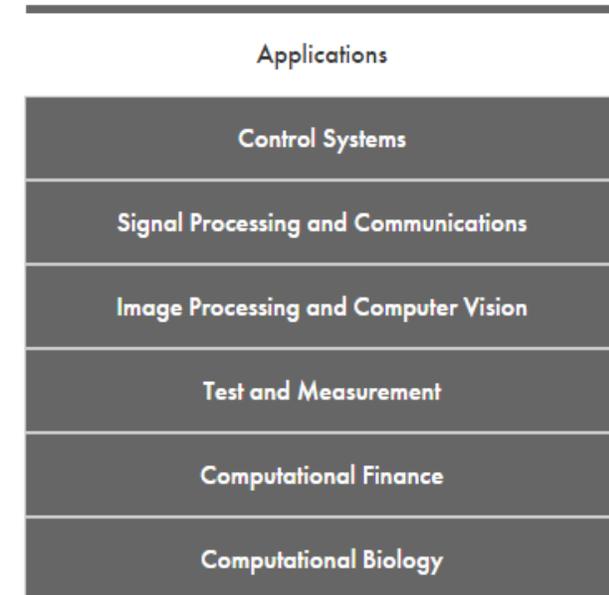
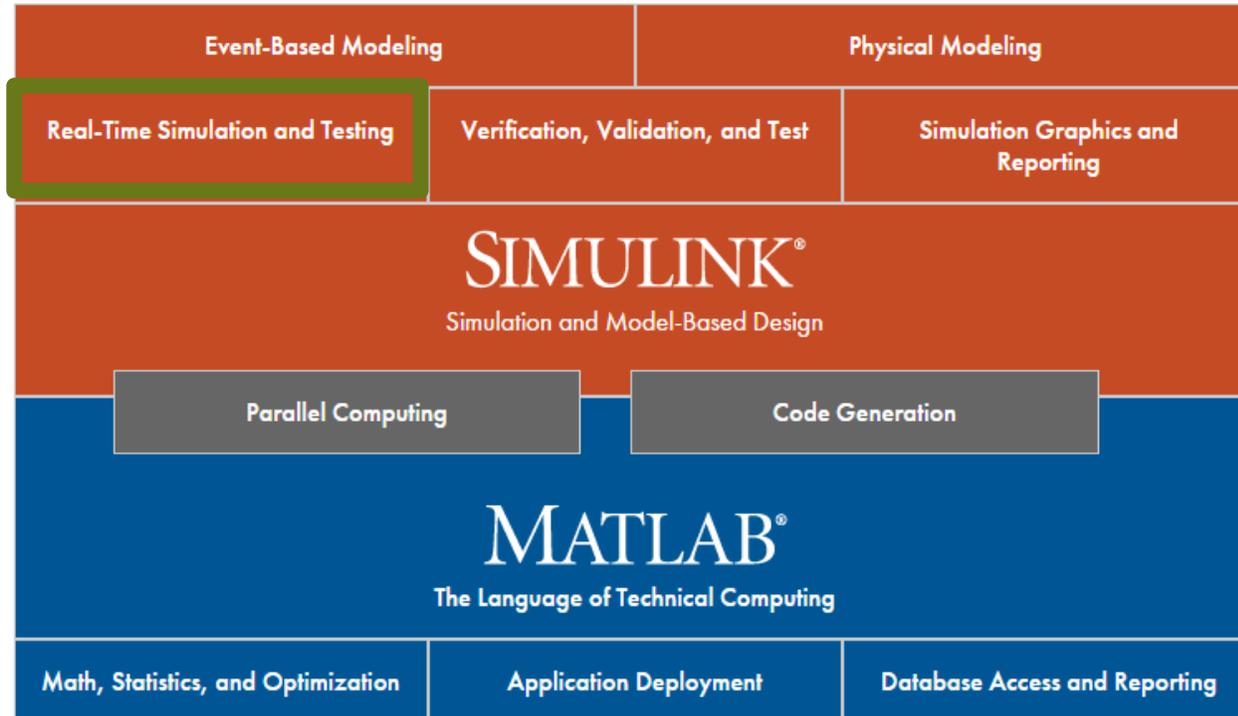
- Redesigned Control Systems Designer App
- Updated Control System Tuner App
- New Model Reducer App

