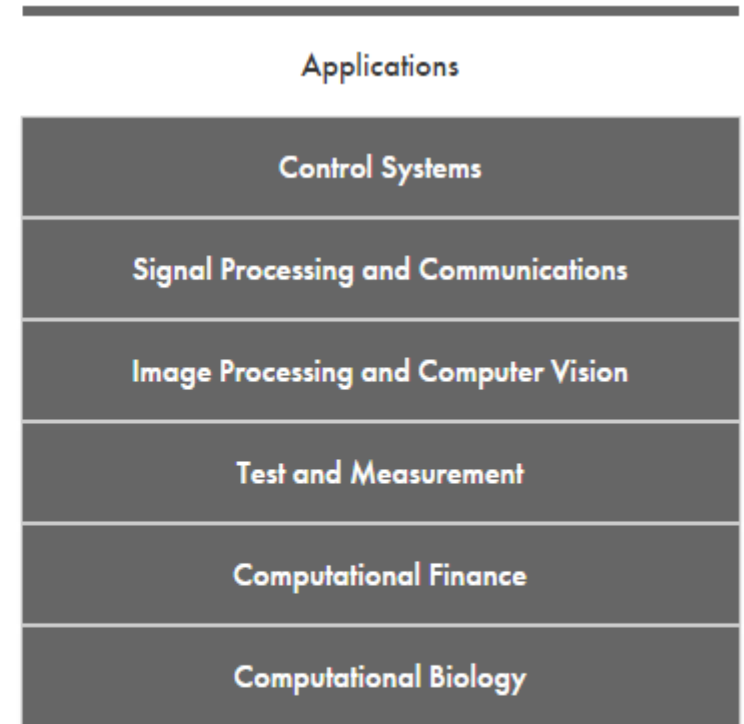
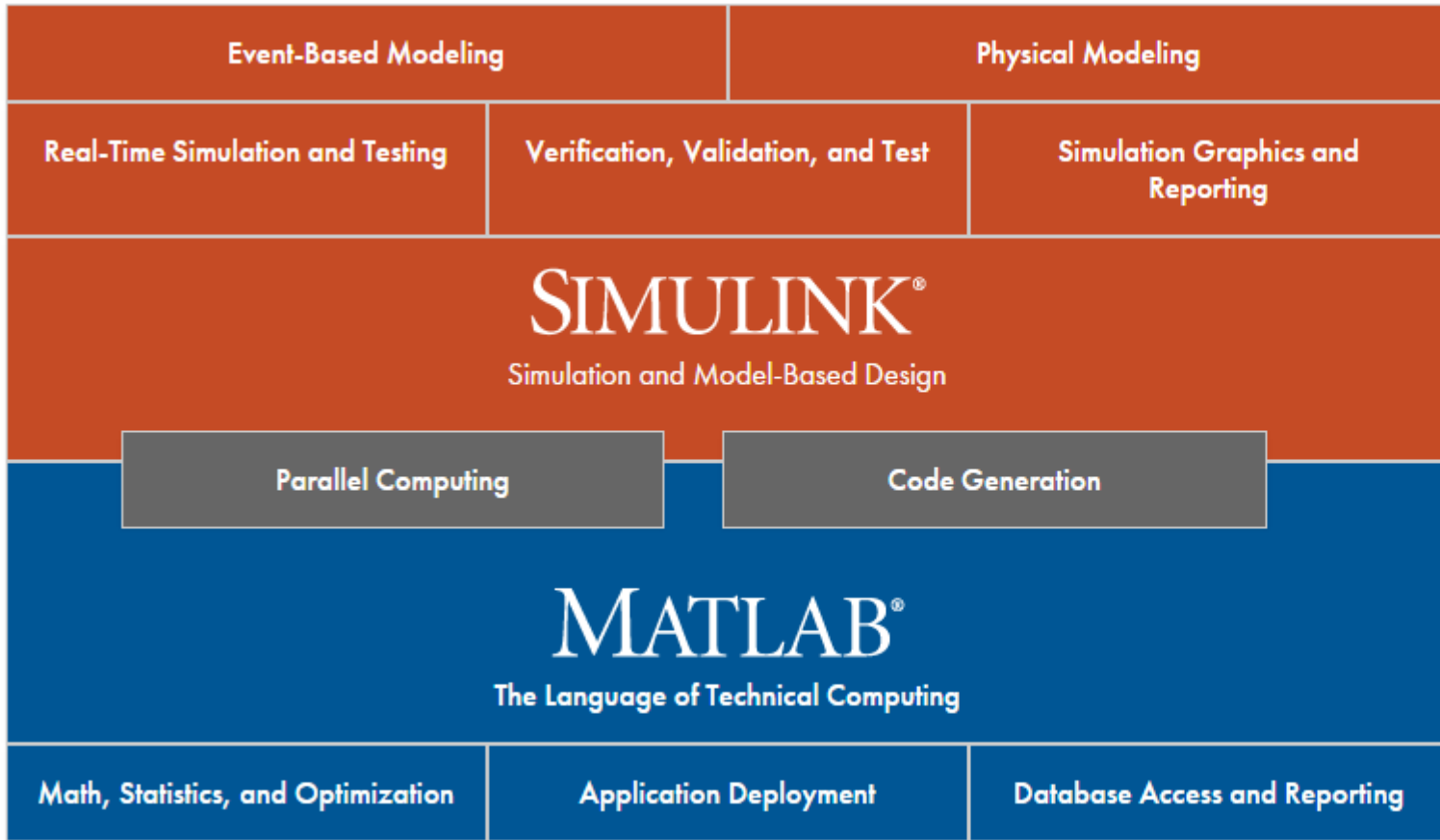


