

# Requirements-Driven Workflows in Implementation and Test

MATLAB EXPO 2018



# Requirements – why we care

1. Because it is in our interests to care
2. Because we have to care

# Requirements – why we care



The cost of the mission was \$327.6 million

# Requirements – why we care



1

www.projectcartoon.com  
How the customer explained it



2

www.projectcartoon.com  
How the project leader understood it



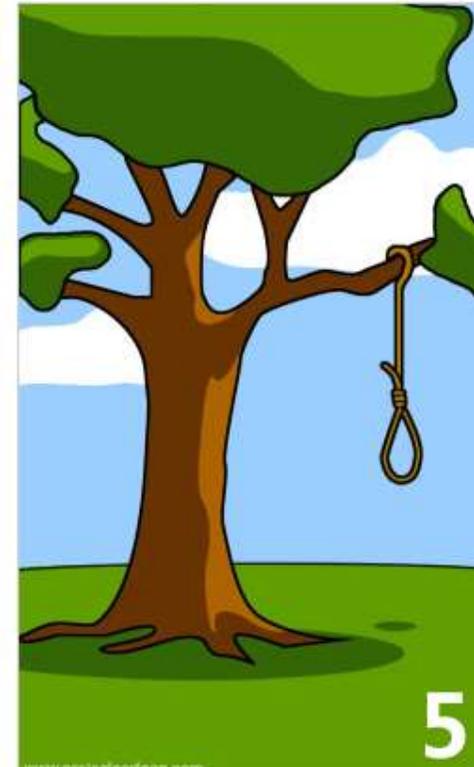
3

www.projectcartoon.com  
How the analyst designed it



4

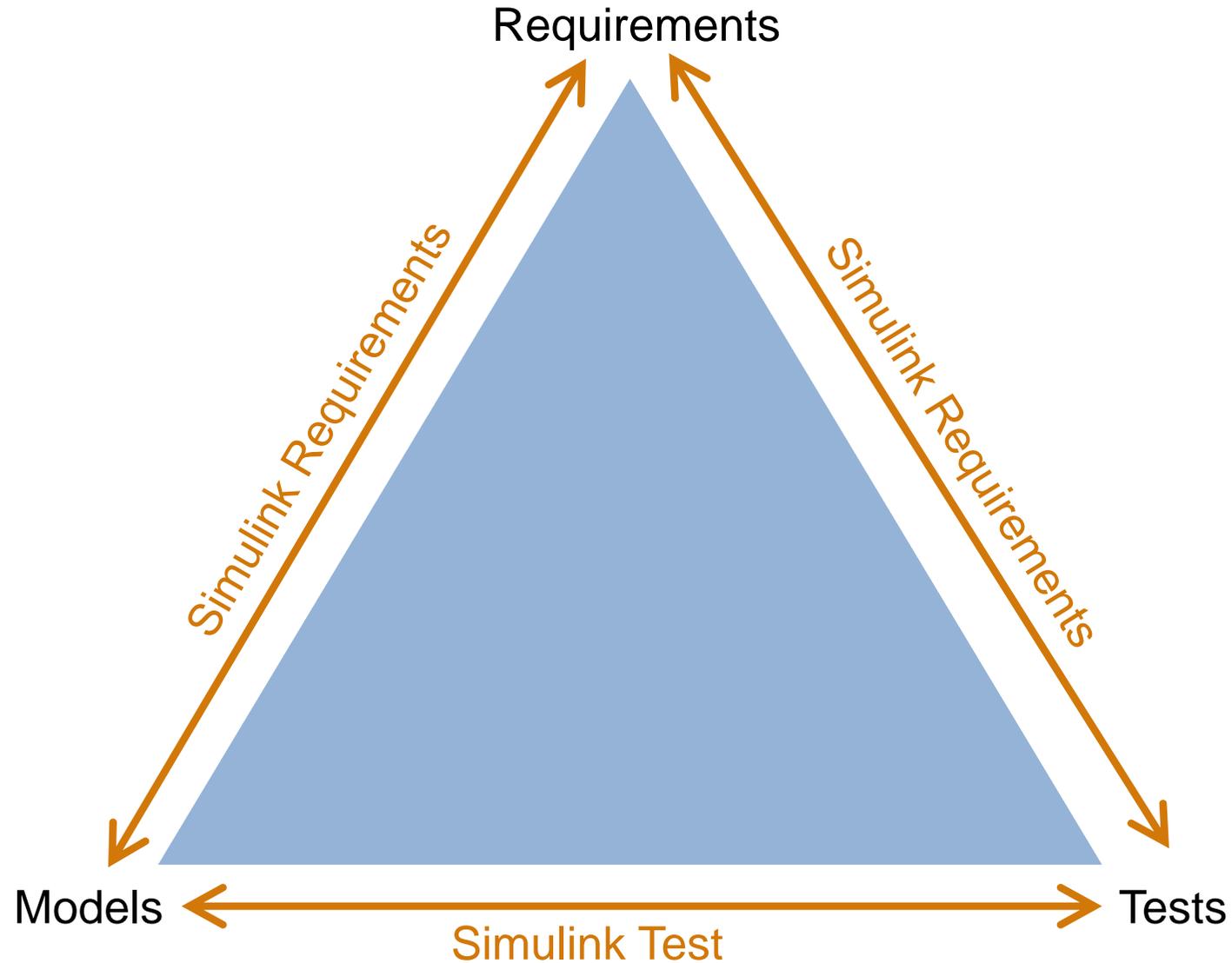
www.projectcartoon.com  
How the programmer wrote it