## 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

Test Harness	Test Sequence Block	Test Manager												
<ul style="list-style-type: none"> <li>Synchronized, simulation test environment</li> </ul>	<ul style="list-style-type: none"> <li>Test Inputs and assessments</li> <li>Based on logical, temporal conditions</li> </ul>	<ul style="list-style-type: none"> <li>Author, execute, manage test cases</li> <li>Review, export, report</li> </ul>												
<p>Test Harness</p> <p>Component Under Test</p> <p>Main Model</p>	<p>Test Sequence1</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Transition</th> <th>Next Step</th> </tr> </thead> <tbody> <tr> <td>init_step speed = ramp (t); throttle = ramp (t);</td> <td>1. after (2. sec)</td> <td>step_2</td> </tr> <tr> <td>step_2 speed = 2* ramp (t); throttle = 2* ramp (t);</td> <td>1. gear == 3</td> <td>step_3</td> </tr> <tr> <td>step_3 peak_speed = speed; peak_throttle = throttle;</td> <td></td> <td></td> </tr> </tbody> </table>	Step	Transition	Next Step	init_step speed = ramp (t); throttle = ramp (t);	1. after (2. sec)	step_2	step_2 speed = 2* ramp (t); throttle = 2* ramp (t);	1. gear == 3	step_3	step_3 peak_speed = speed; peak_throttle = throttle;			<p>Report Generated by Test Manager</p> <p>Title: LandingGearControl-Regression Tests      Author: Jessica Johnson      Date: 20-Feb-2015 18:28:22</p> <p>Test Environment      Platform: PCWIN64      MATLAB: R2015a</p>
Step	Transition	Next Step												
init_step speed = ramp (t); throttle = ramp (t);	1. after (2. sec)	step_2												
step_2 speed = 2* ramp (t); throttle = 2* ramp (t);	1. gear == 3	step_3												
step_3 peak_speed = speed; peak_throttle = throttle;														

# Develop, Manage, and Execute Simulation-Based Tests

Capabilities to enhance full testing workflow

## What is this update about?

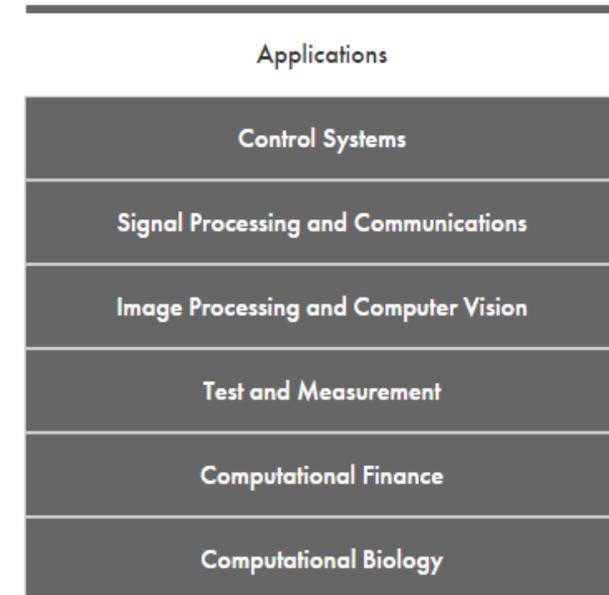
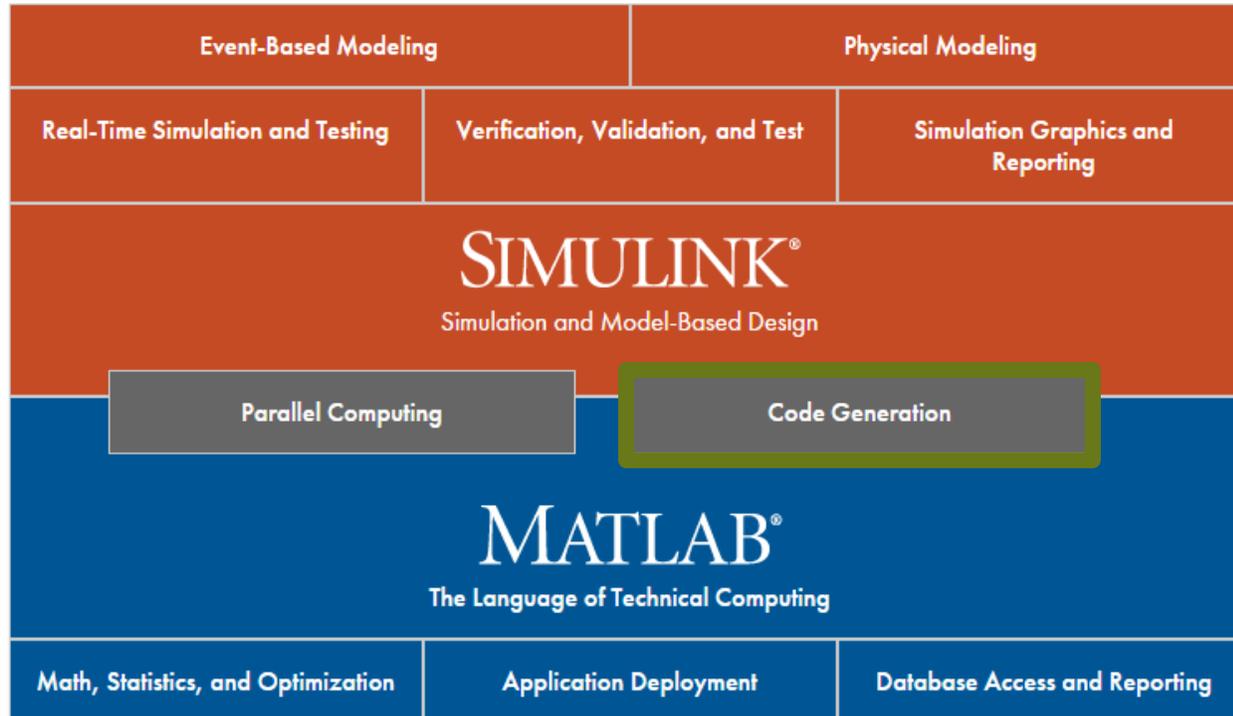
- Real-time testing capability added
- verify Statement to verify simulation behaviour
- External test harness creation for subsystem or model testing