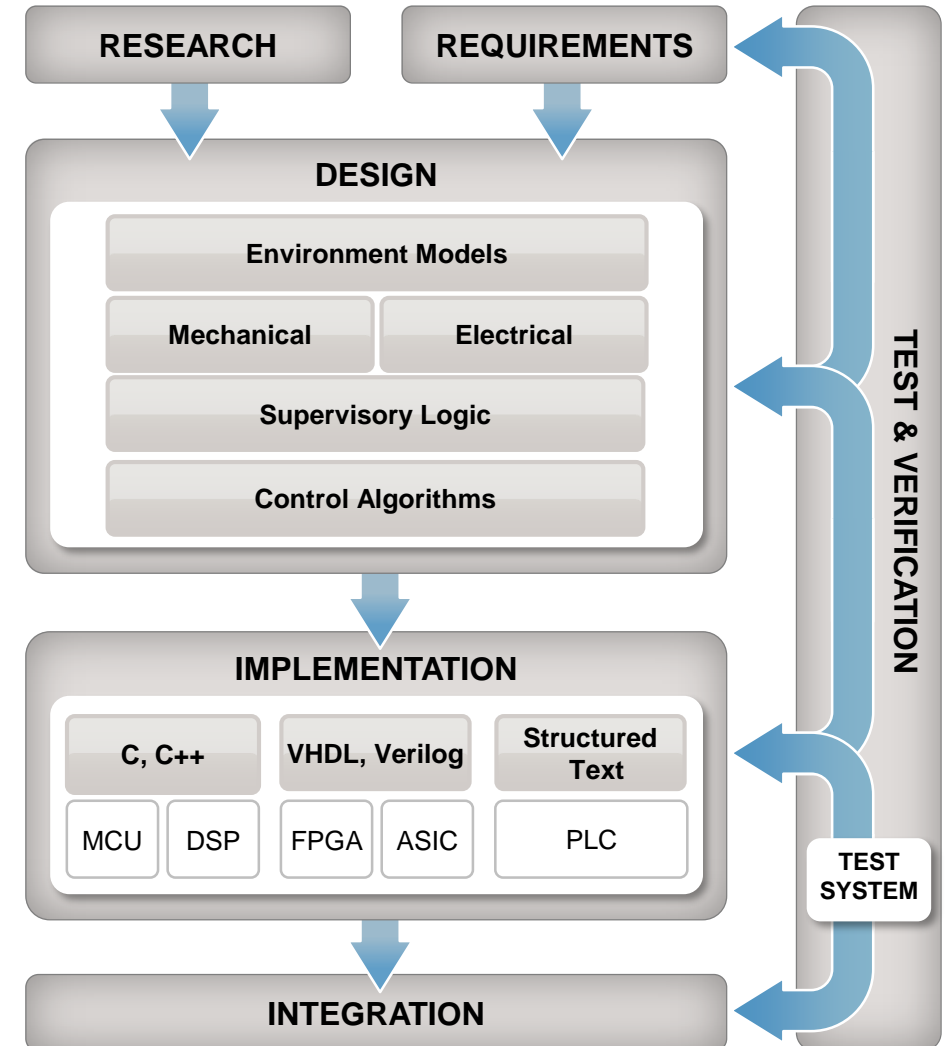
What's New in Simulink in R2015b and R2016a

Ruth-Anne Marchant
Application Engineer

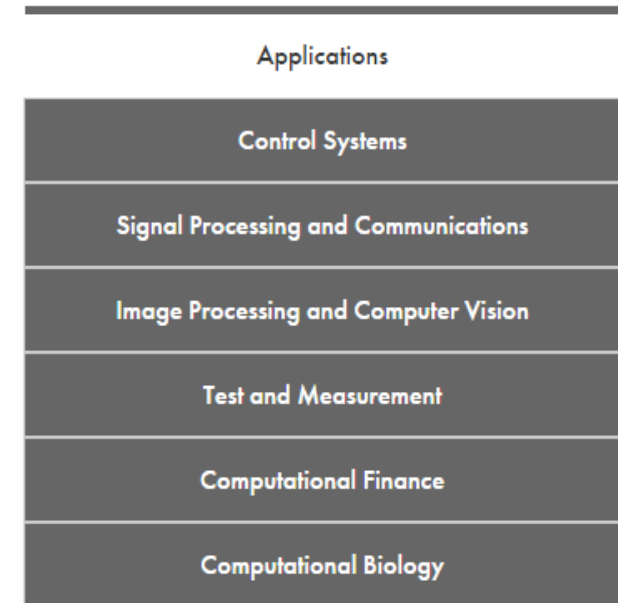
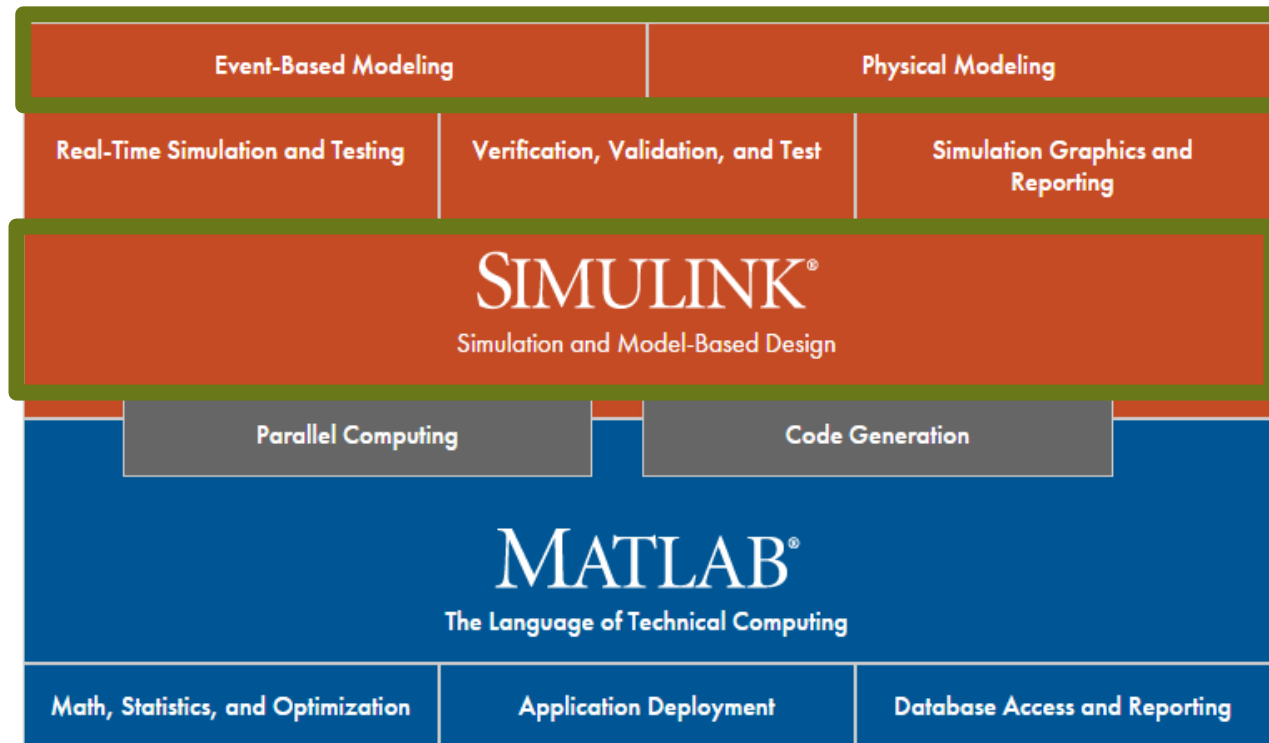