5

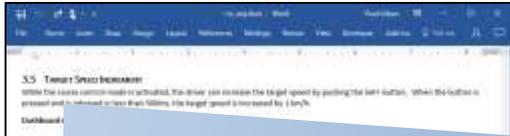
www.projectcartoon.com  
What the beta testers received

# Requirements & Model-Based Design



# Requirements & Model-Based Design

Because we have questions to manage such as:



## REQ 3.5 TARGET SPEED INCREMENT

While the cruise control mode is activated, the driver can increase the target speed by pushing the Set+ button.

How is it being tested?

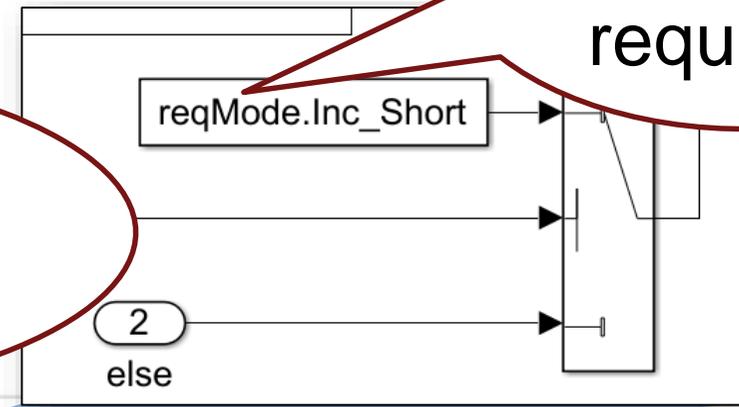
What is the test result?

Why is this block required?

