

# MATLAB EXPO

## What's New in Simulink

*Ruth-Anne Marchant*  
*Senior Application Engineer*



2,611





**SIMULINK®**



**Test and Verify**



**Share and Deploy**



**SIMULINK®**



**Test and Verify**

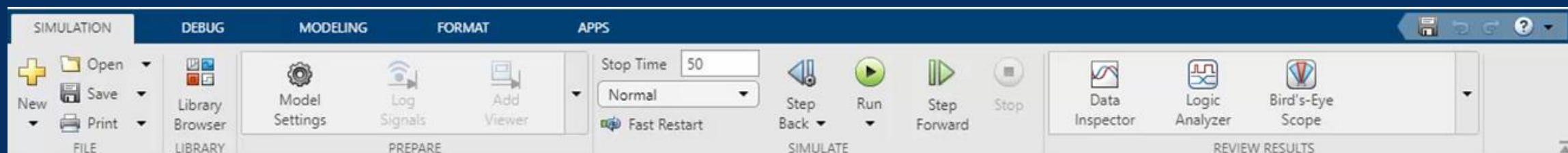


**Share and Deploy**



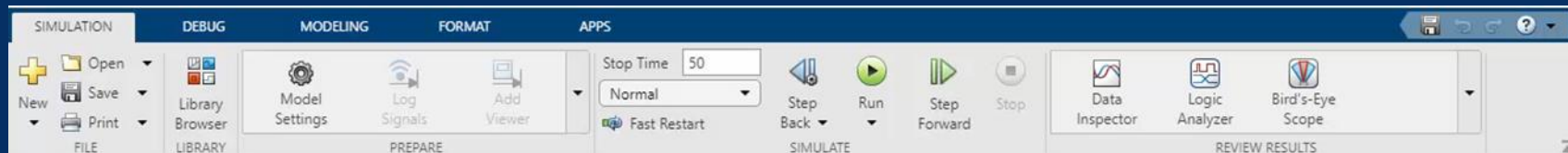
# Enable **any engineer** at **any level** to model **any system**

## User interfaces

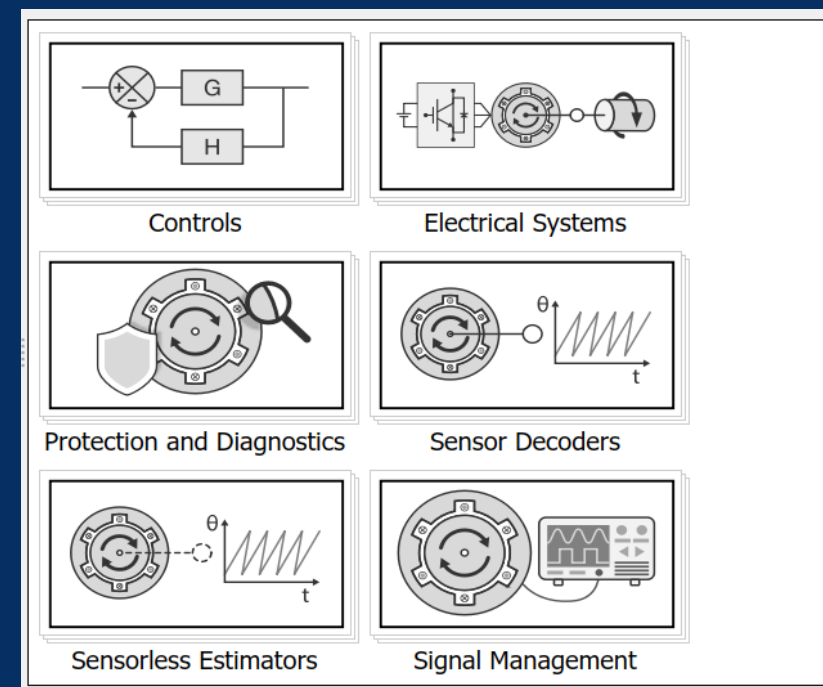


# Enable **any engineer** at **any level** to model **any system**

User interfaces

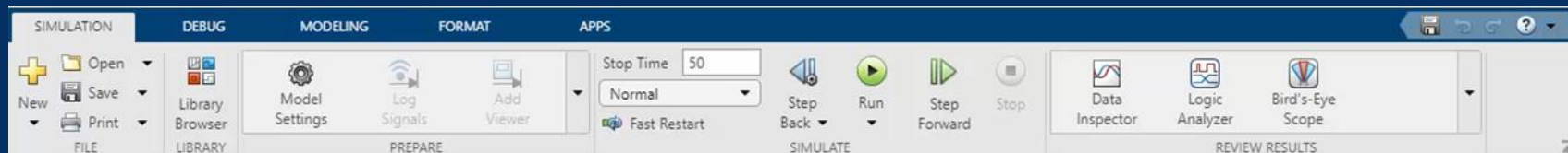


Libraries



# Enable **any engineer** at **any level** to model **any system**

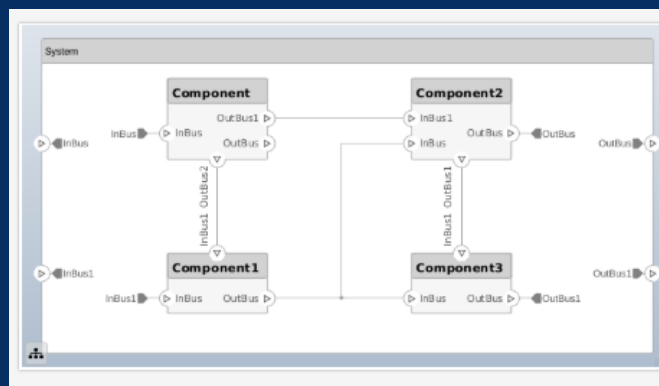
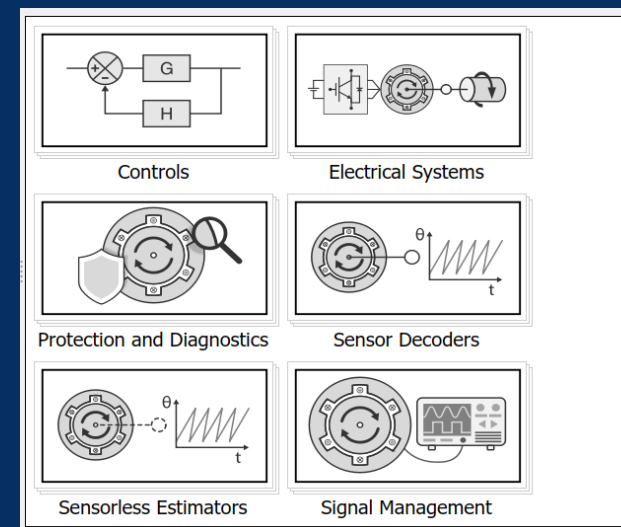
User interfaces



Libraries



Systems engineering



## Architecture Model

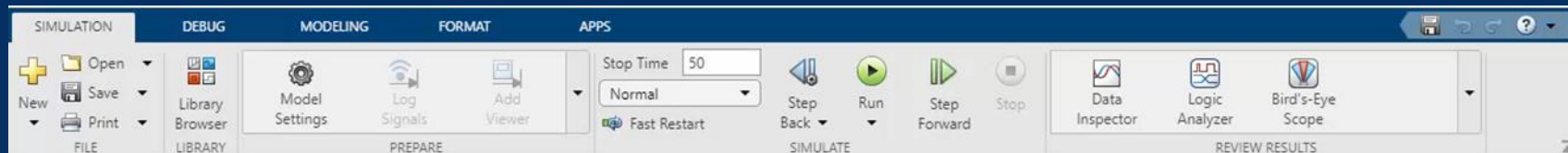
By The MathWorks, Inc.

[Create Model](#)

Create an architecture model. Model physical and logical architecture of a system. Create a visual representation with components, ports, and connectors. Specify information exchange between components with interfaces.

# Enable any engineer at any level to model any system

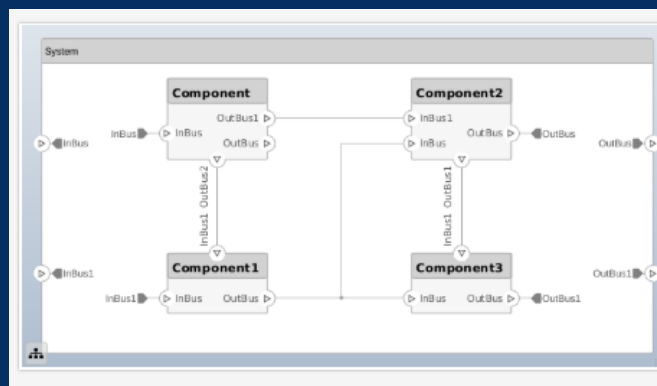
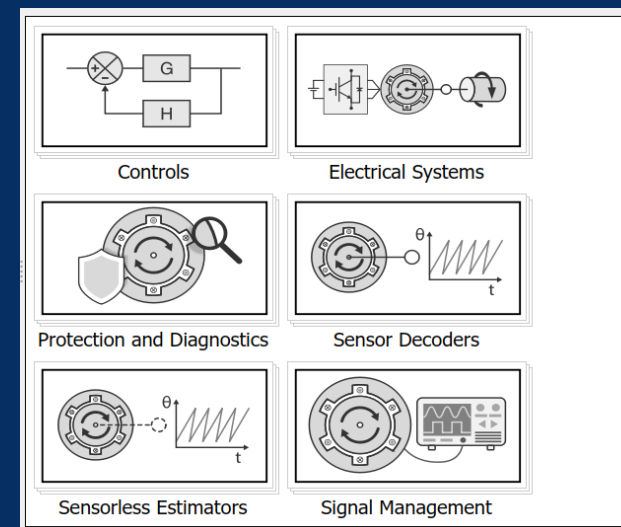
User interfaces



Libraries



Systems engineering



## Architecture Model

By The MathWorks, Inc.

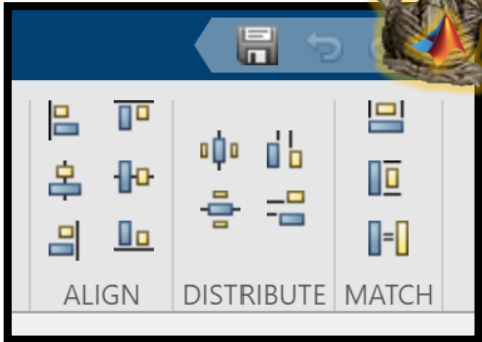
[Create Model](#)

Create an architecture model. Model physical and logical architecture of a system. Create a visual representation with components, ports, and connectors. Specify information exchange between components with interfaces.



Now it's time to show you a little of what's old...

Well...



R2008a

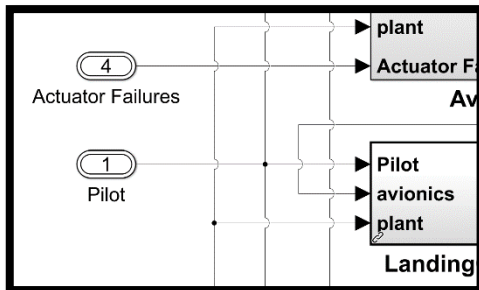


Why do we have to navigate out of a subsystem just to see its interface?

We spend too much time formatting blocks!

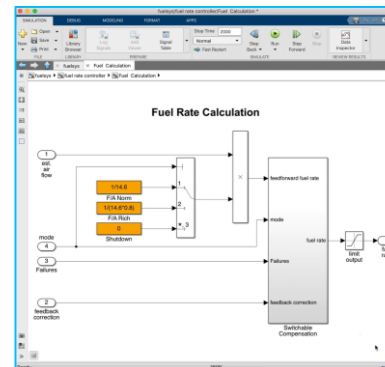
We need tools and blocks.