Summary of Major New Capabilities for Model-Based Design

- 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

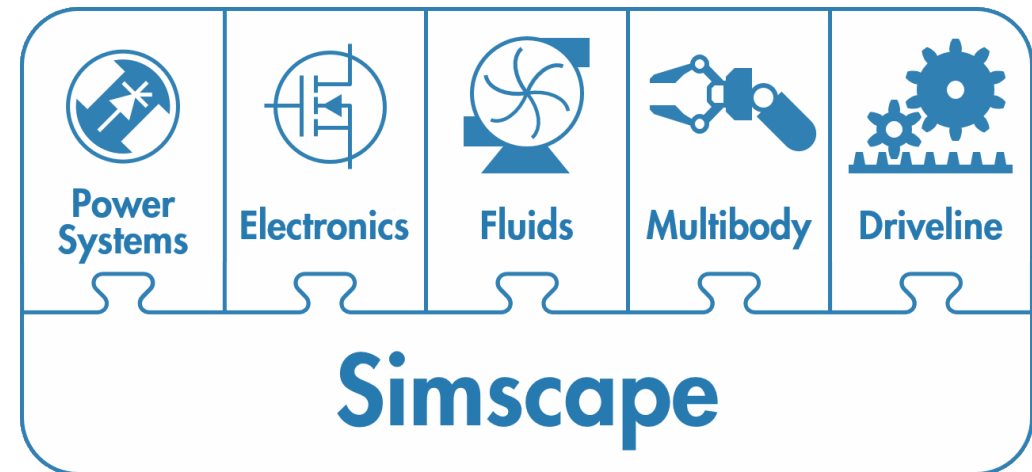


Modelling Physical Systems

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

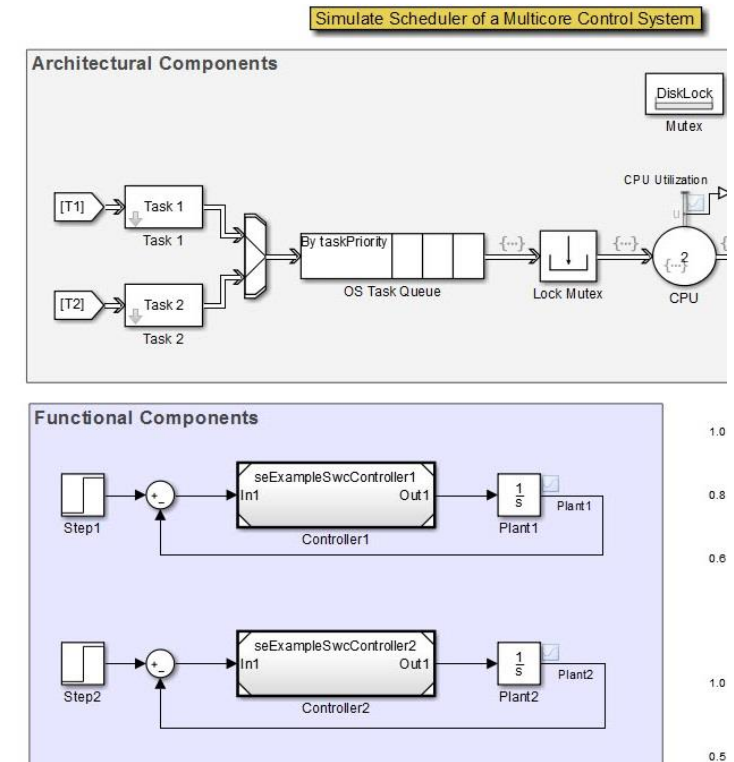
SimEvents – Completely Redesigned for Model-Based Design

What is this update about?