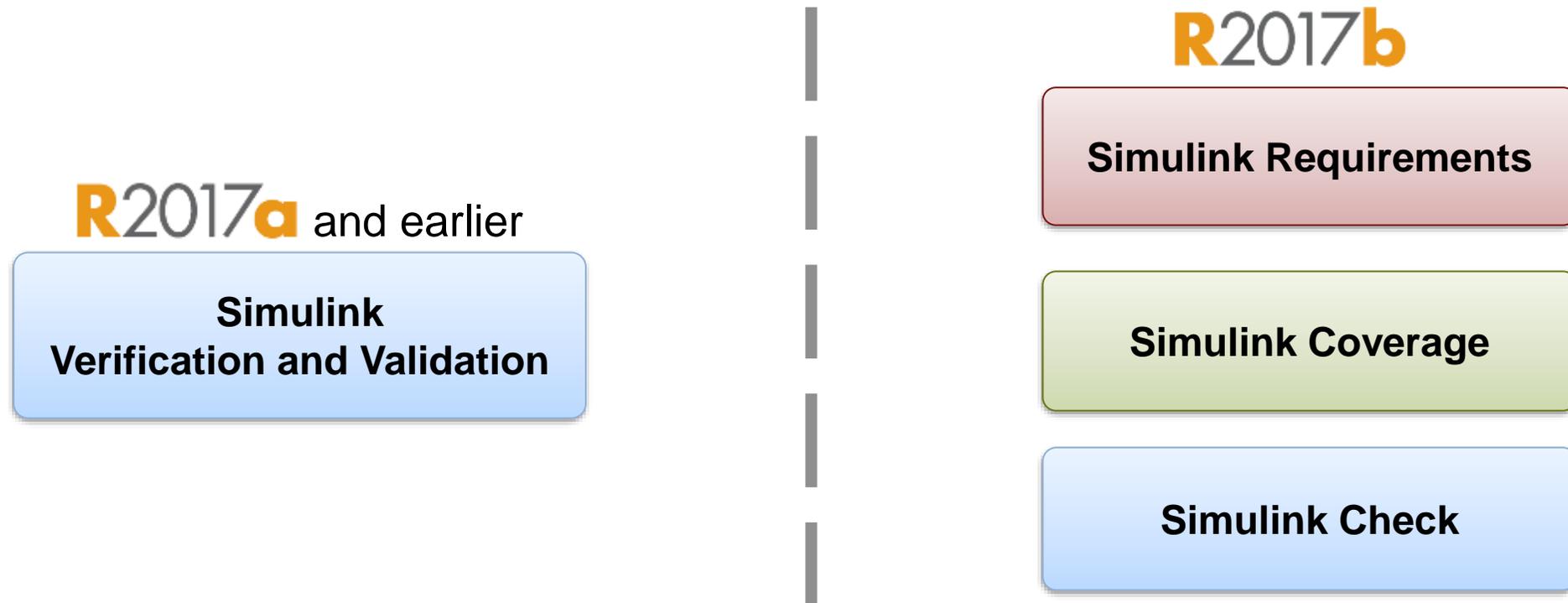
What is the impact of this requirement changing?

Is this implemented?

What verification coverage of my requirements do I have?



## New Verification and Validation Products



- Simulink Requirements – requirements authoring, editing, trace, management

# Simulink Requirements

## Work with requirements without leaving Simulink

- Author or import requirements
- Trace to design, code and test
- Identify gaps in design or test
- Respond to requirement changes

The screenshot displays the Simulink Requirements Manager interface. At the top, a summary window for requirement '#31: Increment mode' is shown, with a description: 'If the Cancel switch is pressed, the value of reqDrv should be set to reqMode.Cancel.' Below this, a diagram shows a block 'opMode.Increment' with an arrow labeled 'IMPLEMENTS' pointing to the requirement. To the right, a panel lists the requirement's provenance: 'Implemented by: Switch, Enumerated Constant' and 'Verified by: Cancel button' (marked with a red 'X'). Below the diagram, a table shows the status of requirements:

Implemented	Verified
Blue bar	Green bar
Blue bar	Green bar
Blue bar	Green bar

At the bottom, a notification window displays an issue: 'Issue: Destination Changed.' with a yellow warning icon. It shows 'Stored: Revision: 15' and 'Actual: Revision: 18', along with a 'Clear Issue' button.

# Agenda

- Importing requirements
- Tracing requirements to implementation
- Tracing requirements to tests
- Requirement change
- Reporting
- Programmatic interface

# Agenda

- Importing requirements
- Tracing requirements to implementation
- Tracing requirements to tests
- Requirement change
- Reporting
- API

DOORS Database: /WindTurbine - DOORS

File Edit View Tools Change Management Help

Favorites Location /WindTurbine

Filter

Name	Type	Description
WindTurbineControllerRequirements	Formal	Controller Require
WindTurbineStructuralRequirements	Formal	Structural Require
WindTurbineUserInterfaceRequirements	Formal	User Interface Re