## 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



# Generate code from MATLAB cell arrays

## What is this update about?

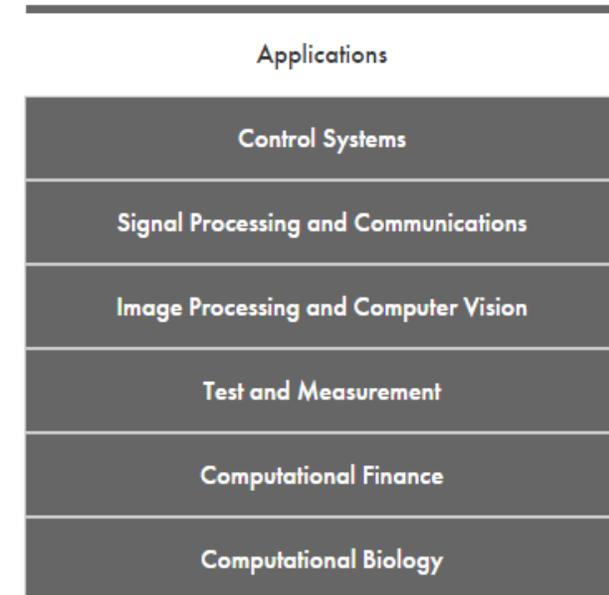
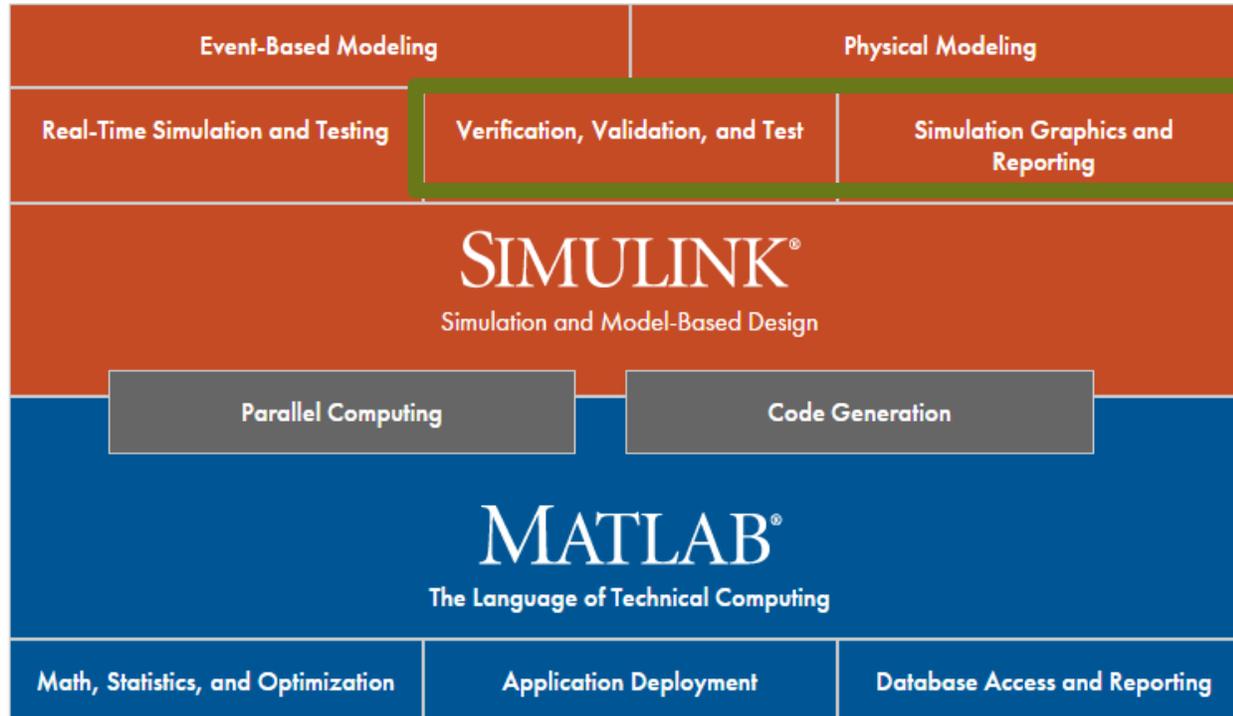
- Generate C code from MATLAB code that uses cell arrays
- Detect and report run-time errors while testing generated standalone libraries and executables