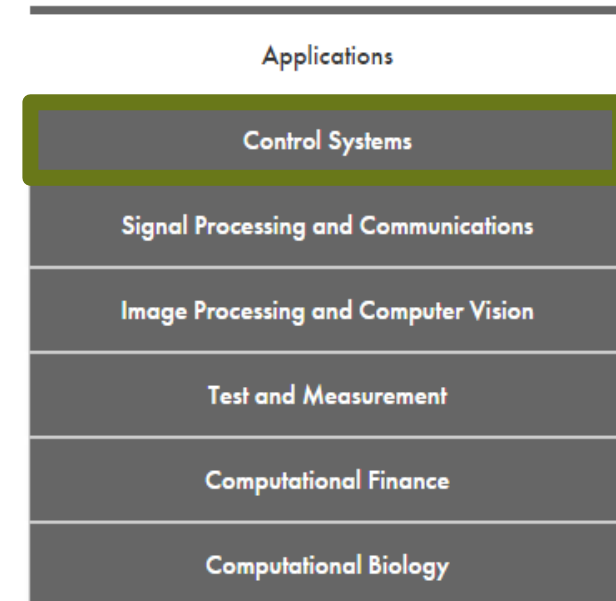
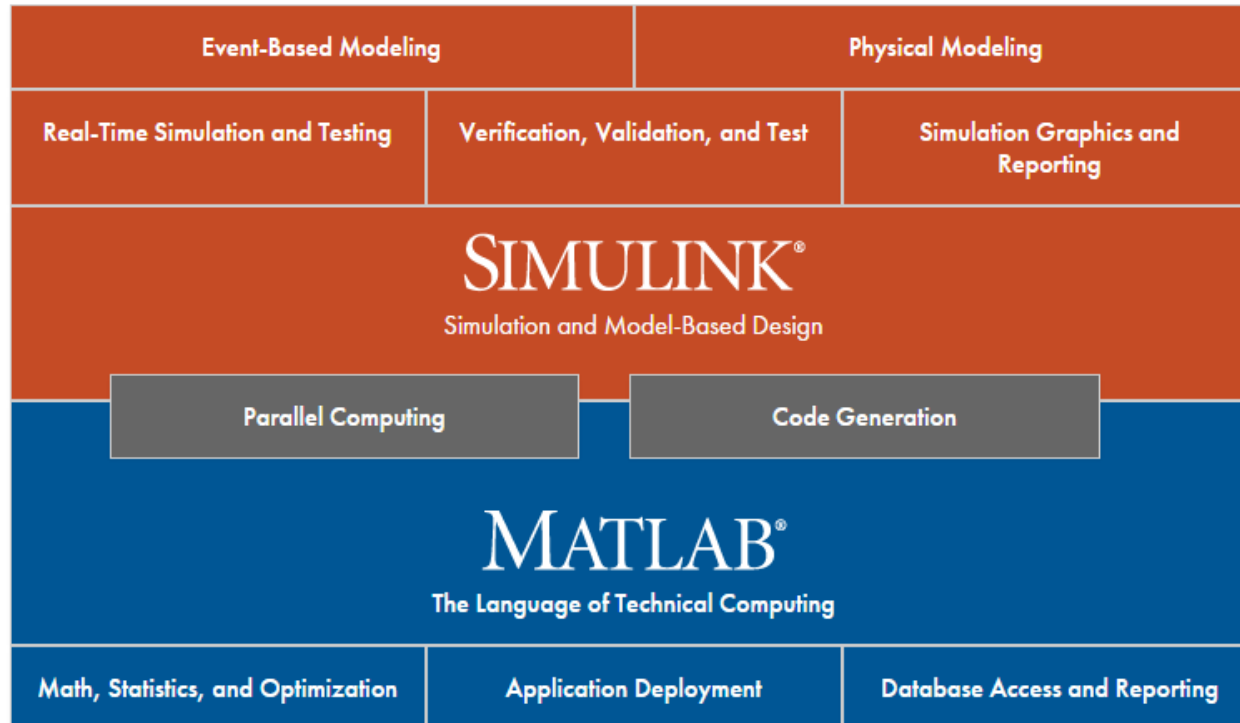
- Develop custom queues, SimEvents blocks, and visualization
- Launch functions directly from within SimEvents
- Advance debugging
- Agent-based simulation

Why is this redesign important?

- SimEvents now supports the Model-Based Design Workflow



CONTROL



State-Machine Design and Simulation

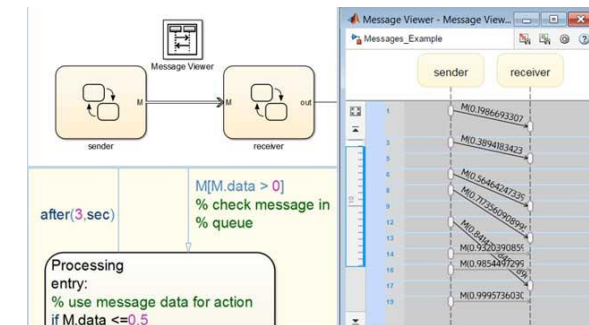
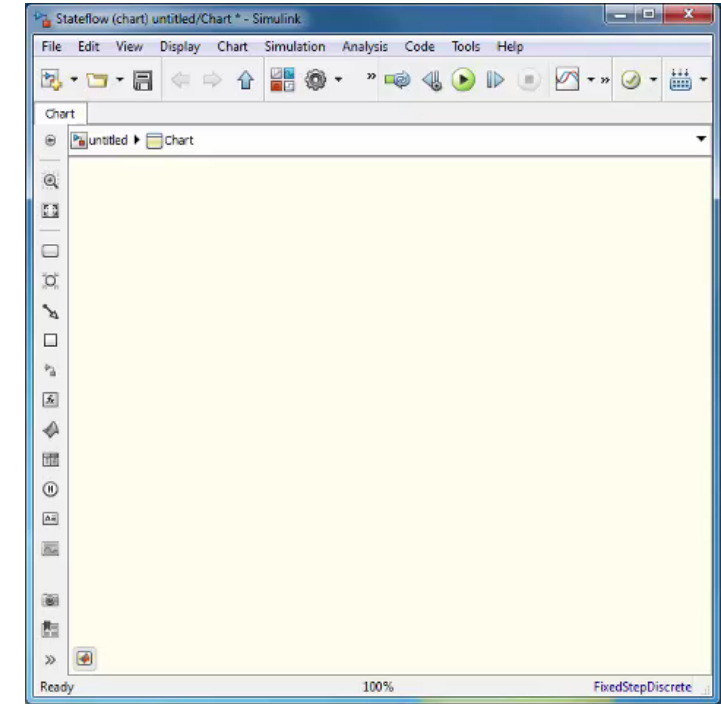
Enhance development with new editing features in Stateflow