Username: fmacmill User type: Database Manager

MATLAB R2018b

Search Documentation Fraser

FILE

Current Folder: C:\fmacmill\Demos\General\WindTurbine\Requirements

Command Window: fx >>

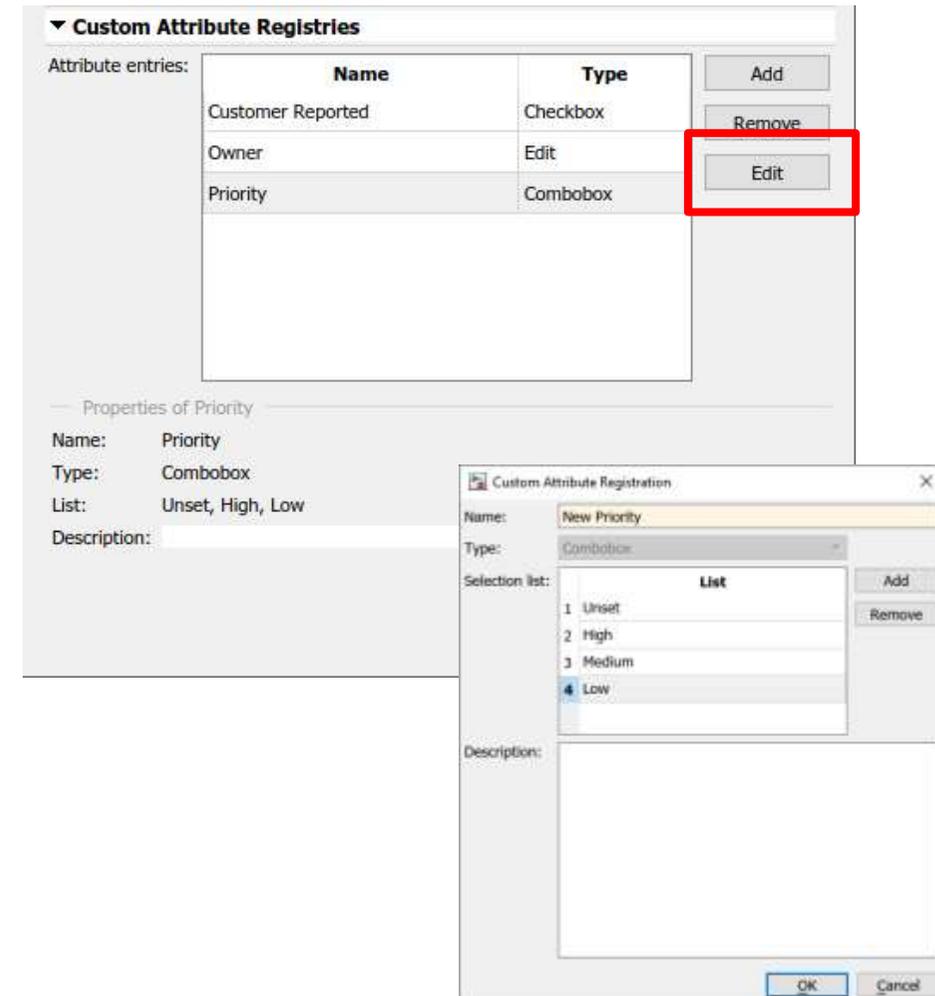
Workspace

Details

# Ability to Modify Custom Attributes

**Existing custom attributes can be modified.**

- Custom attribute name and description is editable.
- New entries for Combobox can be added.
- Attributes value will be kept.



# Requirements Import with ReqIF Standard

Allows you to work with requirements from third party tools in Simulink



DOORS  
DOORS  
Next Generation



Siemens  
Polarion



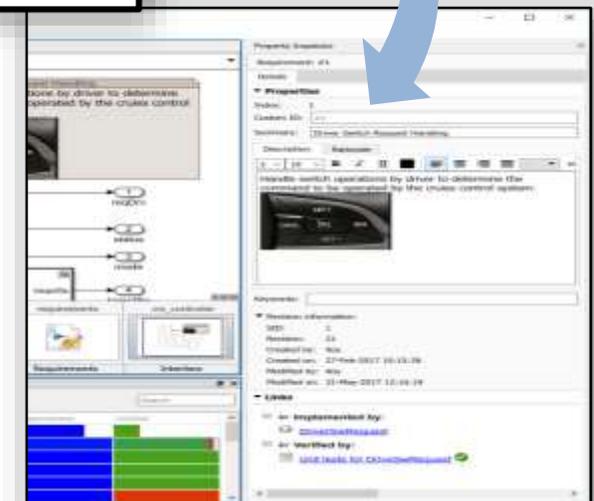
integrity™  
PTC  
Integrity



TEAMCENTER

Siemens  
Teamcenter

- Import requirements from third party tools using ReqIF standard ([Requirements Interexchange Format](#))
- Import wizard supports mapping custom attributes
- Tools that support ReqIF standard:
  - IBM DOORS / DOORS Next Generation
  - Siemens Polarion
  - PTC Integrity



# Agenda

- Importing requirements
- **Tracing requirements to implementation**
- Tracing requirements to tests
- Requirement change
- Reporting
- Programmatic interface