You bet



R2012b

Interface View

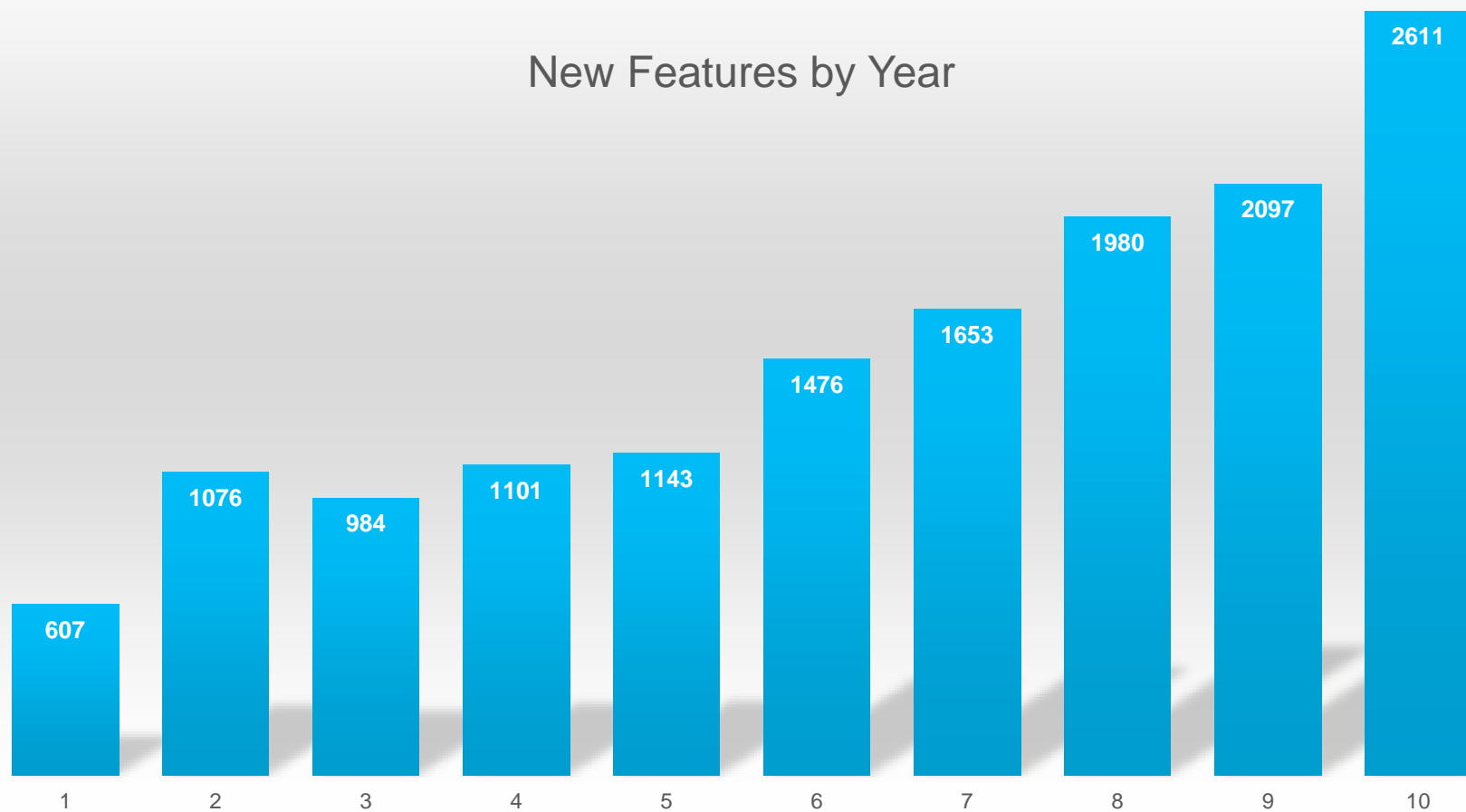


R2014b

sical

# It's not your fault!

New Features by Year





# Our Online Release Notes are interactive

Filter by product or category

Filter by text

Filter by release range

Sort by release or topic

Bug fixes by update

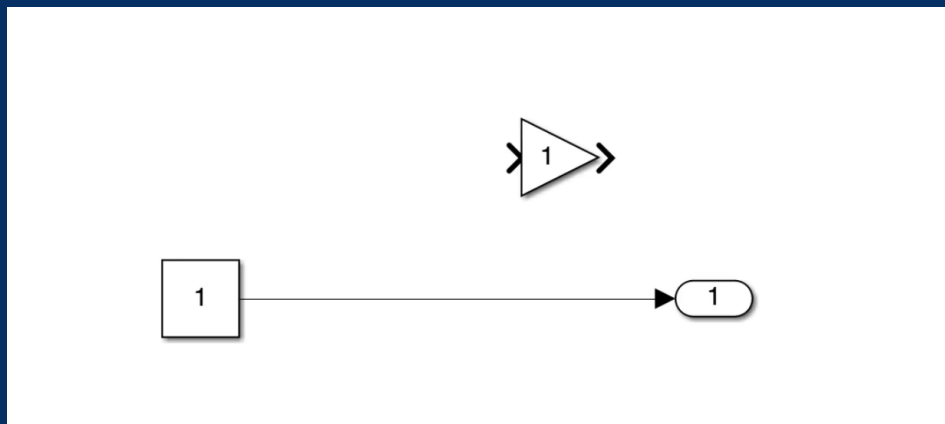
Expandable feature bullets with graphics

So what's the problem?

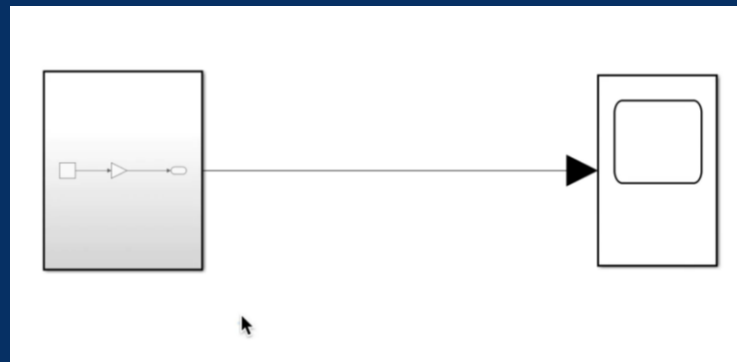
Found 654 notes | Release Range: R2016b to R2019b



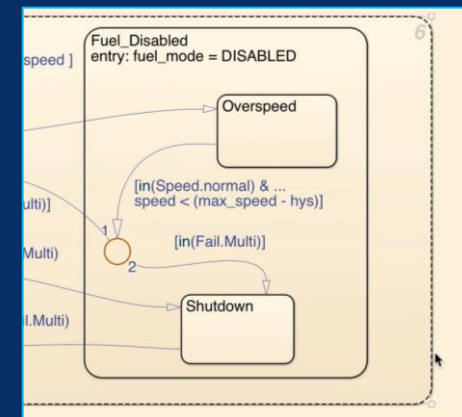
It's our job to bring forward the tools and techniques you need when you need them



Even Spacing Guides  
**R2019a**

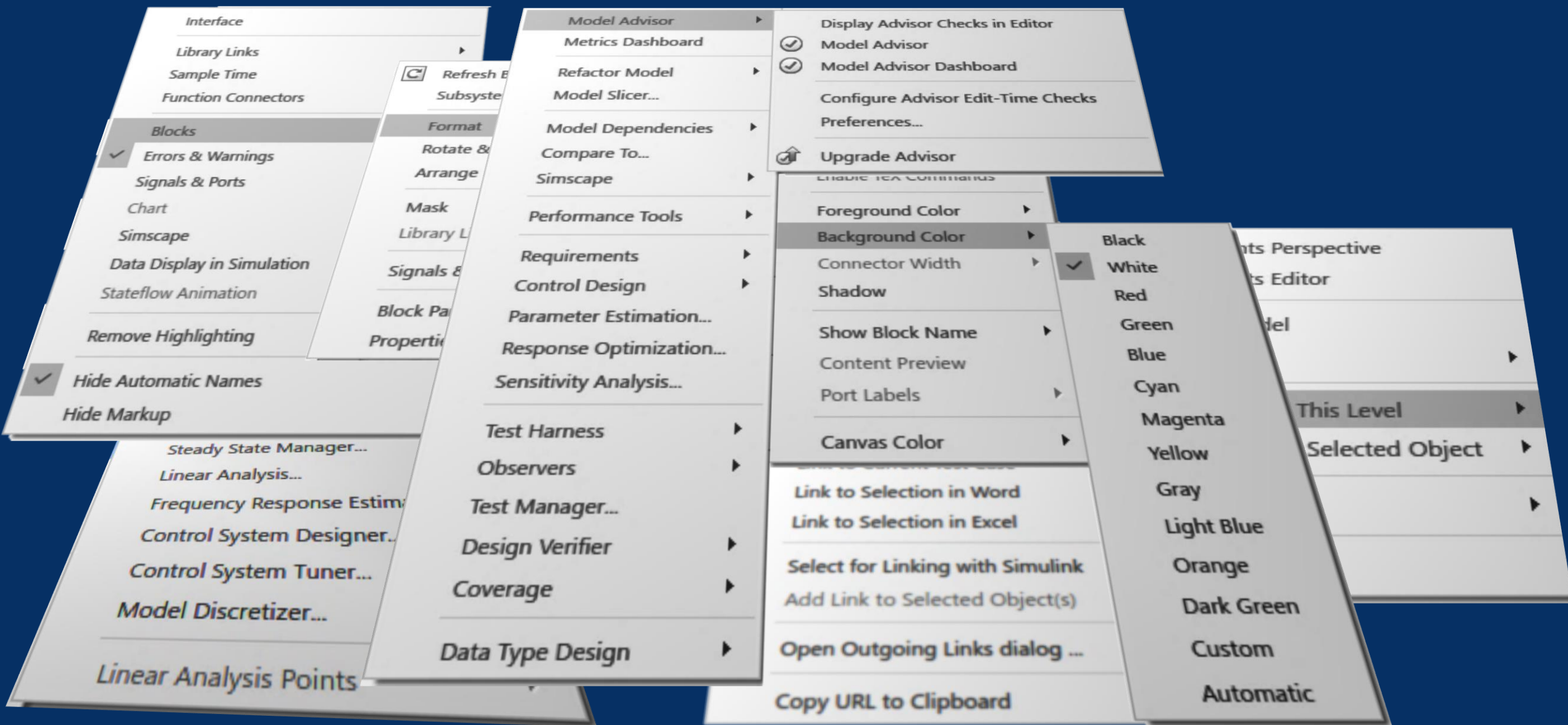


Automatic Port Creation  
**R2018b**



State Drag Regions  
**R2012b**

# Simulink menus have been around for a long time



How many unique menu actions do Simulink products have?

**A + B + C**

**251**

**392**

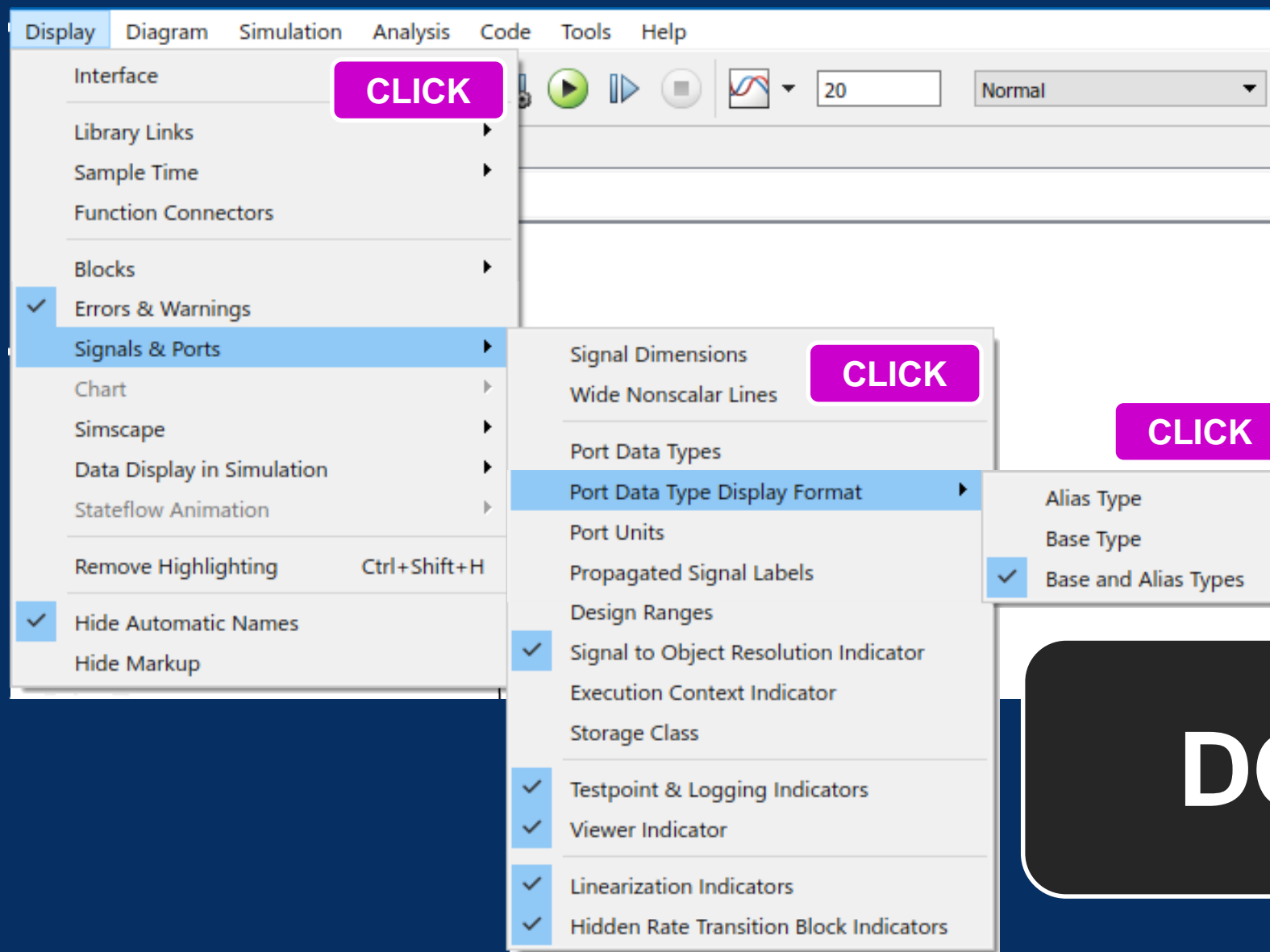
**644**



How many unique menu actions do Simulink products have?