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

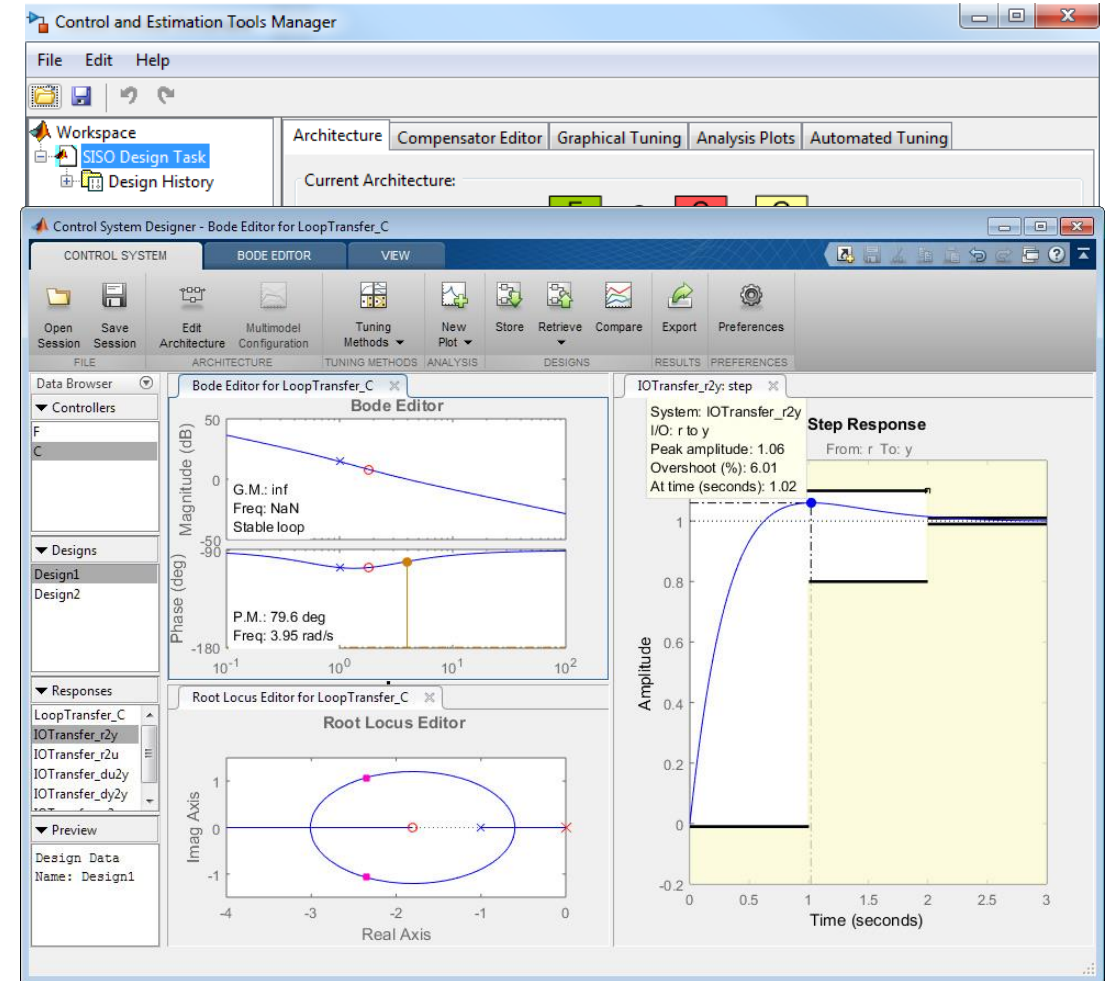
New & Redesigned Apps to tune SISO and MIMO controllers, and create reduced-order models

What is this update about?

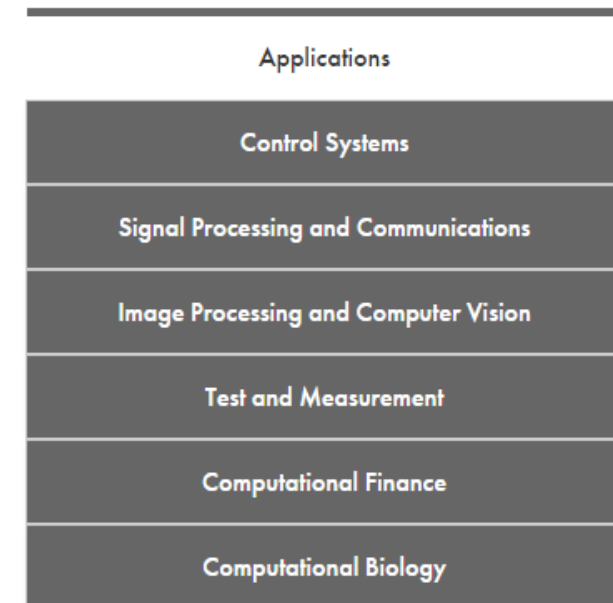
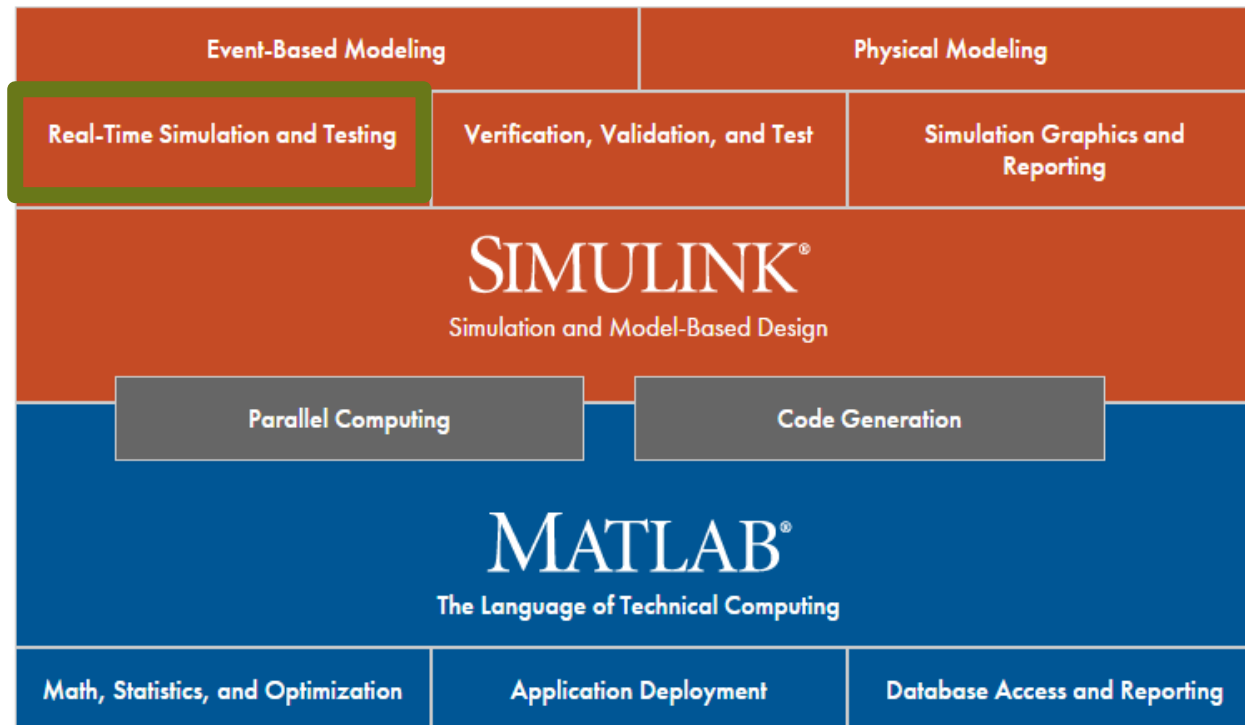
- Redesigned Control Systems Designer App
- Updated Control System Tuner App
- New Model Reducer App