# Link requirements to model (implementation)

### Requirements Editor

File Edit Display Analysis Report Help

View: Requirements Search

Index	ID	Summary	Implemented
WindTurbineCont...			
Import1	00000320	References to WindTurbineC...	
> 1	SRD-CONTROL-1	Front Matter	
> 2	SRD-CONTROL-5	Controllers	
> 2.1	SRD-CONTROL-6	Signal Conditioning	
> 2.2	SRD-CONTROL-26	Supervisory Control	
> 2.3	SRD-CONTROL-9	Pitch Control System	
2.3.1	SRD-CONTROL-10	when in power generation m...	
2.3.2	SRD-CONTROL-11	Under inertial load only (zer...	
2.3.3	SRD-CONTROL-12	Under inertial load only (zer...	
> 2.4	SRD-CONTROL-18	Yaw Control System	
> 3	SRD-CONTROL-94	User Interface	

#### Properties

Type: Functional

Index: 2.3.1

Custom ID: SRD-CONTROL-10

Summary: when in power generation mode the

Description Rationale

when in power generation mode the rotor :  
% of the [RotorNominalSpeed]

Keywords: No

Revision information:

#### Custom Attributes

Definitions: [RotorNominalSpeed] shall be

Last Modified By: fmacmill

Last Modified On: 05 September 2018

Verification: by system level simulation

#### Links

No links

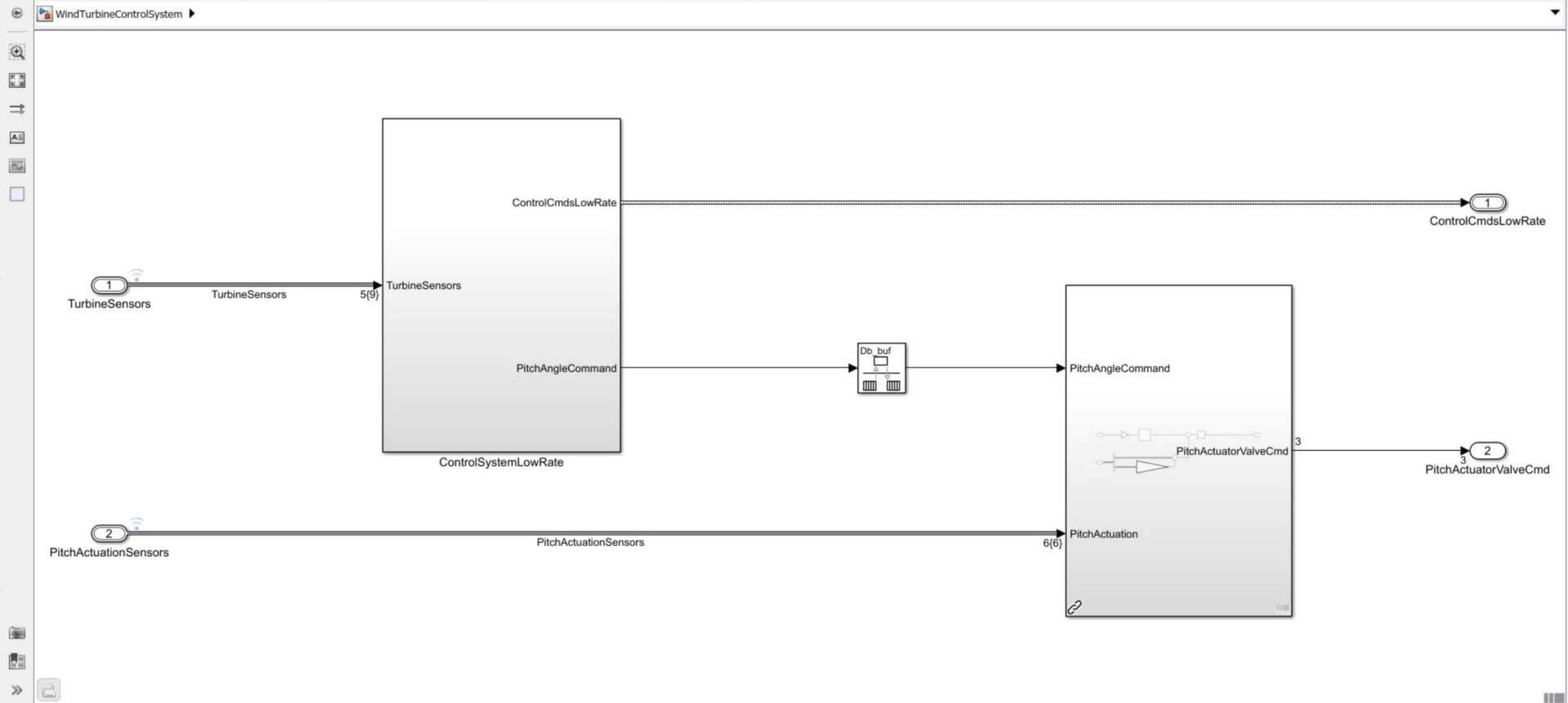
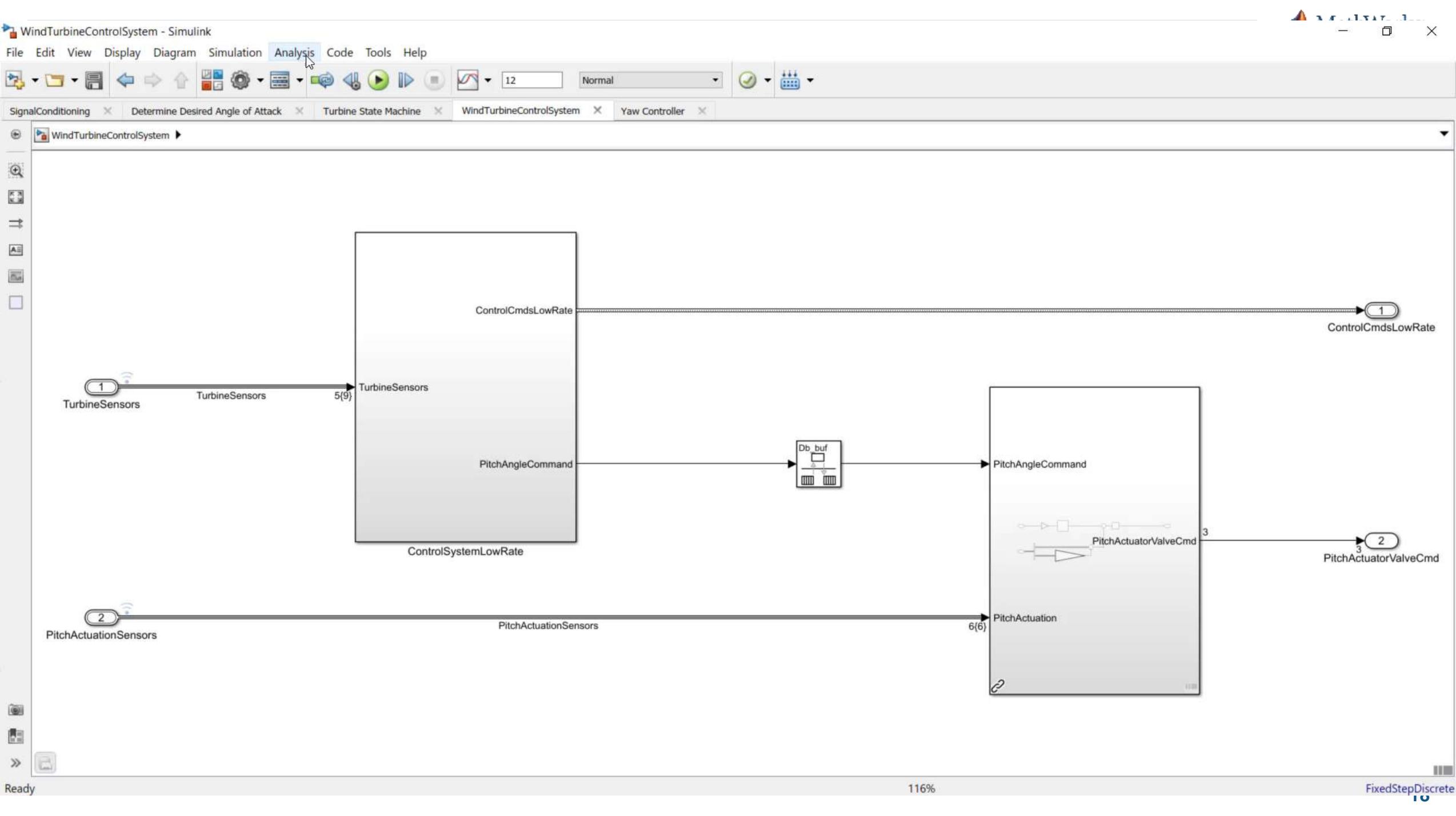
#### Comments