## 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
```

# VERIFICATON AND VALIDATION



# Increase Team Productivity

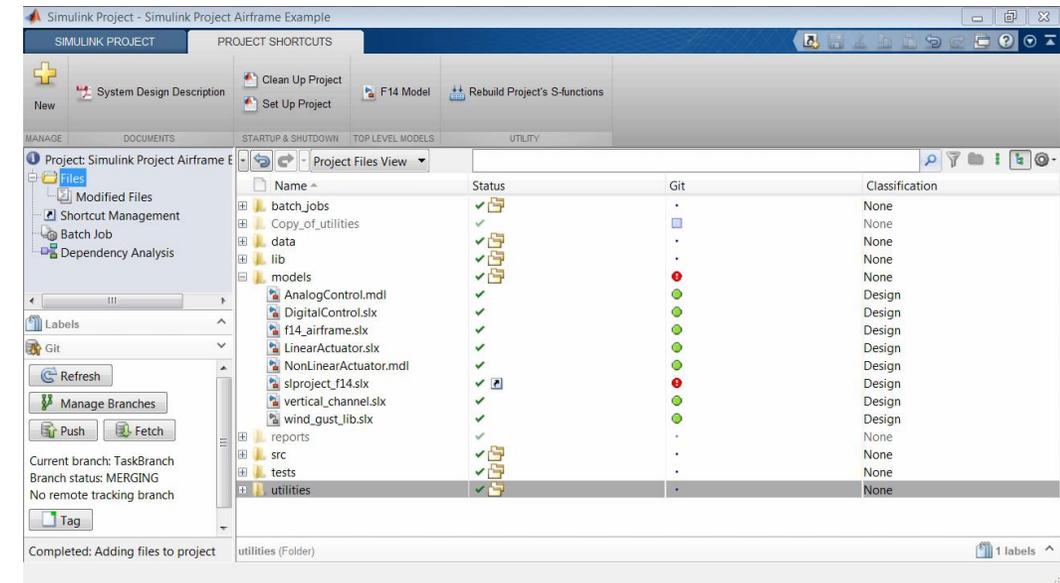
Three-way model merge for graphically resolving conflicts between revisions within a Simulink project

## 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?

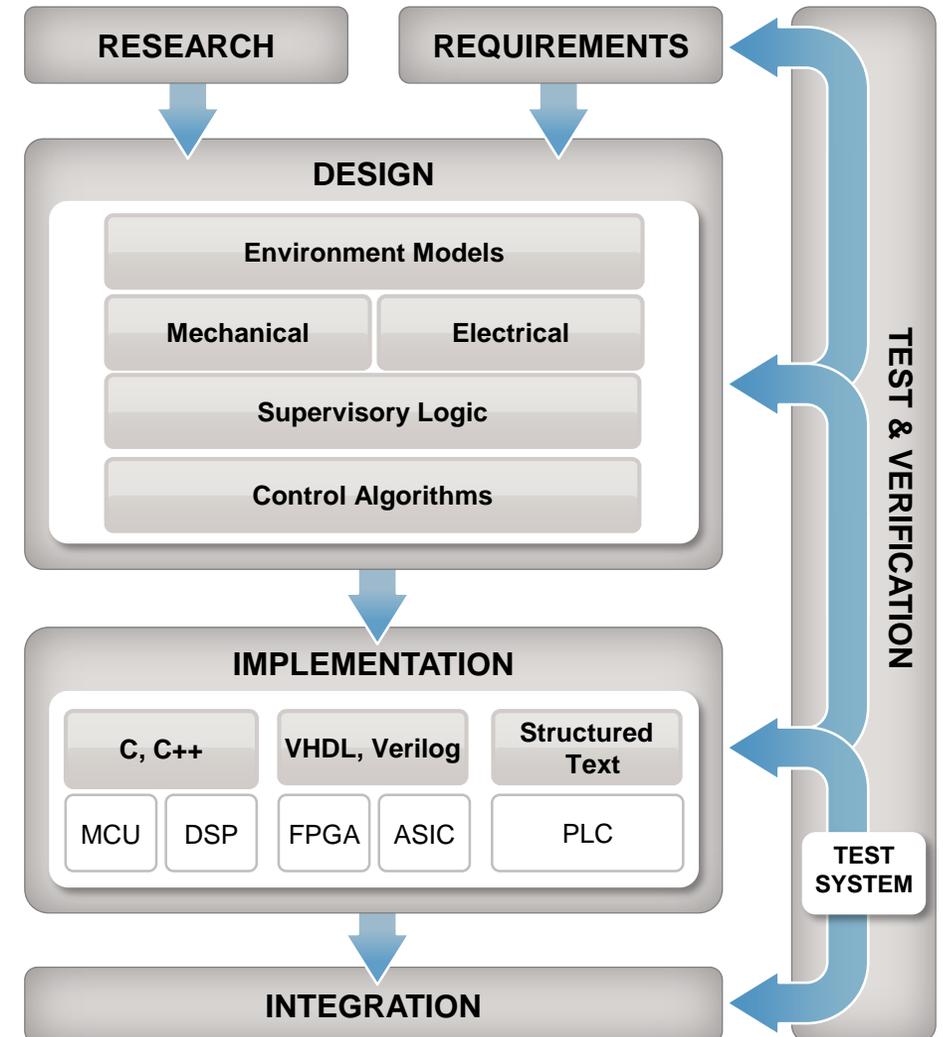
- Detect more types of software defects with 80 new checks – C++ specific, resource management
- View analysis results as they are produced
- Complete MISRA C:2012 support

## Why is this feature important?

- New security specific checks to detect security vulnerabilities
- Be more productive and minimise work disruption

# Summary of Major New Capabilities for Model-Based Design

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## SIMULINK

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### What's New

Learn about new product capabilities.

Explore performance improvements to the Simulink® product family.

### R2016a

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Get started or resume work faster by accessing templates, recent models, and featured examples

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R2016a

#### Automatic Solver Option

Set up and simulate your model more quickly with automatically selected solver settings

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R2015b

#### Simulink Units

Specify, visualize, and check consistency of units on interfaces

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R2016a

#### One-Click Display

Click a signal line when the simulation is running to view the current value

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[🕒 Watch video 0:39](#)

R2016a

#### Single-Selection Actions

Access commonly used editing

#### Simulation for Mixed Targets

#### Multi-Input Root Inport Mapping

Status	Scenario	Signal	Port	Block Name	Ma
✓	signal_1	1	Signal 1	roc	
✓	signal_2	2	Input 1	roc	
✓	busSignal	3	Bus_1	roc	

#### Signal and State Logging to File

Signal logging: oldemo\_fuelsys\_output  
 Data stores: dsmout  
 Log Dataset data to file: out.mat  
 Single simulation output: out  
 Record loaded workspace data in Simulation Data