Why are these features important?

- Interactively simplify complex, high-order models
- Discover and learn functionality through apps

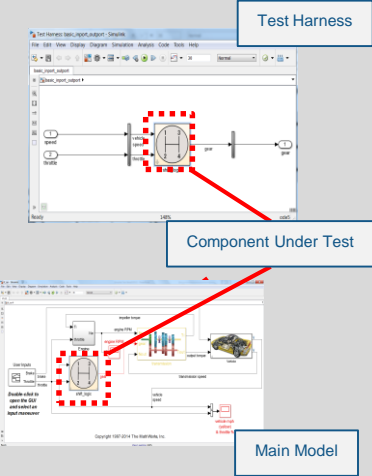
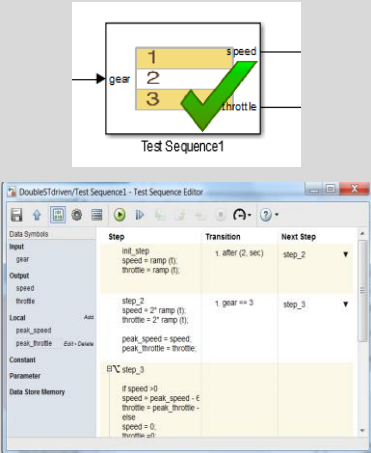
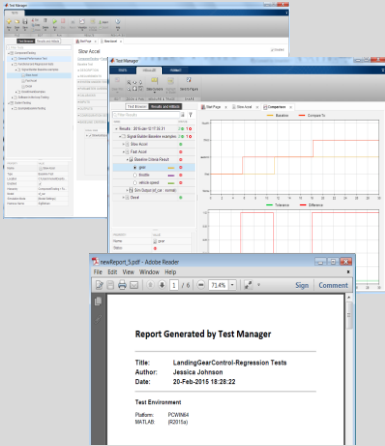


SIMULATION AND HARDWARE TESTING



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"> Synchronized, simulation test environment 	<ul style="list-style-type: none"> Test Inputs and assessments Based on logical, temporal conditions 	<ul style="list-style-type: none"> Author, execute, manage test cases Review, export, report 												
 <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?

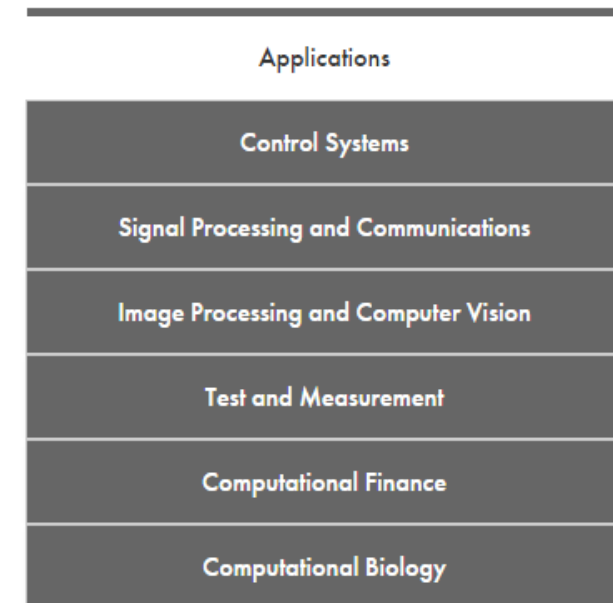
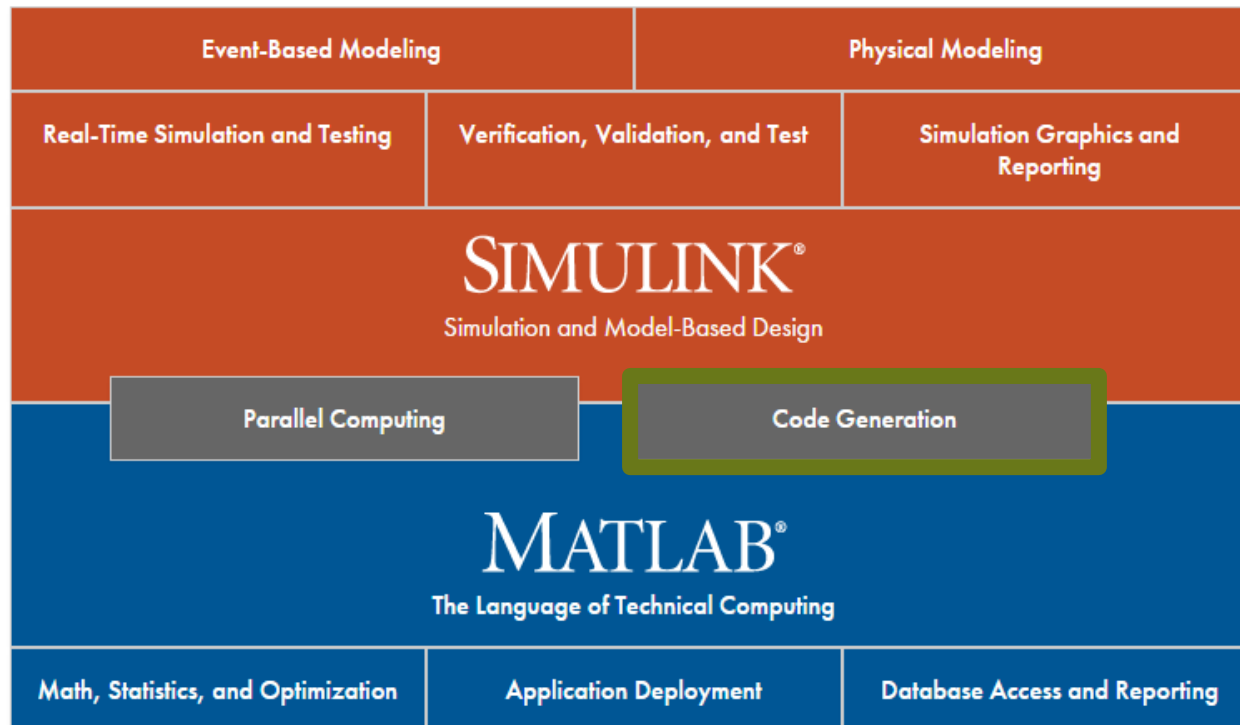
- Real-time testing capability added
- verify Statement to verify simulation behaviour
- External test harness creation for subsystem or model testing