### WindTurbineControlSystem - Simulink

File Edit View Display Diagram Simulation Analysis Code Tools Help

SignalConditioning Determine Desired Angle of Attack Turbine State Machine WindTurbineControlSystem

Ready 56% FixedStepDiscrete



# Link requirements to data (implementation)

Requirements Editor

File Edit Display Analysis Report Help

View: Requirements Search

Update completed. There are no changes.

Index	ID	Summary
WindTurbineControl...		
Import1	00000320	References to WindTurbineControllerR...
1	SRD-CONTROL-1	Front Matter
2	SRD-CONTROL-5	Controllers
2.1	SRD-CONTROL-6	Signal Conditioning
2.2	SRD-CONTROL-26	Supervisory Control
2.3	SRD-CONTROL-9	Pitch Control System
2.4	SRD-CONTROL-18	Yaw Control System
2.4.1	SRD-CONTROL-19	The yaw rate magnitude shall be less t...
2.4.2	SRD-CONTROL-101	The commanded yaw torque per actua...
2.4.3	SRD-CONTROL-102	Place-holder
3	SRD-CONTROL-94	User Interface
Import2	00000321	References to WindTurbineStructuralR...
3	#26	Justifications
WindTurbineSystem...		

**Properties**

Type: Functional

Index: 2.4.1

Custom ID: SRD-CONTROL-19

Summary: The yaw rate magnitude shall be less than 0.5 deg/s

Description Rationale

The yaw rate magnitude shall be less than 0.5 deg/s

Keywords: No

**Revision information:**

SID: 21

Revision: 4

Updated on: 13-Sep-2018 07:56:47

Modified on: 13-Sep-2018 07:56:47

Show in document

**Custom Attributes**

**Links**

Implemented by:

- Discrete PID Controller

**Comments**

Add Comment

No comments

WindTurbineControlSystem/ControlSystemLowRate/Yaw Controller \* - Simulink

File Edit View Display Diagram Simulation Analysis Code Tools Help

SignalConditioning Determine Desired Angle of Attack Turbine State Machine ControlSystemLowRate Yaw Controller

WindTurbineControlSystem ControlSystemLowRate Yaw Controller

SRD-CONTROL-19: The yaw rate magnitude shall be less than 0.5 deg/s

SRD-CONTROL-101: The commanded yaw torque per actuator shall be less than 250Nm

Discrete PID Controller

YawRateCmd

Proportional Gain

Limit Servomotor Torque Cmd

YawActuatorTorqueCmd

YawActuatorTorqueCmd

Ready 100% FixedStepDiscrete

# Simulink Requirements

## New File Extensions

1) **.slreqx**

File containing imported or authored requirements

2) **.slmx**

Where links are stored

# Managing Large Sets of Requirements

- Project may have thousands of requirements
- Simulink Requirements provides features to make it easier to find and navigate the requirements
- Customize browser view to only see relevant data
  - Sort by column
  - Select columns to display
- Keywords – add tags to requirements to categorize and search
- Search – filter and locate requirements by search term

# Agenda

- Importing requirements
- Tracing requirements to implementation
- **Tracing requirements to tests**
- Requirement change
- Reporting
- Programmatic interface

# Link requirements to test (verification)

Requirements Editor

File Edit Display Analysis Report Help

View: Requirements Search

Update completed. There are no changes.

Index	ID	Summary
WindTurbineContr...		
Import1	00000320	References to WindTurbineControllerRe...
1	SRD-CONTROL-1	Front Matter
2	SRD-CONTROL-5	Controllers
2.1	SRD-CONTROL-6	Signal Conditioning
2.2	SRD-CONTROL-26	Supervisory Control
2.3	SRD-CONTROL-9	Pitch Control System
2.4	SRD-CONTROL-18	Yaw Control System
2.4.1	SRD-CONTROL-19	The yaw rate magnitude shall be less th...
2.4.2	SRD-CONTROL-101	The commanded yaw torque per actuat...
2.4.3	SRD-CONTROL-102	Place-holder
3	SRD-CONTROL-94	User Interface
Import2	00000321	References to WindTurbineStructuralRe...
3	#26	Justifications
WindTurbineSysteme...		