**1,285 actions**  
**and counting**

# Long menus are inefficient

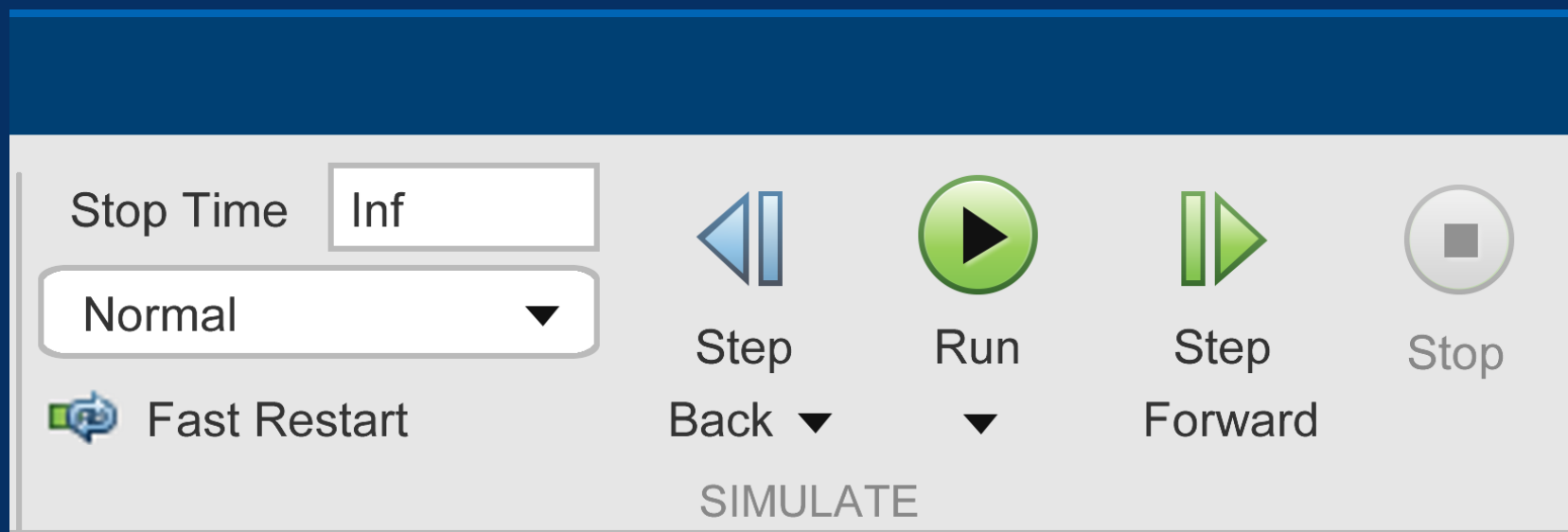


CLICK

CLOSE

**DO IT AGAIN**

# New toolstrip improves discoverability and access to Simulink functionality



R2019b

## Discover & Access



# Toolstrip supports workflows in clearly organized steps

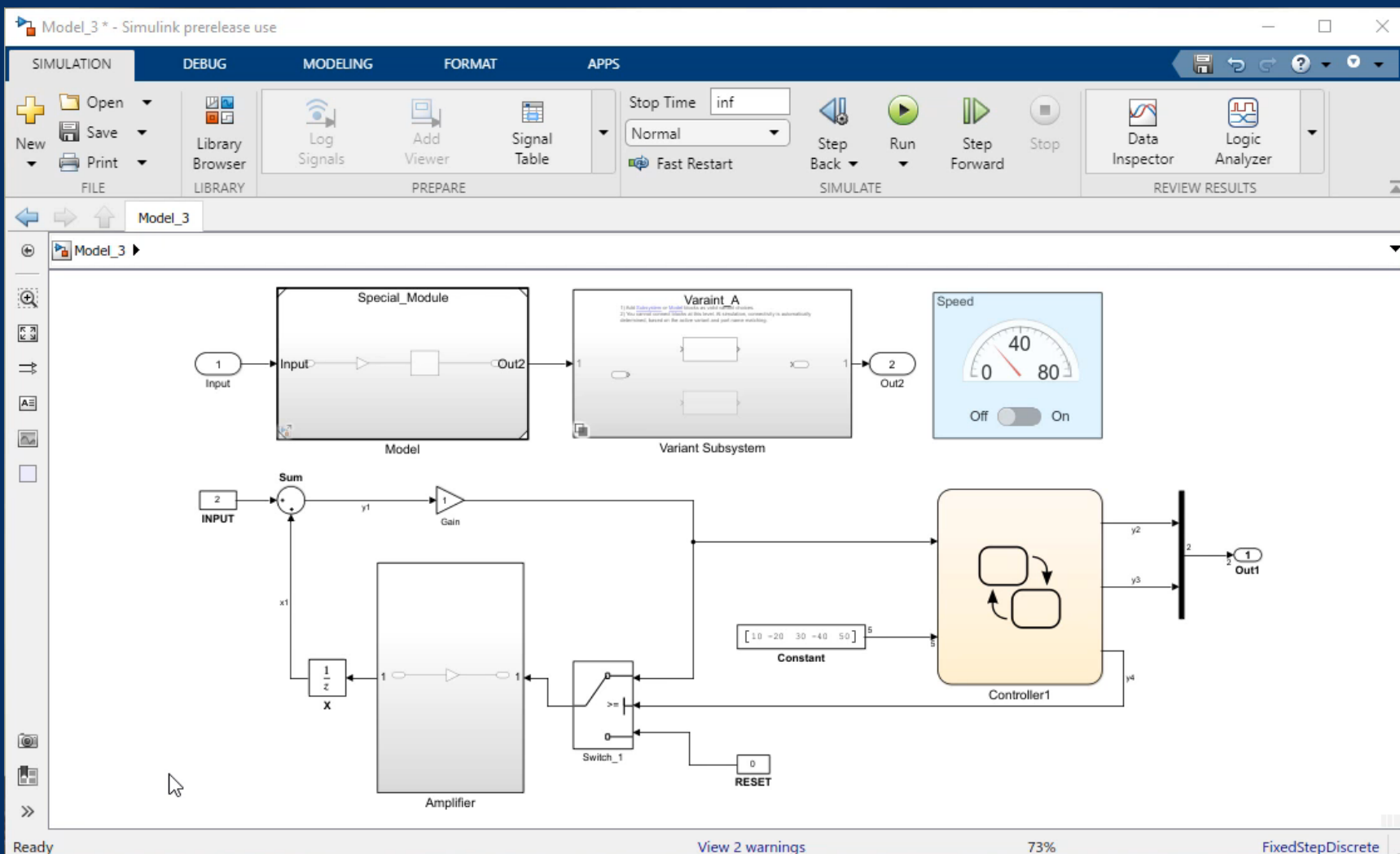
## Simulation Workflow

The image shows a screenshot of the MATLAB/Simulink toolstrip, which is organized into three distinct workflow steps:

- 1 PREPARE**: This step is highlighted with a blue border and includes the 'MODELING' tab. It contains tools for 'Log Signals', 'Add Viewer', and 'Signal Table'.
- 2 'DO IT'**: This step is highlighted with a green border and includes the 'SIMULATE' tab. It contains tools for 'Fast Restart', 'Step Back', 'Run', 'Step Forward', and 'Stop'. The 'Run' button is the primary action for this step.
- 3 REVIEW RESULTS**: This step is highlighted with a brown border and includes the 'REVIEW RESULTS' tab. It contains tools for 'Data Inspector', 'Logic Analyzer', and 'Bird's-Eye Scope'.

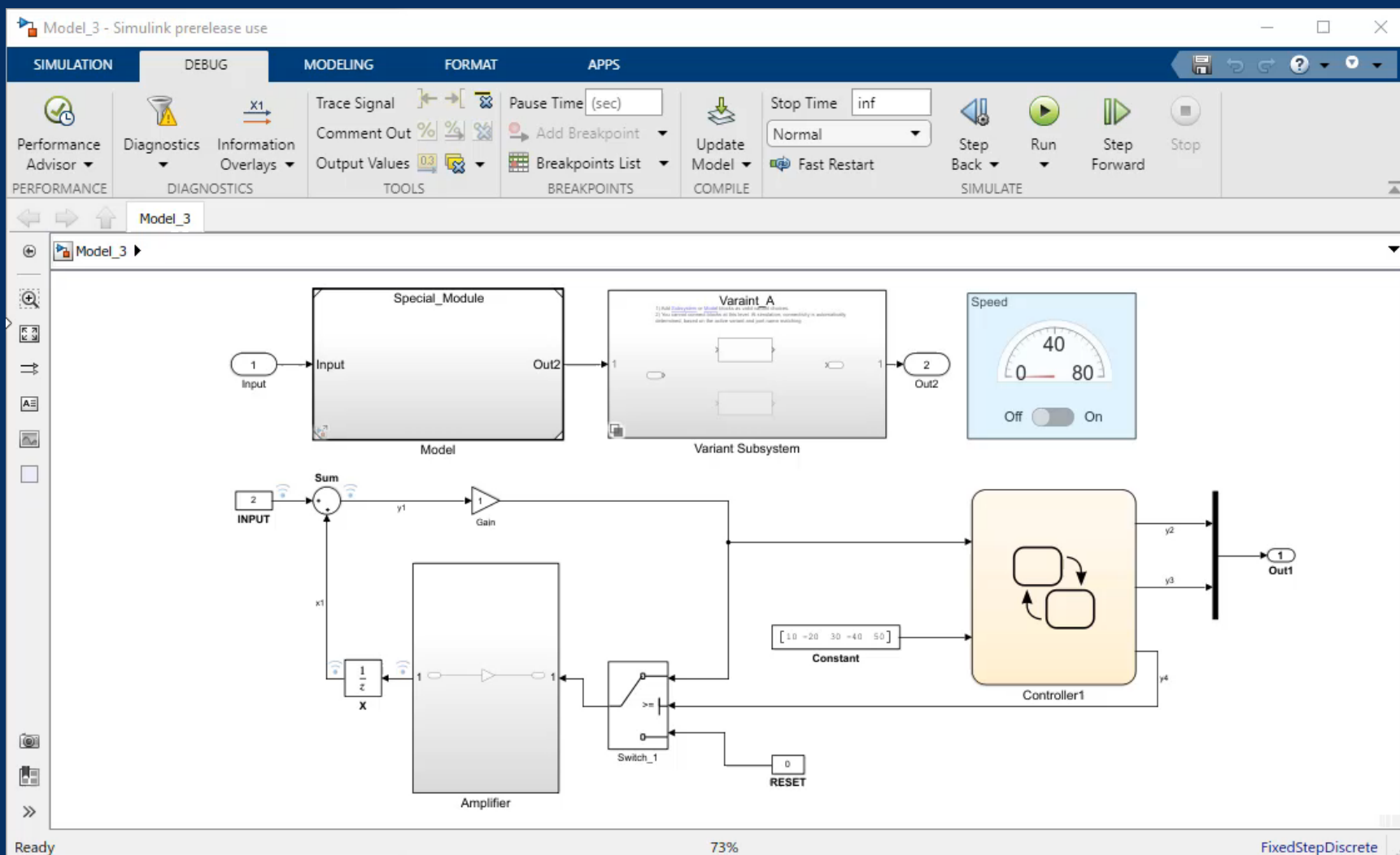
Below the toolstrip, three numbered circles (1, 2, 3) are positioned above corresponding colored buttons labeled 'PREPARE', ''DO IT'', and 'REVIEW RESULTS' respectively, illustrating the workflow sequence.

# Prepare and Results galleries support simulation workflow



# VIDEO

# Debugging tools work together



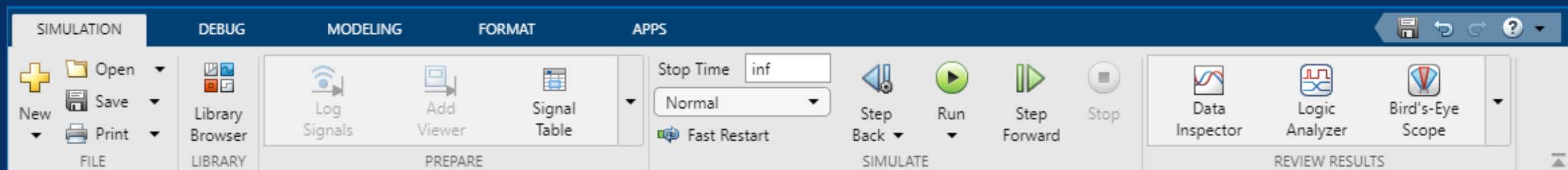
# VIDEO

# Format tab makes your ideas ready for sharing

The screenshot displays the ShareModel+ interface with the **FORMAT** tab selected. The ribbon includes sections for **COPY & VIEW** (Format Painter, Screenshot, Show Markup), **LAYOUT** (Auto Arrange), **FONT & PARAGRAPH** (font size, bold, italic, underline, text color), and **STYLE** (Background, Foreground, Shadow). The main workspace shows a block diagram with two main areas: **Sources** (light blue background) and **System** (light green background). The **Sources** area contains an **Operator** block with a **sensor** and **goal** signal, and an **Environment** block with **disturbance F1** and **disturbance F2** signals. The **System** area contains a **Controller** block with **goal** and **sensor** signals, and a **Mechanical System** block with **control**, **disturbance**, and **sensor** signals. A **My Annotation** panel on the right shows a photograph of a blue car. The status bar at the bottom indicates 'Ready', '124%', and 'VariableStepAuto'.