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?

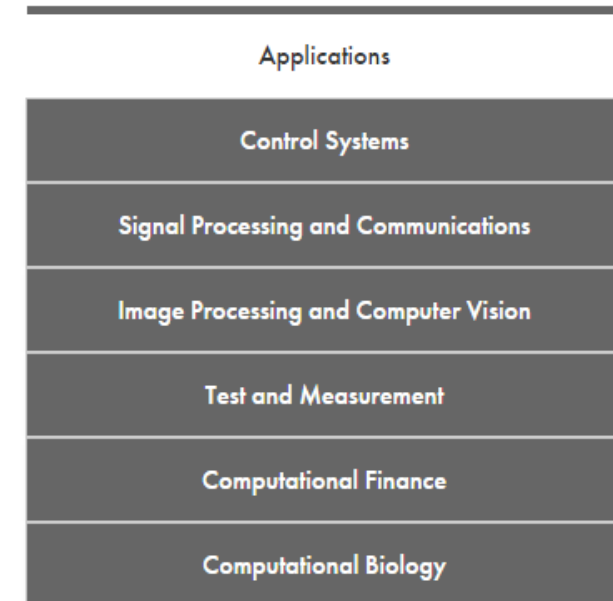
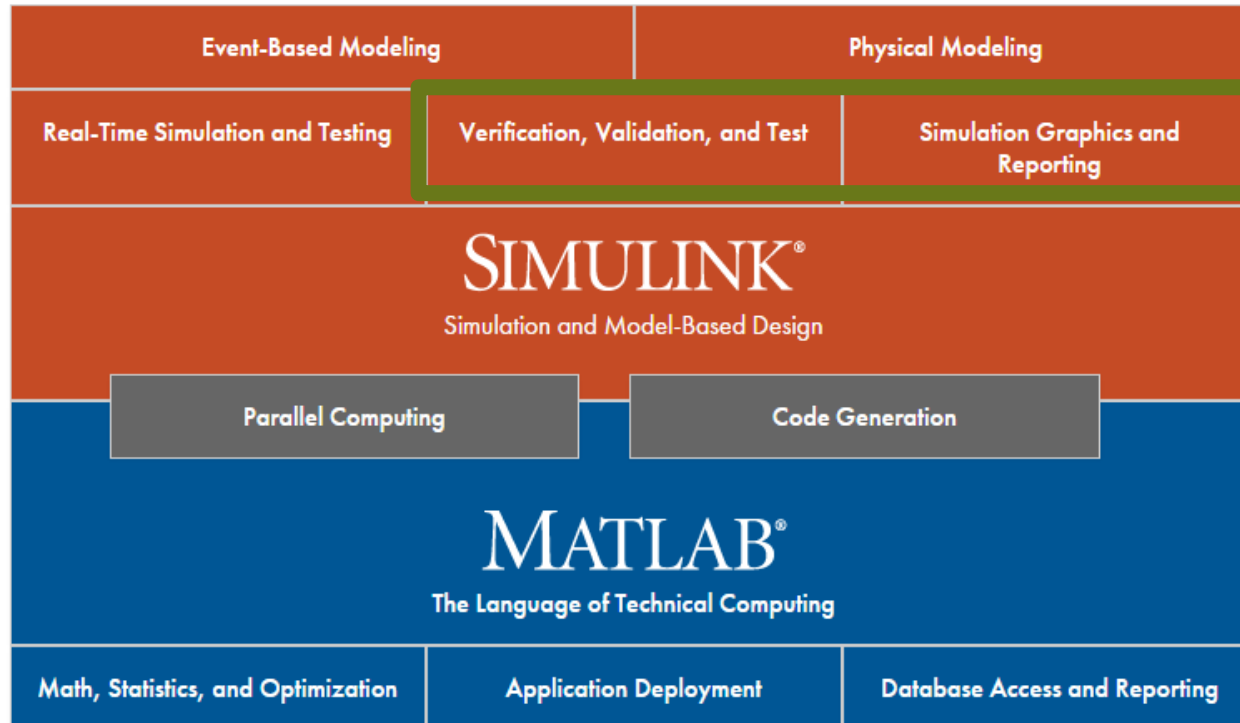
- Generate C code from MATLAB code that uses cell arrays
- Detect and report run-time errors while testing generated standalone libraries and executables