# VIDEO

# In summary, new Simulink toolstrip improves discoverability and access to long-existing functionality

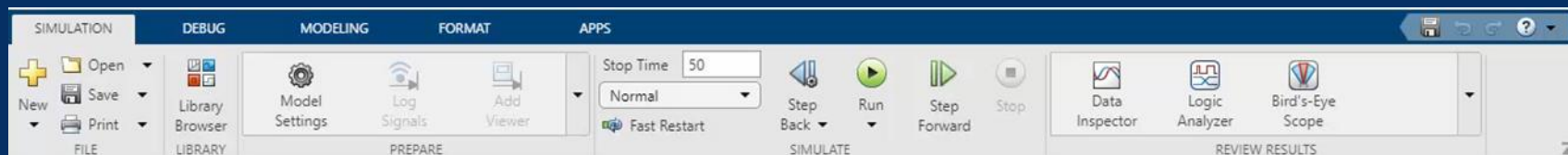


## Discover & Access



# Access and discover Simulink capabilities when you need them

User interfaces

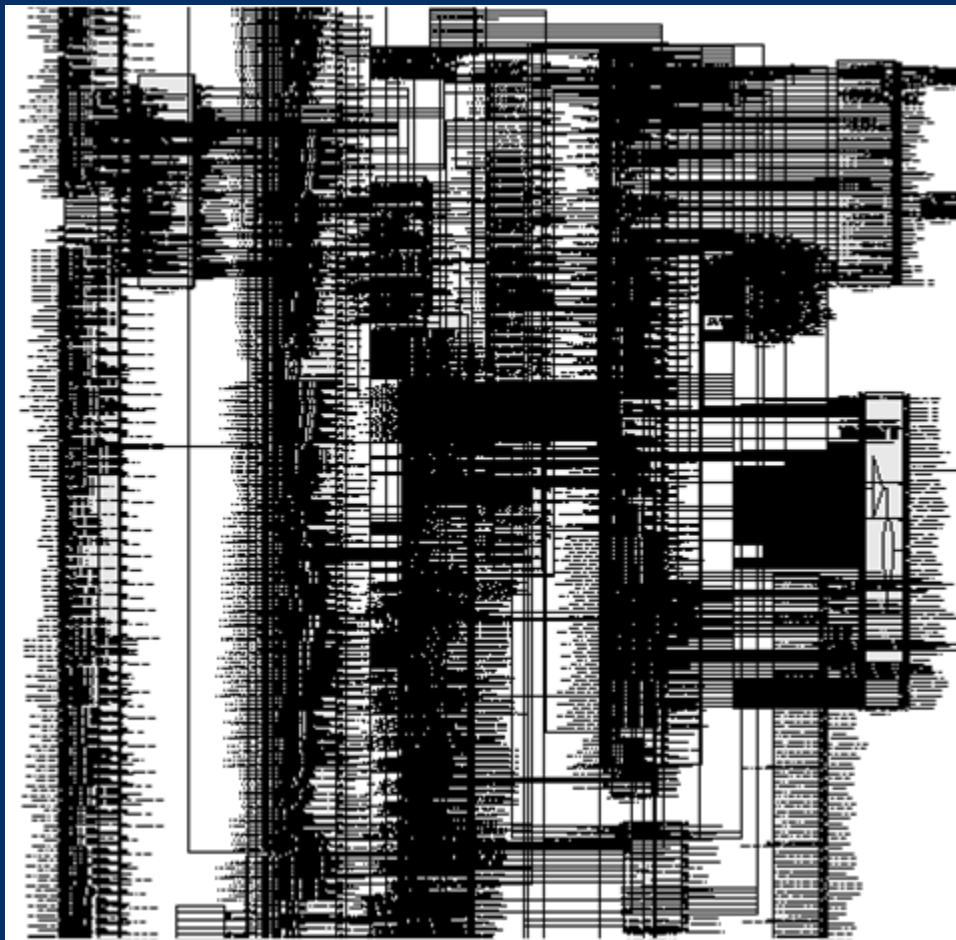


Libraries

Systems engineering

Simulink Toolstrip

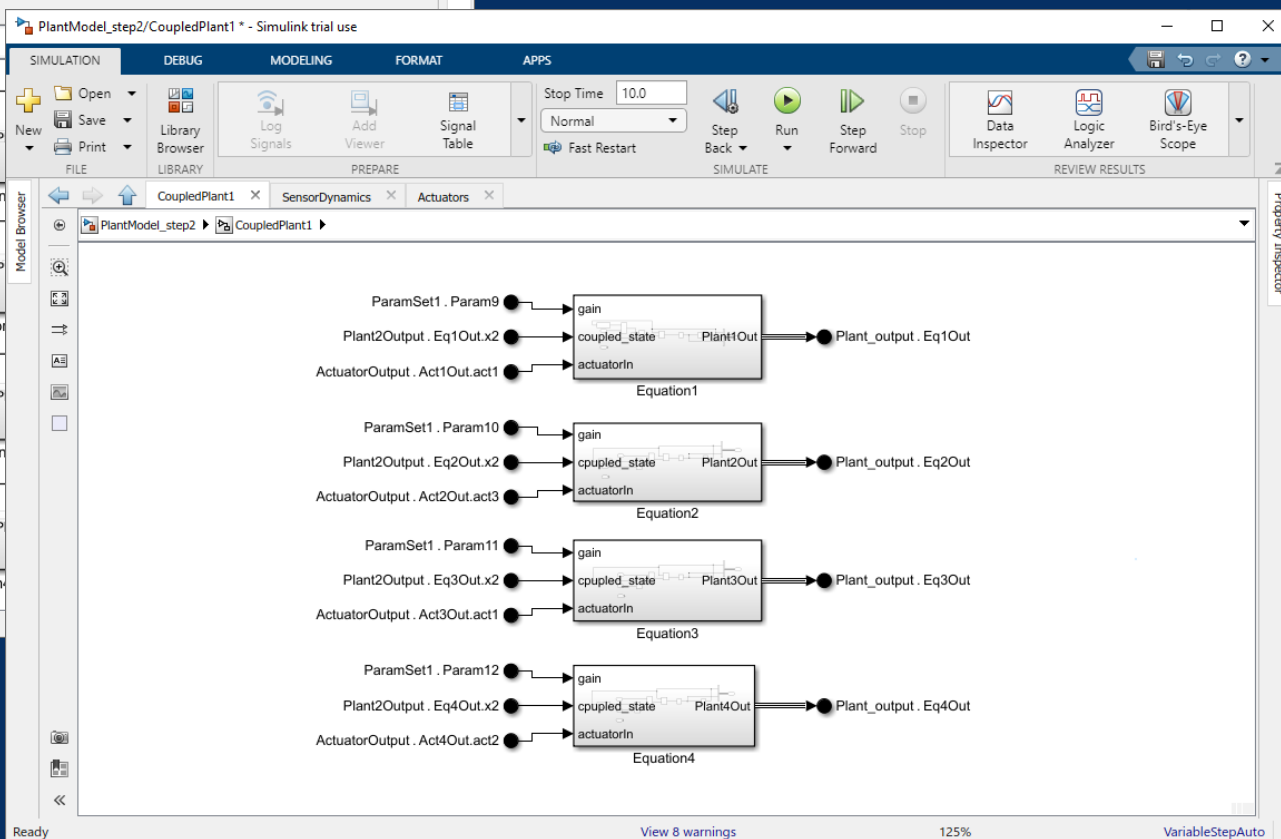
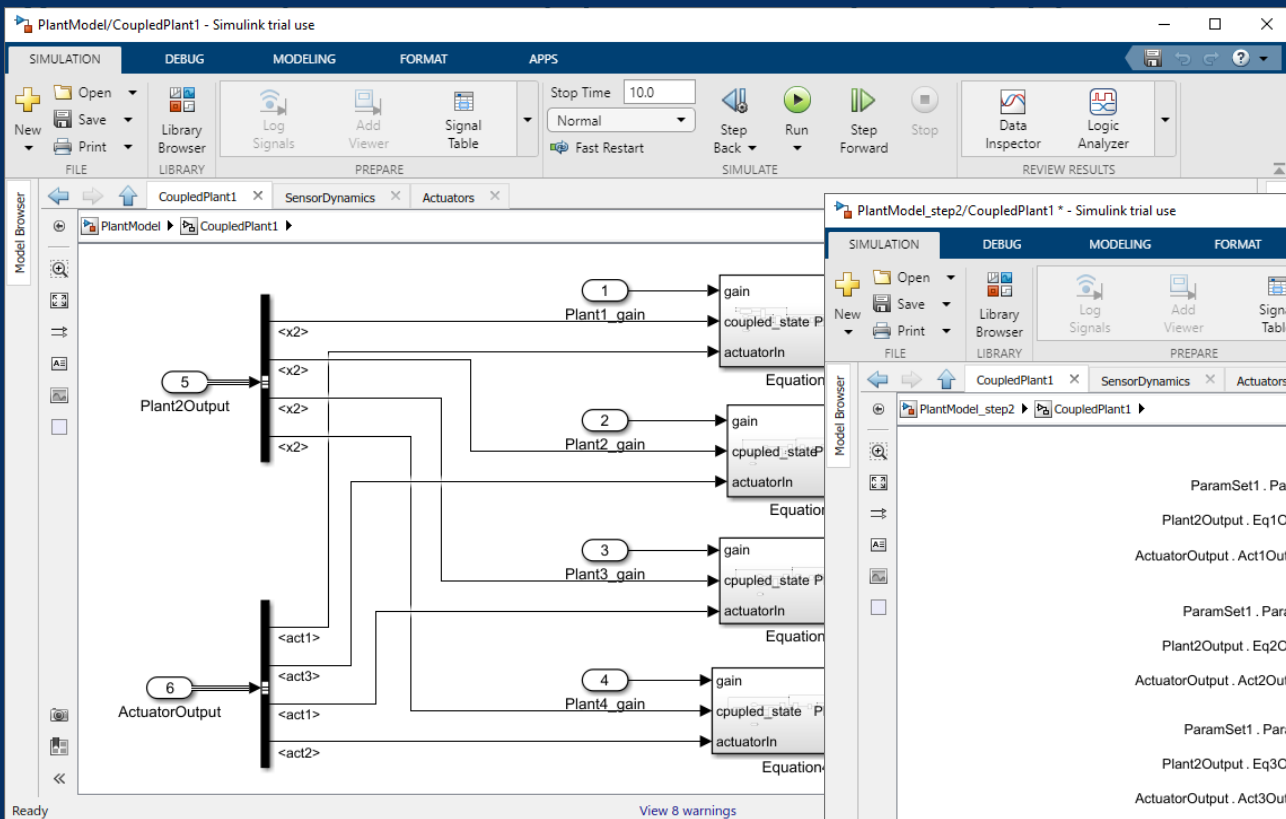
# Real Simulink models can get messy



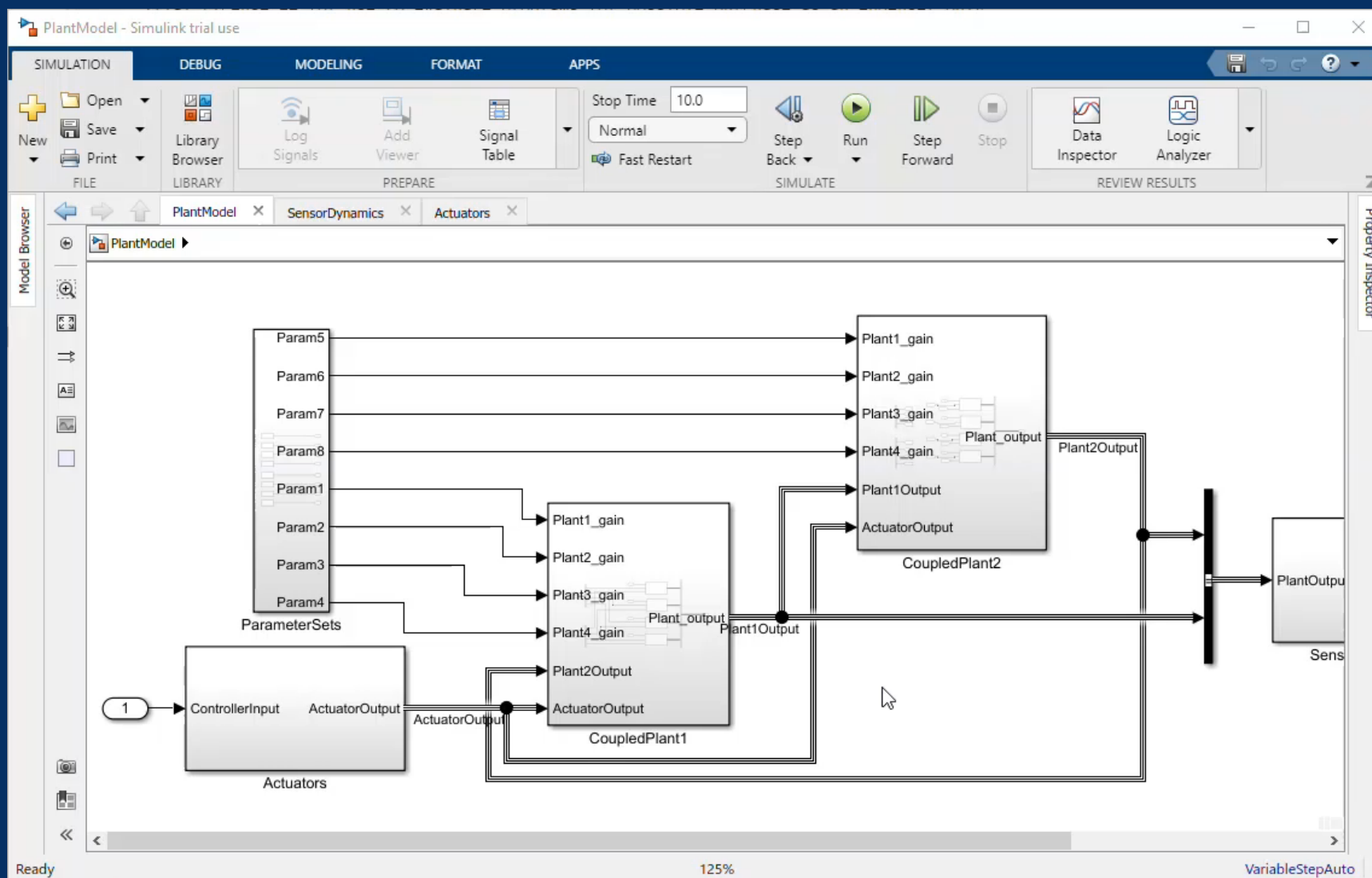
How many of you have a model like this?

# You can make your models more easily readable and editable

*Let's get started!*

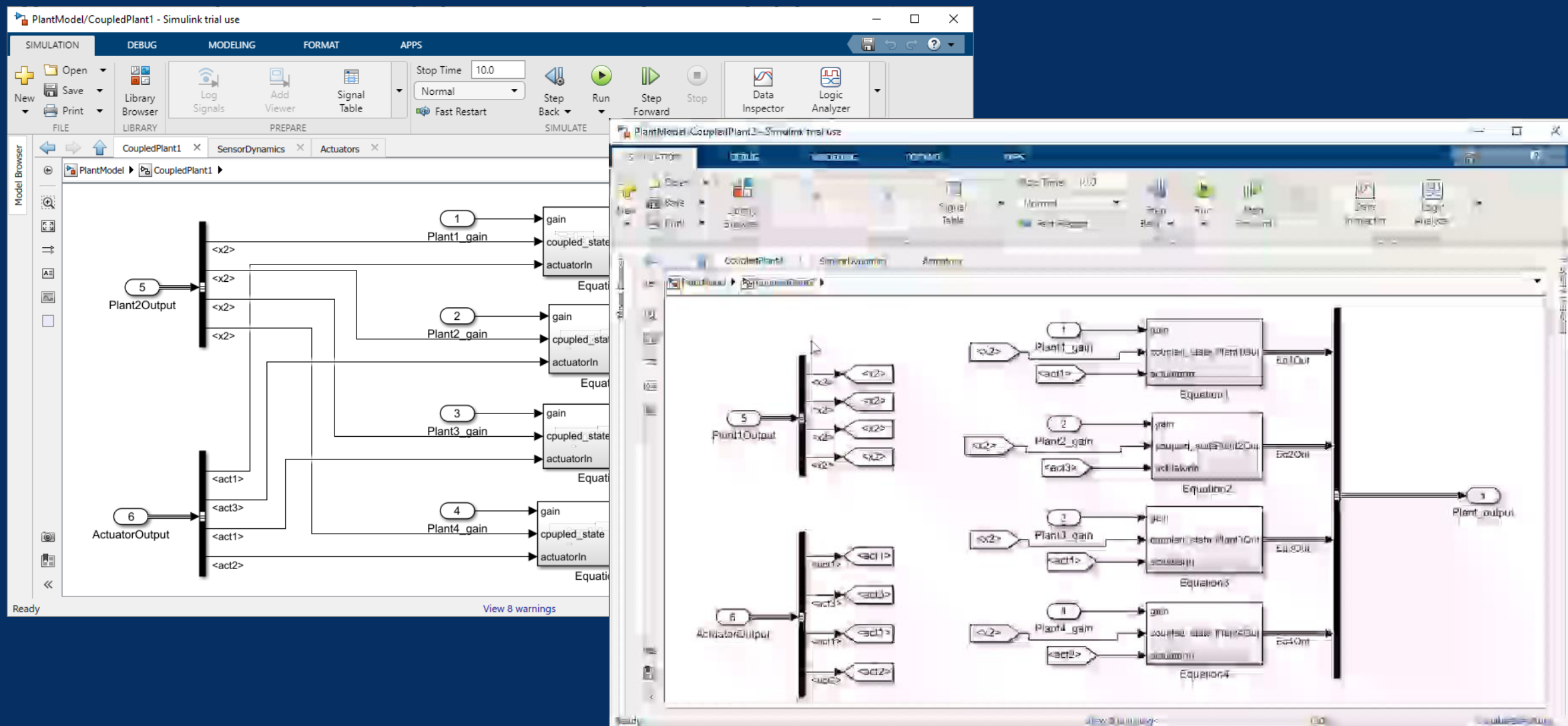


# You can get started with buses easily

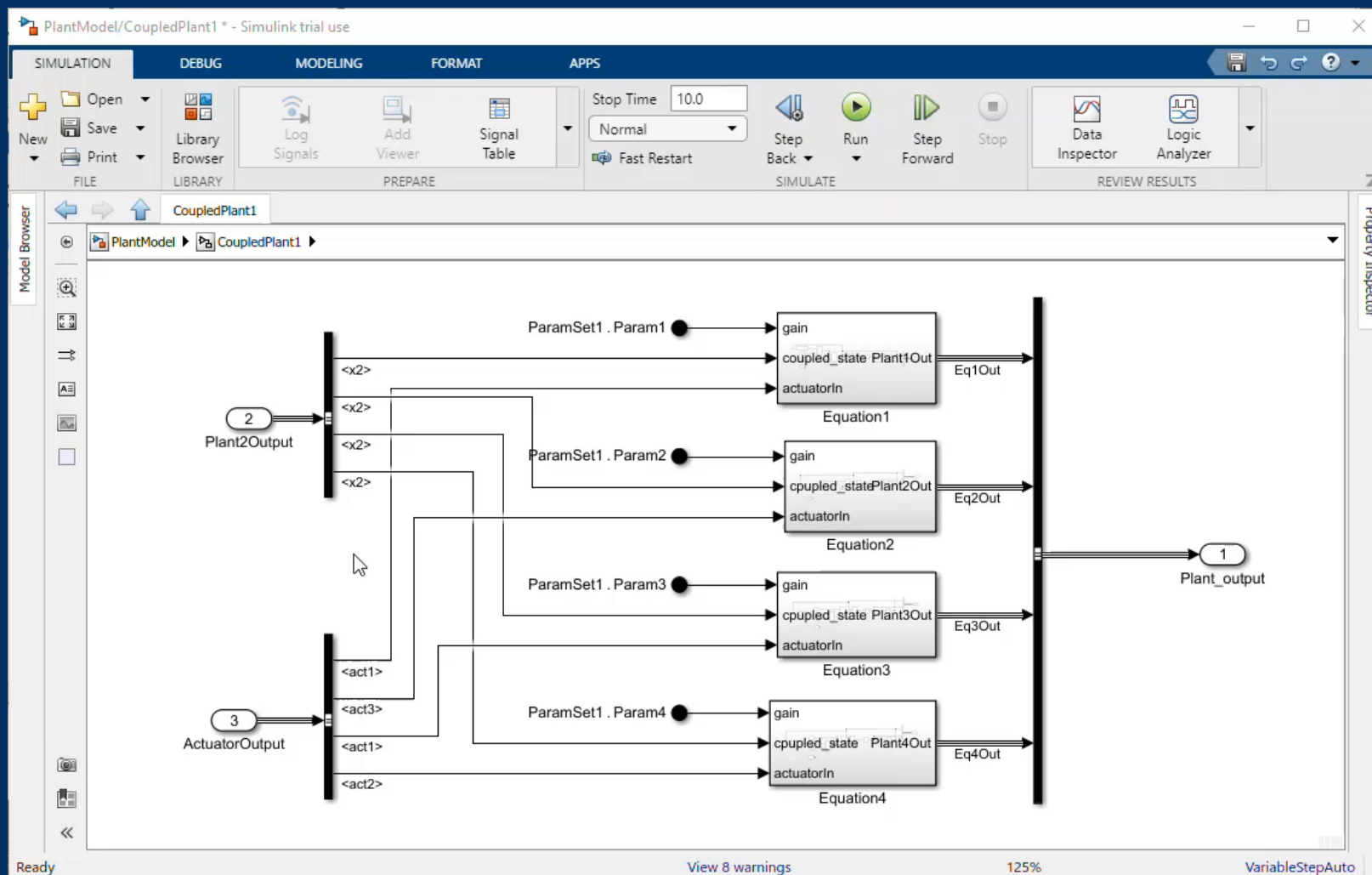
**R2018a**



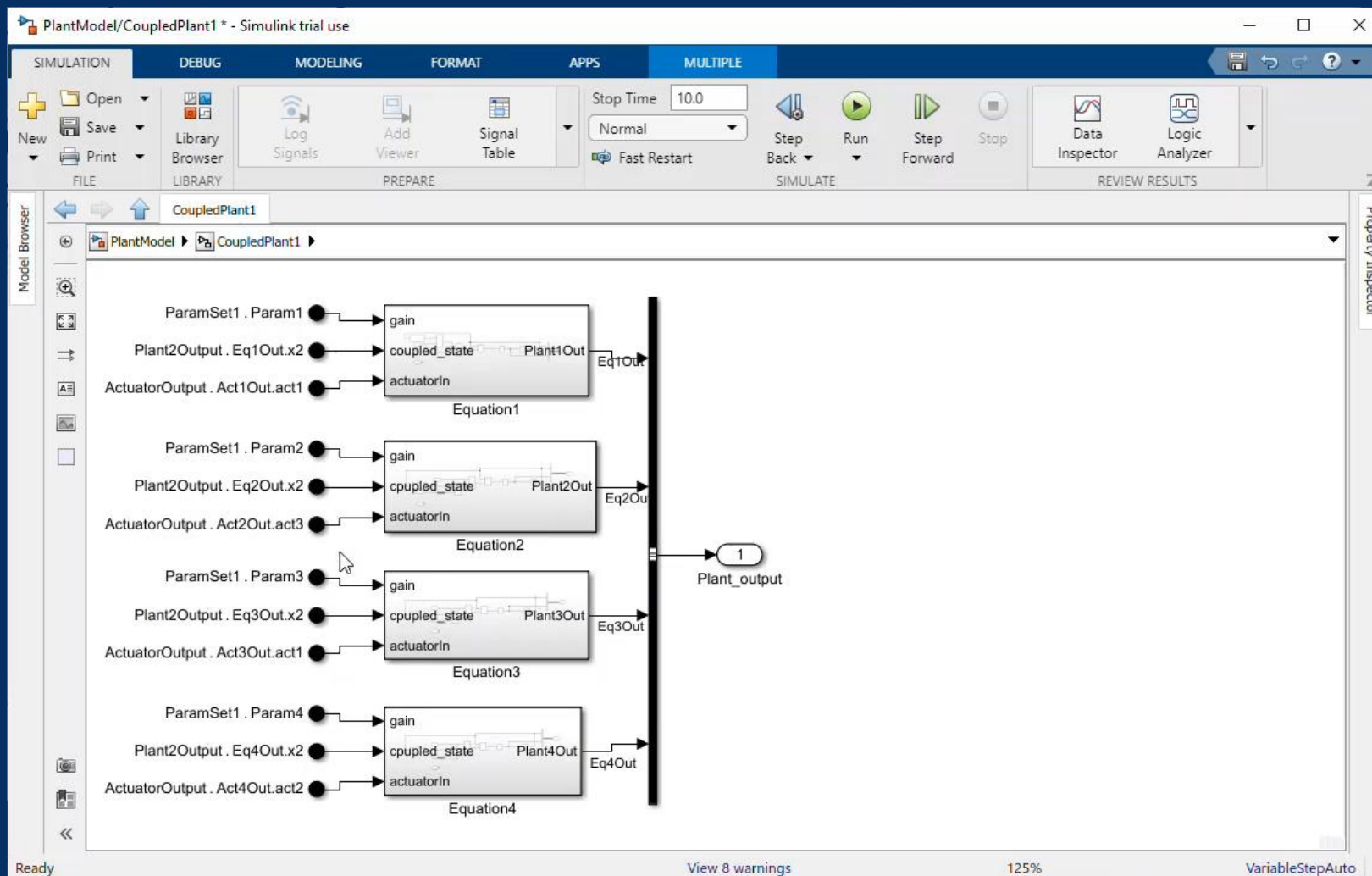
# It's useful to be able to see the port near where it gets used



# Bus element ports allow you to see bus structure and put the port where the data gets used.

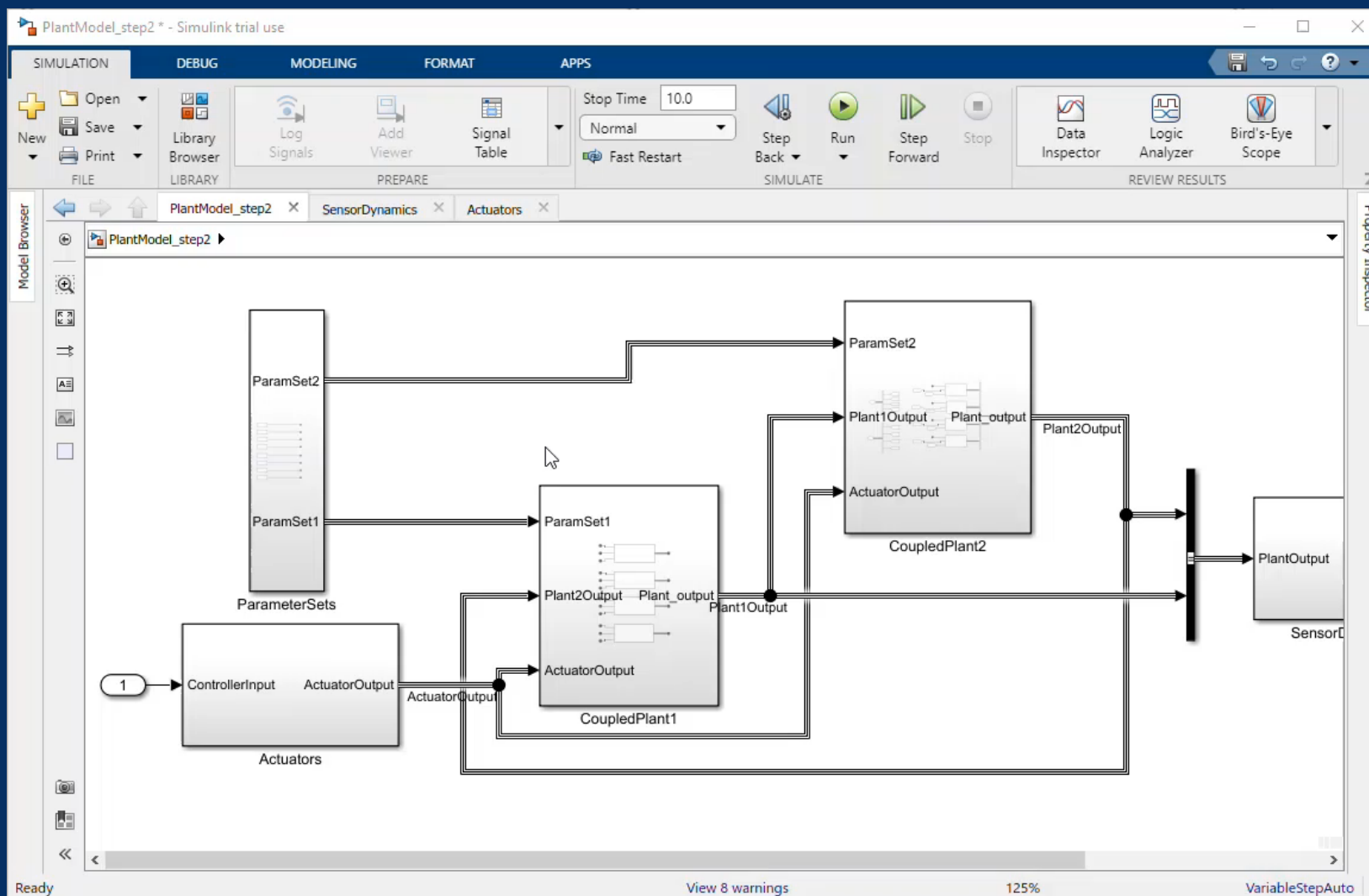
**R2017a**

Bus element ports allow you to see bus structure and put the port where the data gets used.



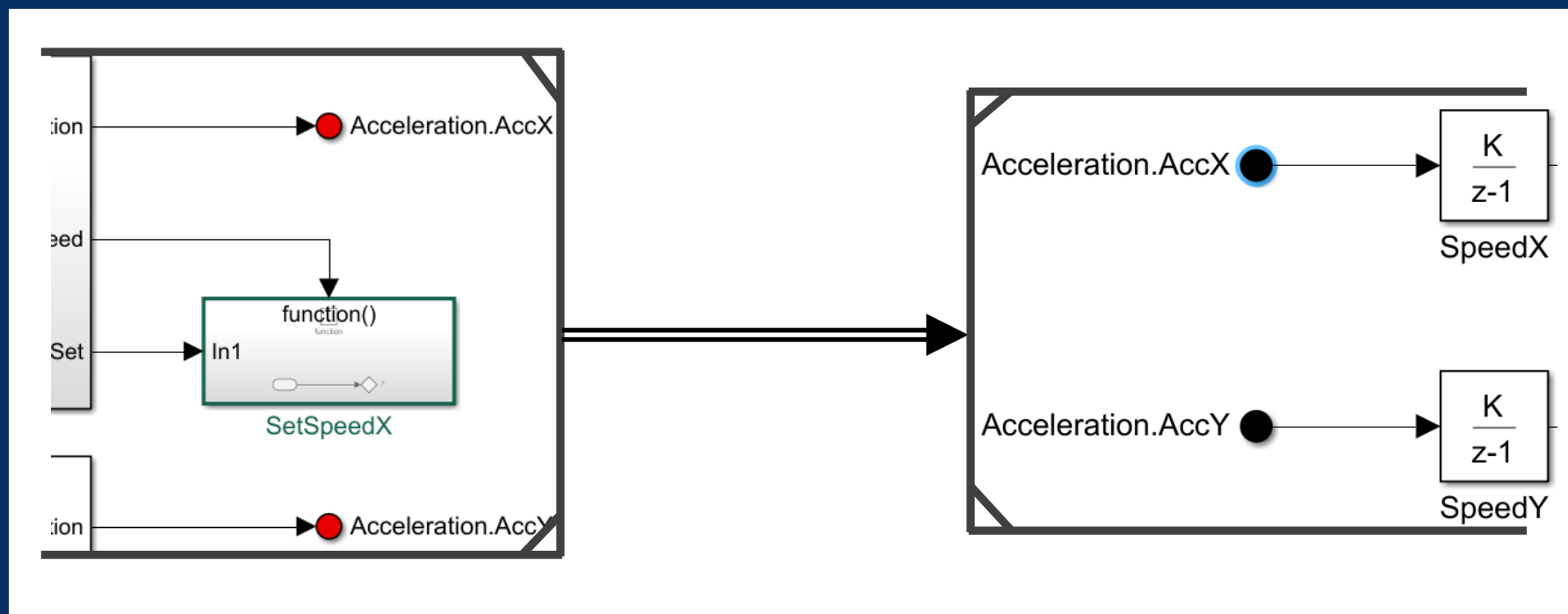
R2017a

# Bus element ports allow you to easily modify signals in your buses





# Bus objects are no longer necessary when passing bus signals across Model blocks

**R2019a**

# You can make your model more easily readable and editable with buses and bus element ports

The image displays three Simulink windows illustrating the use of buses and bus element ports to improve model readability and editability.