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

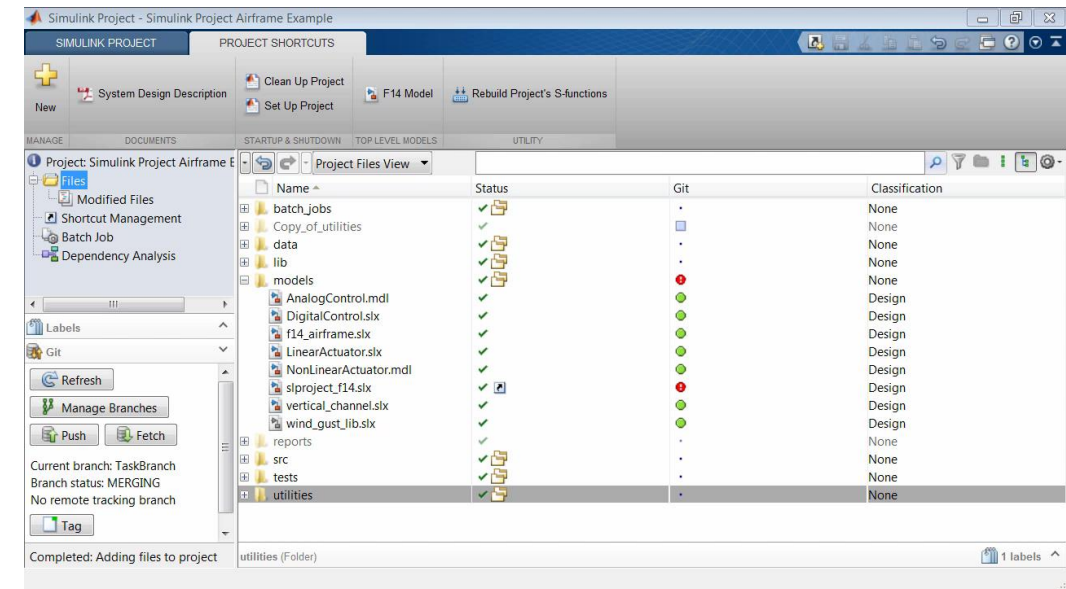
Three-way model merge for graphically resolving conflicts between revisions within a Simulink project

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?

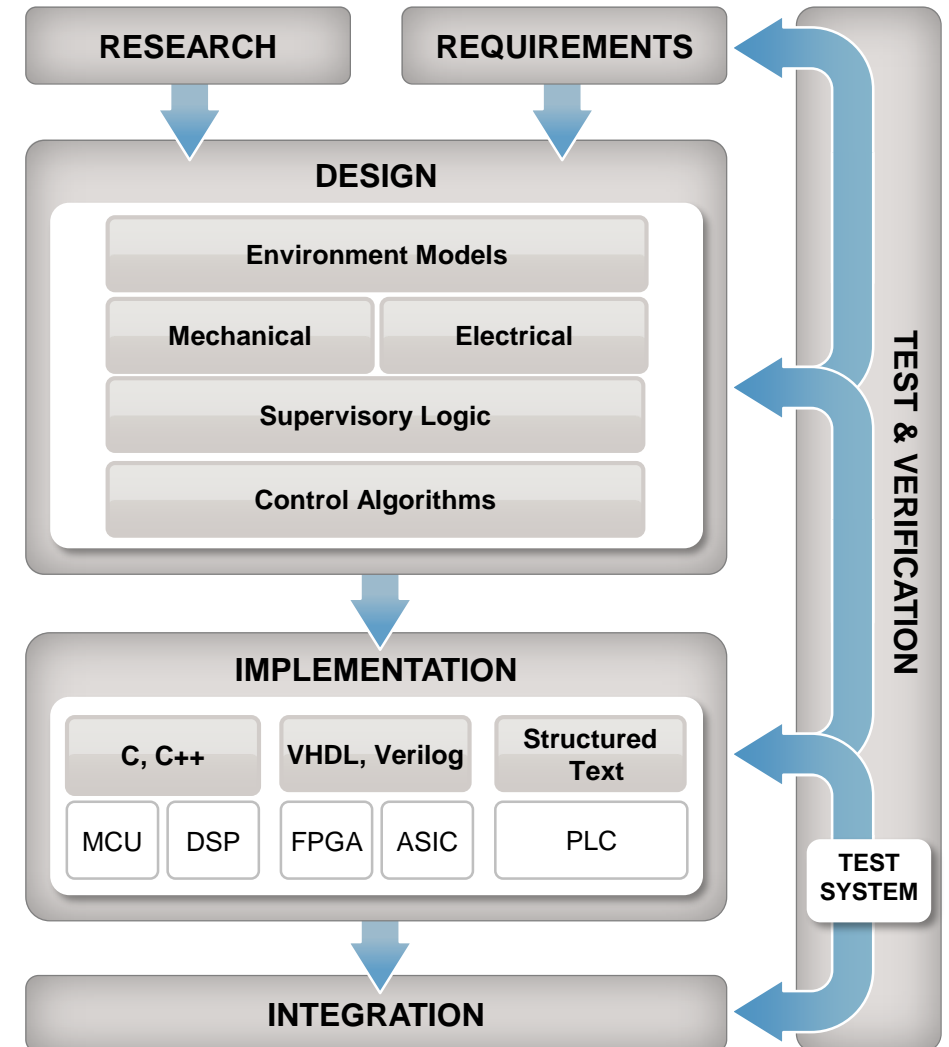
- Detect more types of software defects with 80 new checks – C++ specific, resource management
- View analysis results as they are produced
- Complete MISRA C:2012 support

Why is this feature important?

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

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What's New

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Explore performance improvements to the Simulink® product family.

R2016a

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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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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