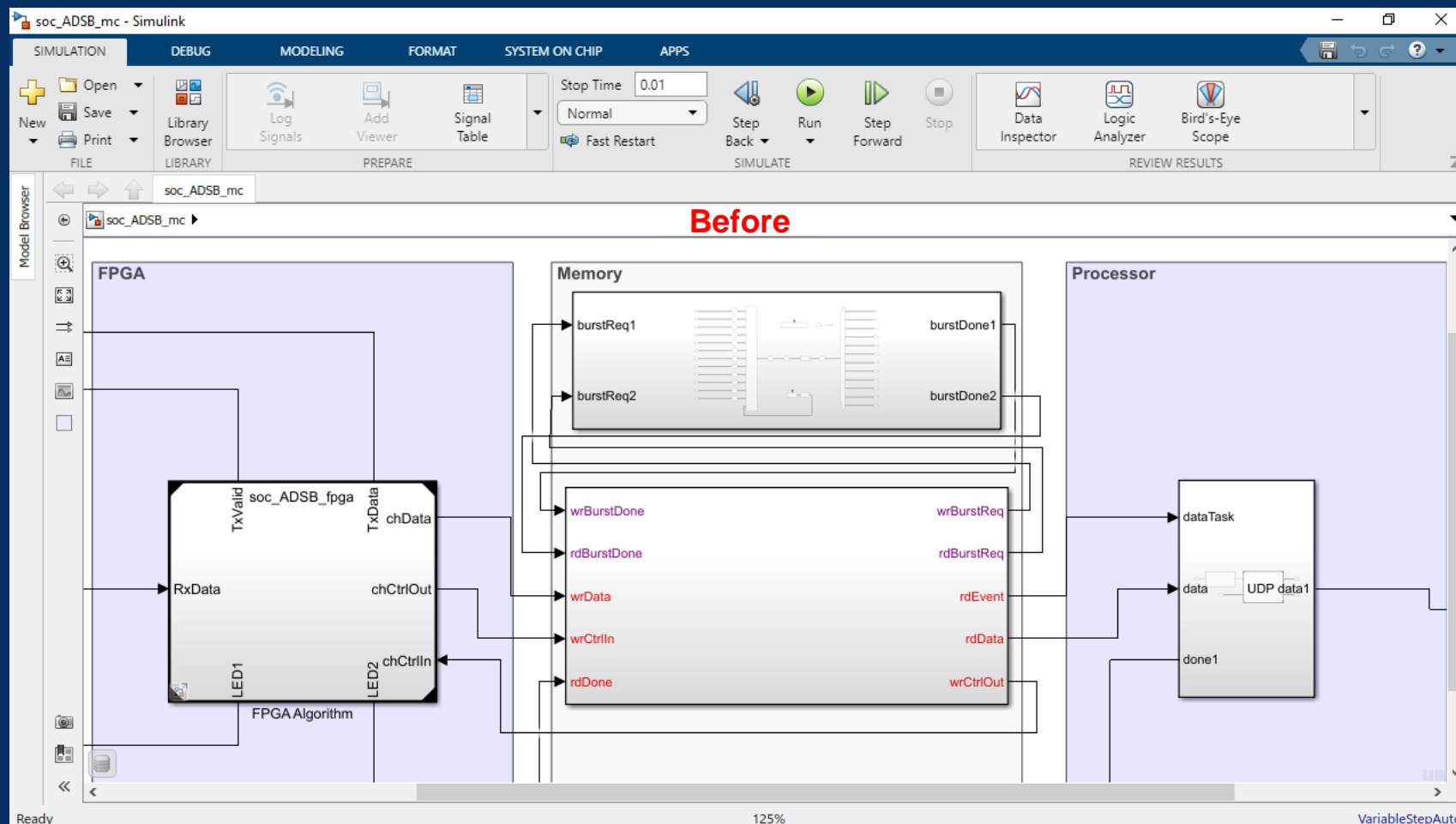
- Top Left Window (PlantModel - Simulink trial use):** Shows a block diagram with multiple parameter sets (Param1-Param7) and gain blocks (Plant1\_gain to Plant4\_gain) connected to various plant and actuator blocks. A blue box highlights the area where a bus is being created to consolidate these connections.
- Top Middle Window (PlantModel/CoupledPlant1 - Simulink trial use):** Shows the 'BUS SELECTOR' tool in use. A vertical bus is created, and its ports are connected to the gain blocks (Plant1\_gain to Plant4\_gain) and actuator outputs (ActuatorOutput) from the previous window. This consolidates many individual signal lines into a single bus structure.
- Bottom Right Window (PlantModel\_step2/ParameterSets \* - Simulink trial use):** Shows the 'OUTPORT' tool. It displays a list of parameters (Parameter1 to Parameter6) and their corresponding parameter sets (ParamSet1, ParamSet2). This provides a clear, organized view of the parameter configuration used in the model.

# Edit at the speed of thought

User interfaces

Libraries

Systems engineering

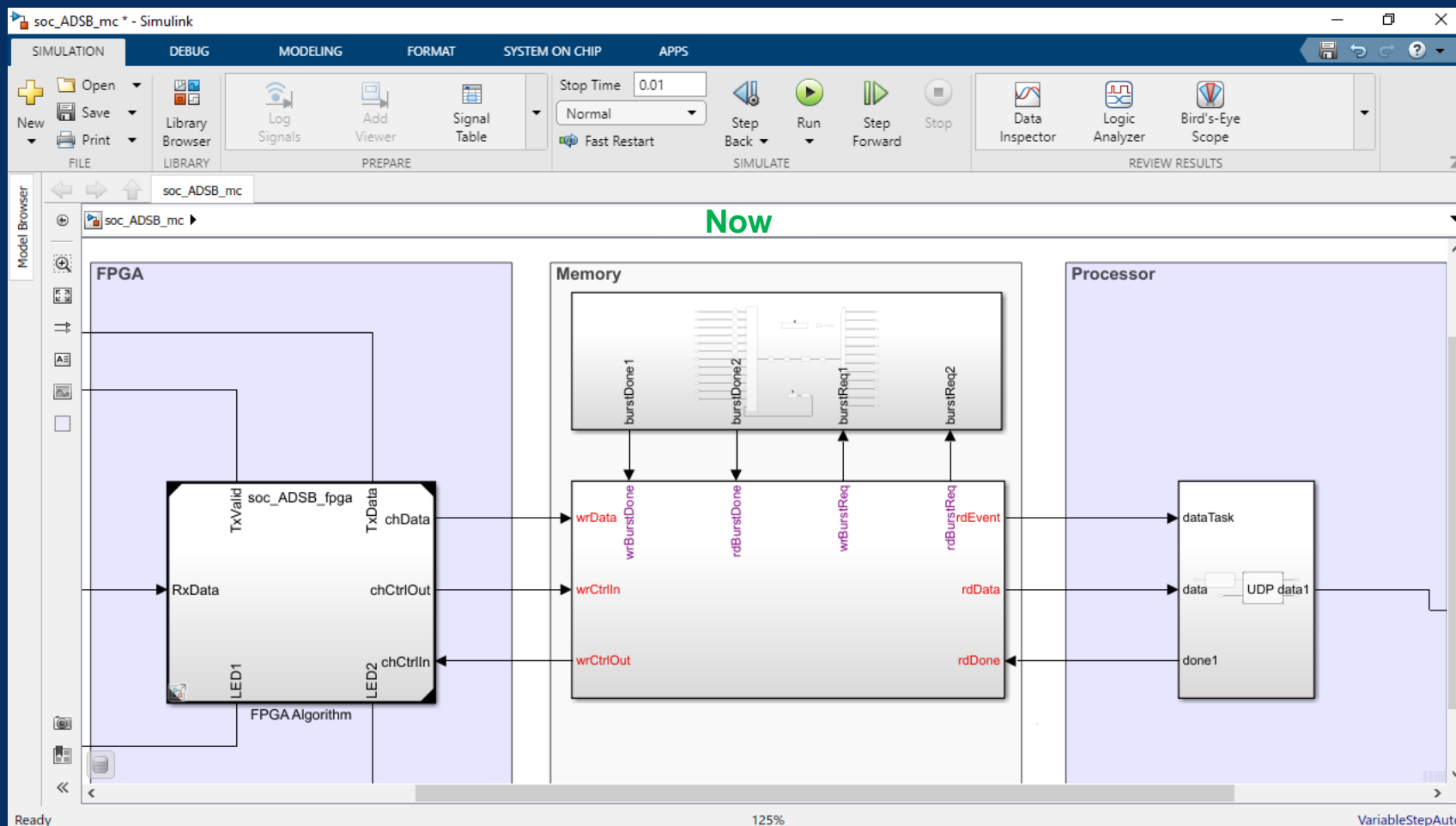


# Edit at the speed of thought

User interfaces

Libraries

Systems engineering



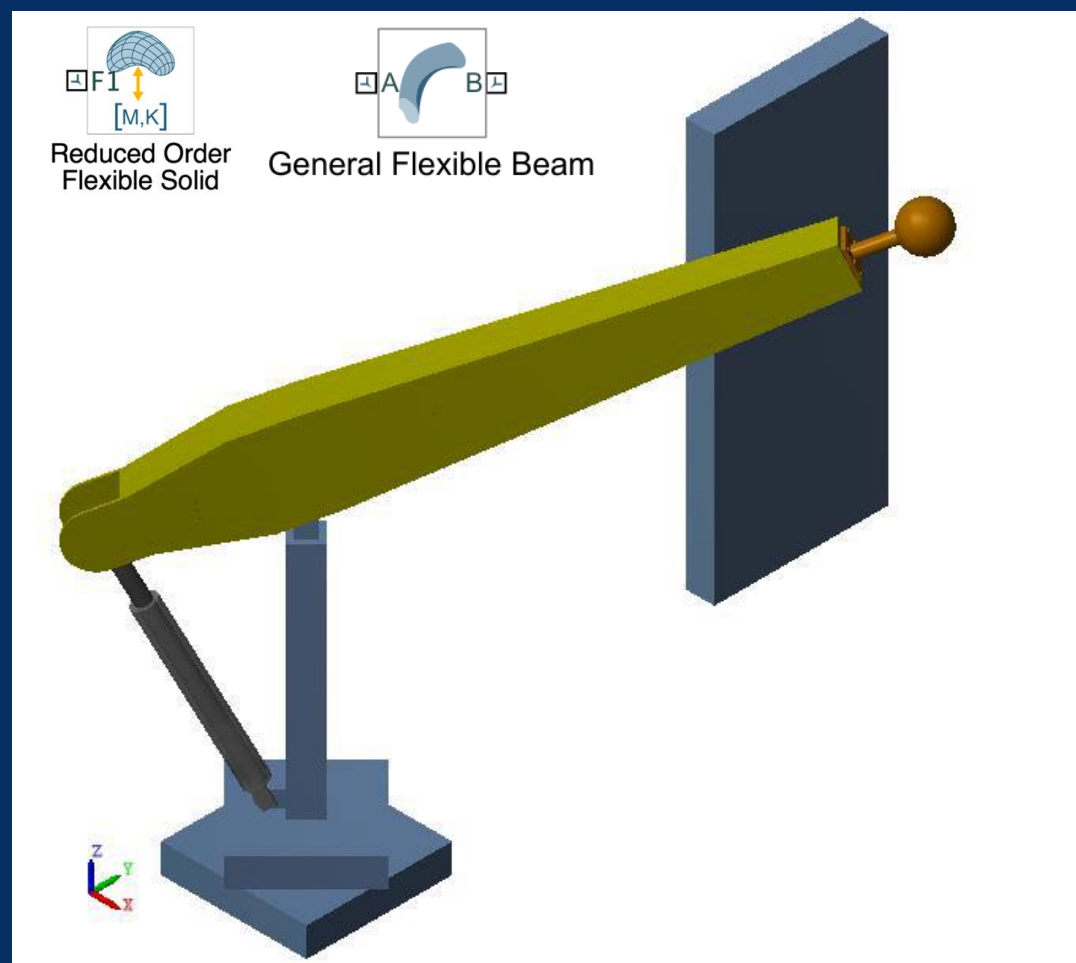


# Model deformations and contact between bodies

User interfaces

Libraries – Physical modeling

Systems engineering

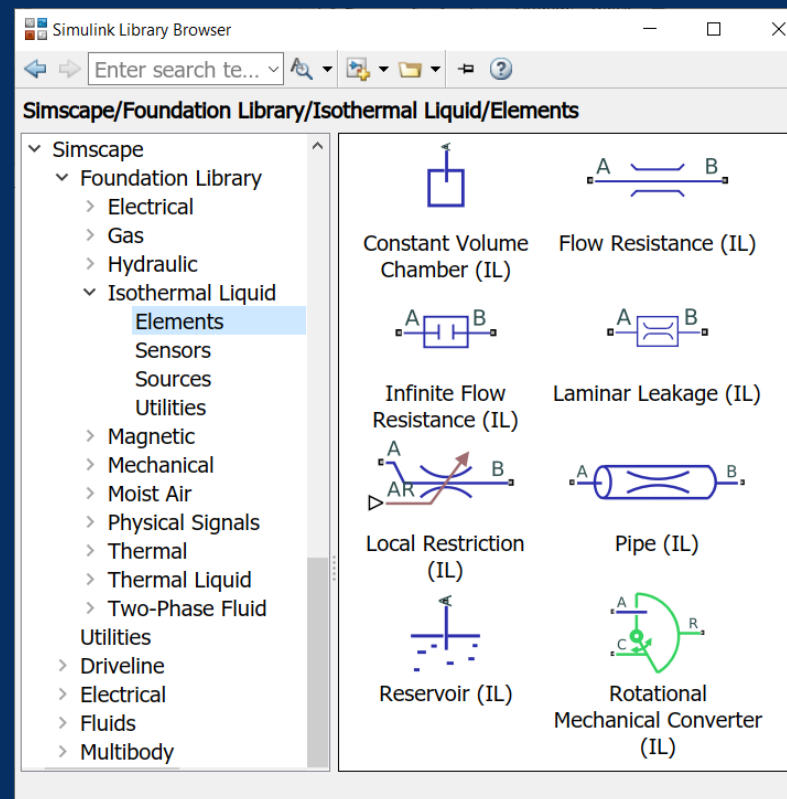


# Model fluid power and transport applications

User interfaces

Libraries – Physical modeling

Systems engineering



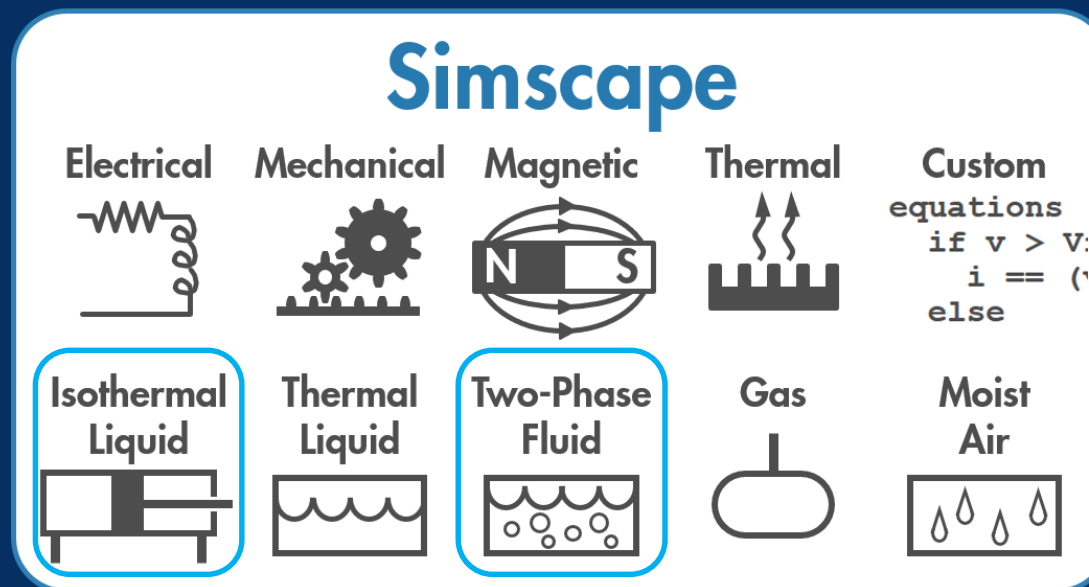
Simulink

# Model fluid power and transport applications

User interfaces

Libraries – Physical modeling

Systems engineering



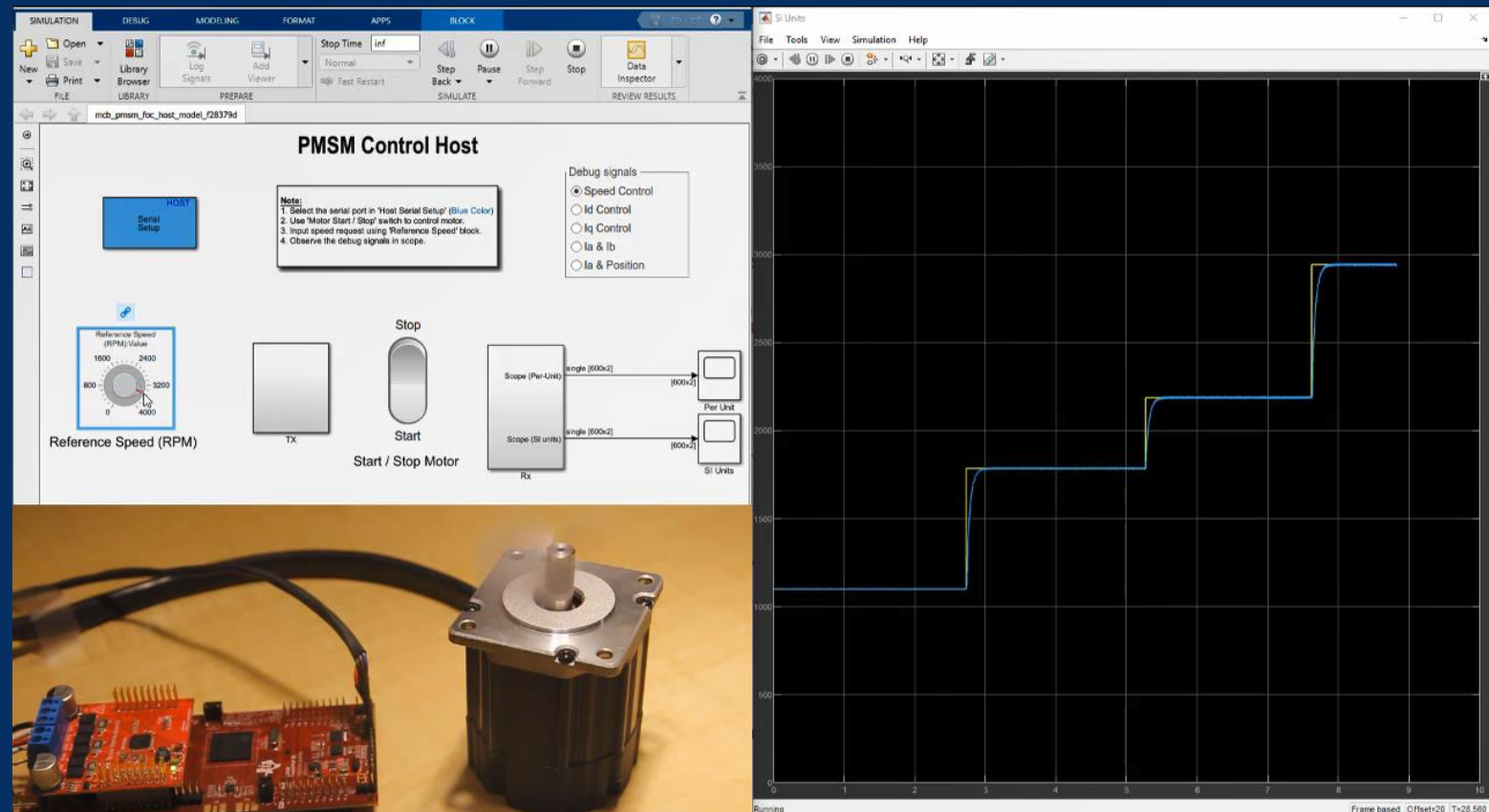
Simscape

# Generate motor control software with just a few clicks

User interfaces

Libraries – Motor control

Systems engineering

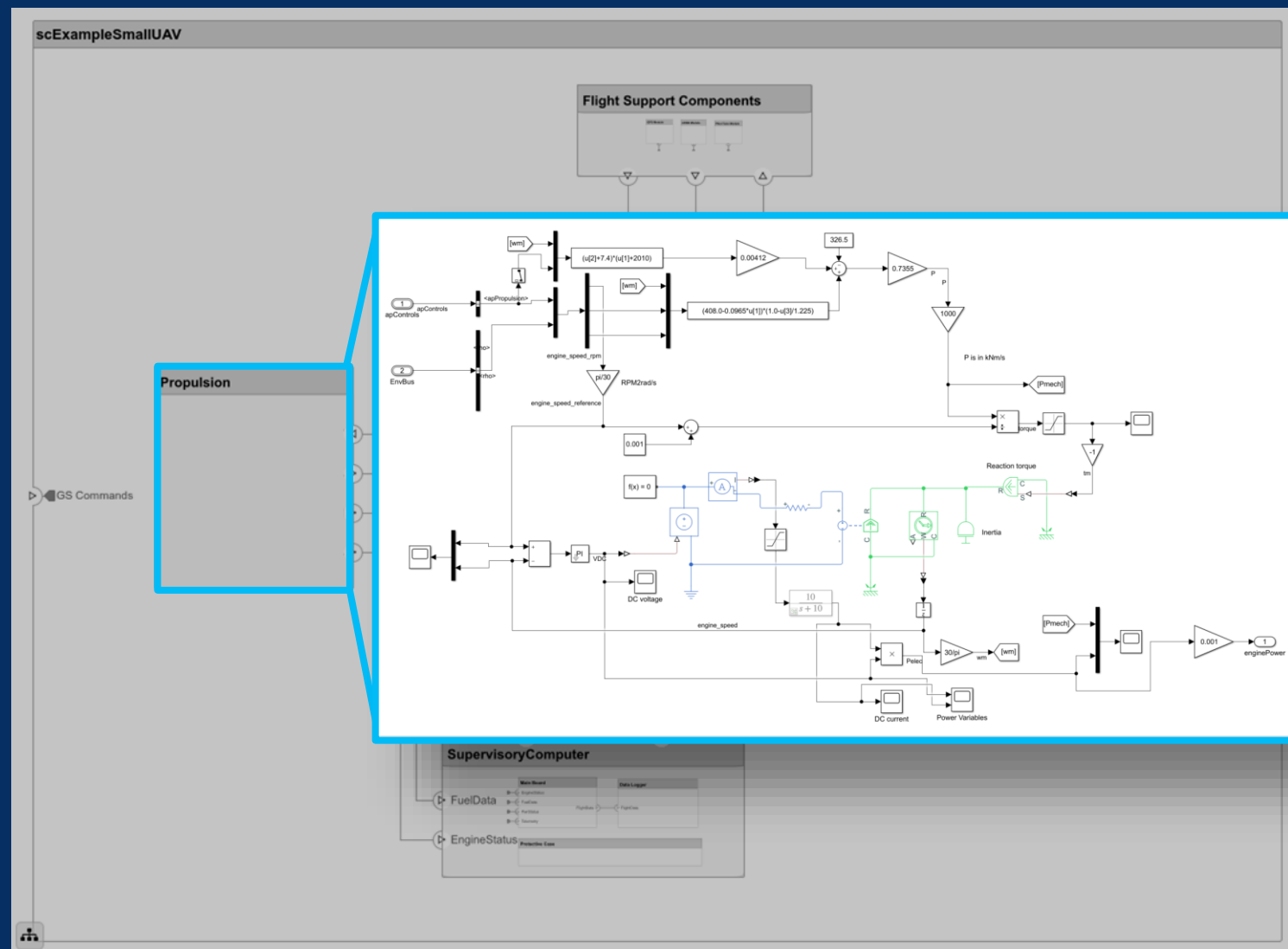


# Design and analyze complex system and software architectures

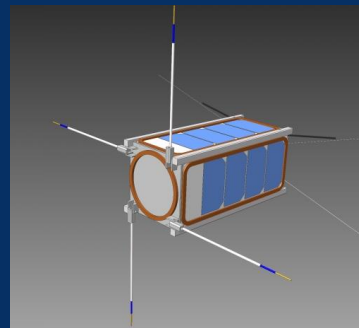
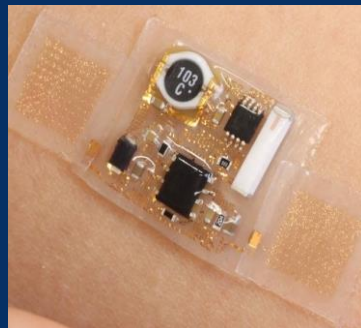
User interfaces

Libraries

Systems engineering



# Simulink





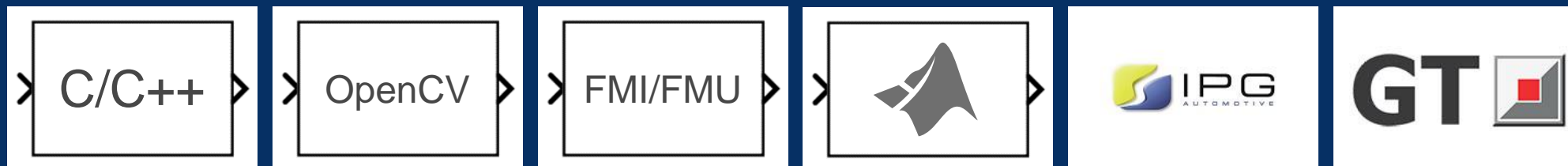
# Simulink is the **simulation integration platform**



**Simulink** 



# Simulink is the **simulation integration platform**



**Simulink** 





SIMULINK®



**Test and Verify**



**Share and Deploy**

# Test and verify your design

Review and analyze traceability between artifacts in one interface

The screenshot shows the 'Traceability Matrix' window with a toolbar at the top containing 'Add', 'Update', 'Scope', 'Expand All', 'Collapse All', 'Highlight Missing Links', and 'Create Link'. A 'FILTER PANEL' on the left allows filtering by 'Type' (Component, Port, Link, Container, Functional, Cell, Implements) and 'Link' (Has No Links). The main area displays a table with columns for components and rows for requirements.

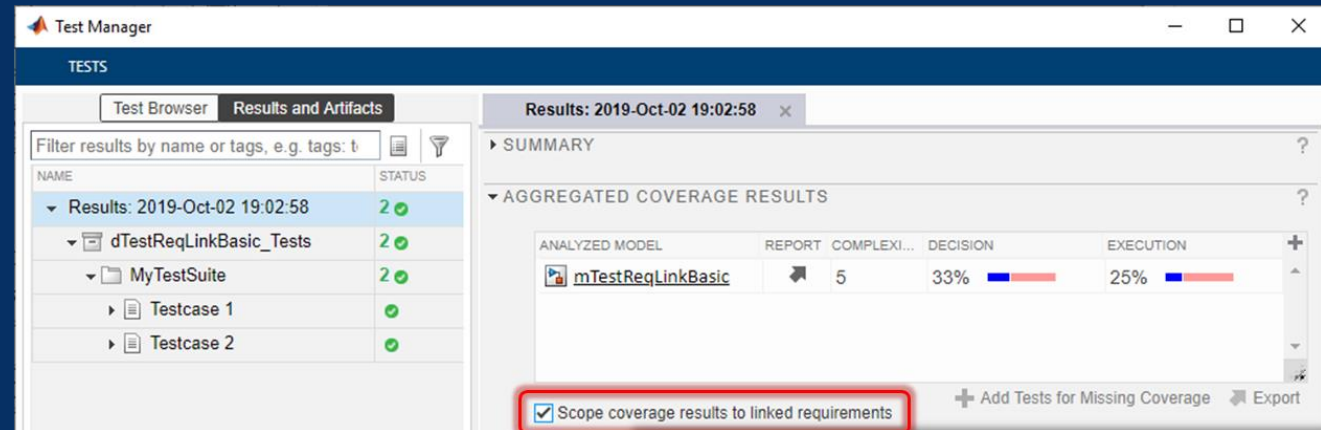
Requirement	scExampleSmallUAVModel	Supervisory Computer	Flight Support Components	Flight Computer	Main Board	Protective Case	Telemetry Antenna	Airframe	Payload	Payload	Gimbal	Payload Retraction Sy	Payload Data Link	Propulsion	Power Module	Prop	Engine	Fuel System	Fuel Level Sensors	Fuel Pump	Fuel Tank	Pressure Regulator	Fuel Filter
#1 Aircraft Capabilities																							
#3 Airworthiness			●	●	●									●	●				●				
#11 Communications																							
#12 Flight Control																							
#13 Payload																							
#14 Payload Capabilities																							
#15 Construction																							
#20 Modularity																							

Traceability Matrix

# Test and verify your design

Review and analyze traceability between artifacts in one interface

Scope model coverage to requirements-based tests (RBT)



MultiPortSwitch block "[MPSwitch1](#)"

Requirement Testing Details

Implemented Requirements	Verified by Tests	Associated Runs
<a href="#">Requirement 1</a>	<a href="#">Testcase 1</a>	<a href="#">T1</a>

Metric Coverage

Cyclomatic Complexity 2

Decision 33% (1/3) decision outcomes

Execution 100% (1/1) objective outcomes

Decisions analyzed

Decision	Coverage
truncated input value	33%
= 1 (output is from input port 1)	51/51 <a href="#">T1</a>
= 2 (output is from input port 2)	0/51 <a href="#">T1</a>
= *,3 (output is from input port 3)	0/51 <a href="#">T1</a>

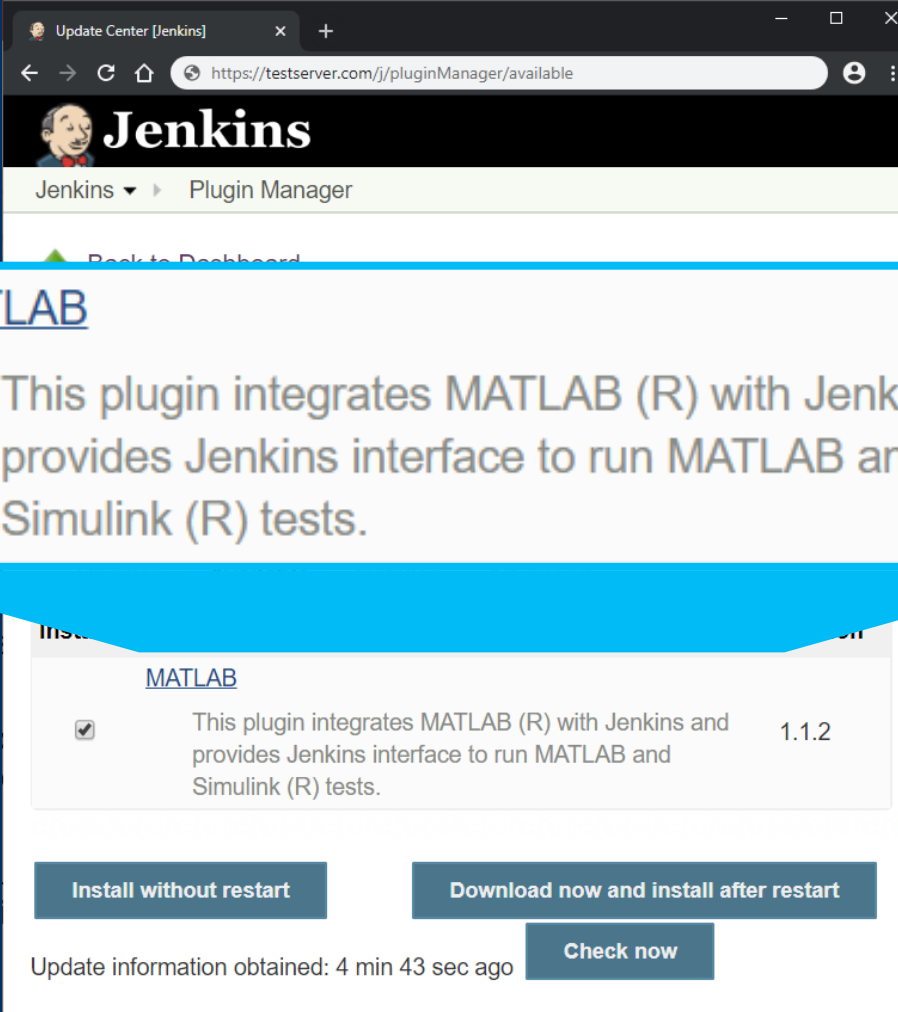
Hit by linked RBT -- **Satisfied**

Hit, but not by linked RBT -- **Unsatisfied**



# Use Jenkins servers to automatically run and test your project

Install MATLAB Plugin for Jenkins directly from the Jenkins Plugin Manager



The screenshot shows the Jenkins Update Center interface. At the top, the browser address bar displays "https://testserver.com/j/pluginManager/available". The Jenkins logo and "Jenkins Plugin Manager" are visible. A callout box highlights the "MATLAB" plugin entry, which includes a description: "This plugin integrates MATLAB (R) with Jenkins and provides Jenkins interface to run MATLAB and Simulink (R) tests." Below the callout, the plugin entry is shown with a checked checkbox, the same description, and the version number "1.1.2". At the bottom of the plugin entry, there are three buttons: "Install without restart", "Download now and install after restart", and "Check now". The text "Update information obtained: 4 min 43 sec ago" is also visible.

MATLAB

This plugin integrates MATLAB (R) with Jenkins and provides Jenkins interface to run MATLAB and Simulink (R) tests.

MATLAB This plugin integrates MATLAB (R) with Jenkins and provides Jenkins interface to run MATLAB and Simulink (R) tests. 1.1.2

Install without restart Download now and install after restart Check now

Update information obtained: 4 min 43 sec ago





SIMULINK®



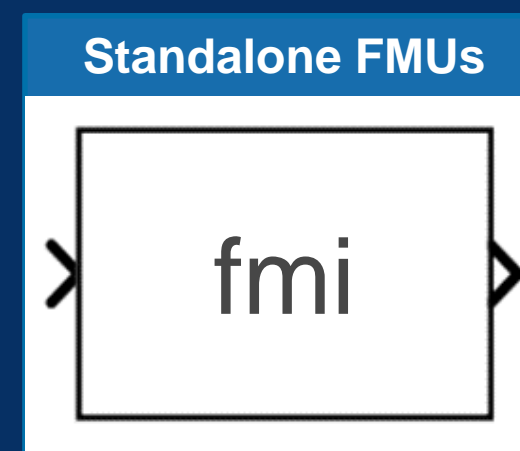
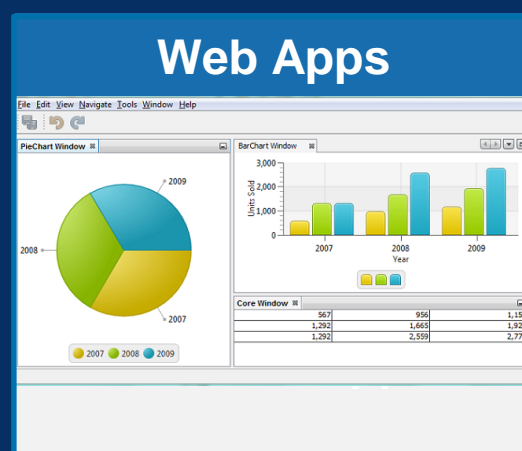
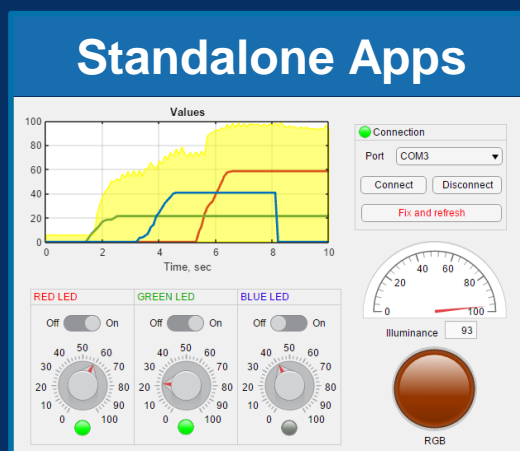
**Test and Verify**



**Share and Deploy**

# Share Simulink simulations – *where Simulink is not available*

Package a compiled Simulink model with MATLAB code





**SIMULINK®**



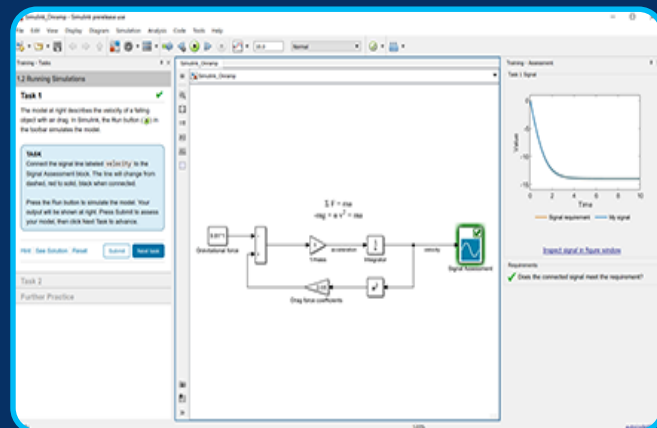
**Test and Verify**



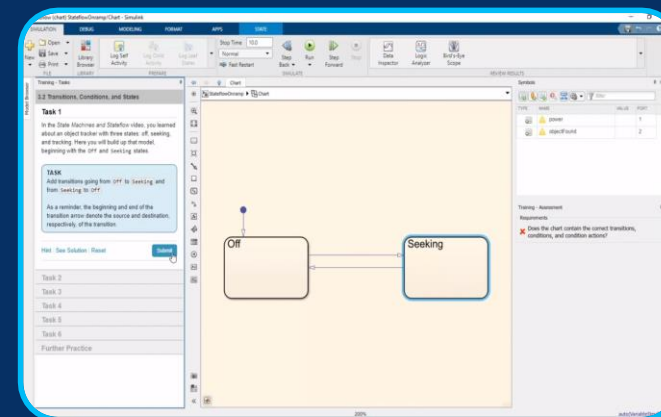
**Share and Deploy**



# Quickly learn the basics with free Onramp courses

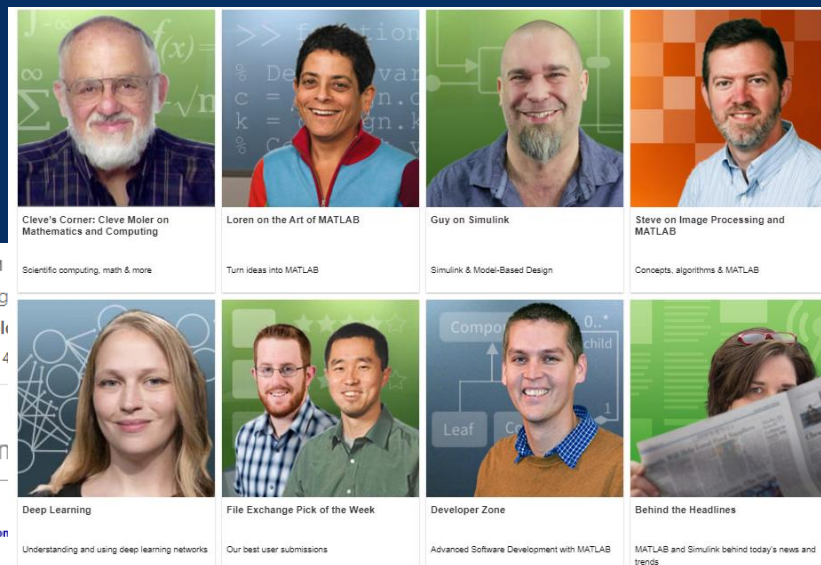


## Simulink Onramp



## Stateflow Onramp

# Learn more about what's new with blogs and release notes



Reply Reply All Forward IM  
 noreply+feedproxy@google.com  
 The "Guy on Simulink" bl  
 You forwarded this message on 5/2/2018 4

## The "Guy on Simulink"

### Communicating with an External Application

Posted: 01 May 2018 02:04 PM PDT

Today I am describing an example that I recently submitted to [MATLAB Central](#) and [GitHub](#) with the help of my colleague Haihua Feng: [Example implementation of Co-simulation using Simulink](#).

In case you did not know, [MathWorks website](#) lists a lot of [third-party modeling and simulation tools](#) from [MathWorks Connection Partners](#).

The screenshot shows the MathWorks website navigation bar with links for Products, Solutions, Academia, Support, Community, and Events. Below is the 'Third-Party Products & Services' section with a search bar and filters. The 'Refine by Product Type' table is as follows:

Product Type	Count
Data Analysis Tools	21
Embedded Hardware - MCU, DSP, FPGA	4
Embedded Software - Tools, IDE, RTOS	3
Lab Experiments	1
Modeling and Simulation Tools	106
Rapid Prototyping and HiL Systems	3

Additional filters include 'Modeling and Simulation Tools', 'Automotive', and 'Remove All'. A 'CosiMate' section is also visible, describing a co-simulation backplane.

## R2020a at a Glance

Search MathWorks.com

### Explore What's New

Get more out of MATLAB and Simulink by downloading the latest release.

Download now



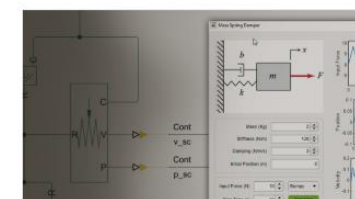
## Release Highlights



### MATLAB Web Apps

Share MATLAB apps and Simulink simulations as browser-based web apps.

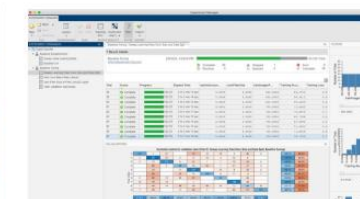
» Learn more



### Simulink Compiler

Share simulations as standalone executables, web apps, and Functional Mockup Units (FMUs).

» Learn more



### Deep Learning

Manage multiple deep learning experiments, keep track of training parameters, and analyze and compare results and code with the new Experiment Manager App.

» Learn more

# MATLAB EXPO