**Properties**

Type: Functional

Index: 2.4.1

Custom ID: SRD-CONTROL-19

Summary: The yaw rate magnitude shall be less than 0.5 d...

Description: The yaw rate magnitude shall be less than 0.5 deg/s

Rationale:

Keywords: No

**Revision information:**

SID: 21

Revision: 4

Updated on: 13-Sep-2018 07:56:47

Modified on: 13-Sep-2018 07:56:47

Show in document

**Custom Attributes**

**Links**

Implemented by:

- Discrete PID Controller
- Design.YawRateCmdMax

Test Manager

TESTS

New Open Save Delete Run Stop Debug Parallel RESULTS ENVIRONMENT RESOURCES

FILE EDIT RUN

Test Browser Results and Artifacts

Filter tests by name or tags, e.g. tags: test

- tests\_ForEXPO
  - IdealTestCases
  - RealWorldScenarios
  - PitchControlTests
    - AllOperatingPoints
    - TimeResponse
  - IdealTestCasesByScenario
  - YawControlTests
    - Wind Direction Ramp Change
    - Wind Direction Step Change

**Wind Direction Ramp Change**  Enabled

tests\_ForEXPO » YawControlTests » Wind Direction Ramp Change

Simulation Test

Select releases for simulation: Current

Create Test Case from External File

**REQUIREMENTS**

No requirements available. Click on Add button to open the link edit...

+ Add Delete

**SYSTEM UNDER TEST\***

Model: WindTurbine

**TEST HARNESS\***

Harness: testHarness\_V

**SIMULATION SETTINGS OVERRIDES\***

**PARAMETER OVERRIDES\***

**CALLBACKS**

**INPUTS\***

**CONFIGURATION SETTINGS OVERRIDES**

**ITERATIONS\***

**COVERAGE SETTINGS\***

PROPERTY	VALUE
Name	Wind Direction R...
Type	Simulation Test
Model	WindTurbine
Harness Name	testHarness_WindTu...
Simulation Mode	[Model Settings]
Location	C:\fmacmill\Demos\G...
Enabled	<input checked="" type="checkbox"/>
Hierarchy	tests_ForEXPO » Ya...
Tags	Type comma or space s

# Model Explorer

File Edit View Tools Add Help



## Model Hierarchy

- Simulink Root
  - Base Workspace
  - WindTurbineControl
    - Design Data
    - WindTurbineControlSystem\*
    - WindTurbine
    - testHarness\_WindTurbine

Contents of: ...odelData\WindTurbineControl.sldd' (and below) Yaw

Column View: Dictionary Objects Show Details 3 object(s)

Name	Status	Value	DataType	DataSource
YawRateCmdMax		0.5	double (auto)	WindTurbineControl.sldd
YawTorqueCmdMax		245	double (auto)	WindTurbineControl.sldd
YawRateToTorqueGain		450	double (auto)	WindTurbineControl.sldd

# Test Execution Support

## Invoke linked tests to verify requirements

- Run all tests which are linked to selected hierarchy of requirements
- Right-click on Requirement or Requirement Set for option to run tests

The screenshot shows the MATLAB Requirements tool interface. A requirement hierarchy is displayed on the left, with '1 Driver Switch Request Handling' selected. A context menu is open over this requirement, showing options like 'Run Tests...'. Below the main window, a 'Run Tests - 1: Driver Switch Request Handling' dialog box is open, displaying a table of test results.

Test	Test Source	Test Status	Verifies
<input type="checkbox"/> <a href="#">Cancel button</a>	DriverSwRequest_Tests	Failed	1.4
<input type="checkbox"/> <a href="#">Enable button</a>	DriverSwRequest_Tests	Passed	1.6
<input checked="" type="checkbox"/> <a href="#">Increment button short</a>	DriverSwRequest_Tests	Unknown	1.8, 1.8.1
<input checked="" type="checkbox"/> <a href="#">Increment button hold</a>	DriverSwRequest_Tests	Unknown	1.8.2
<input checked="" type="checkbox"/> <a href="#">Decrement button short</a>	DriverSwRequest_Tests	Unknown	1.9, 1.9.1
<input checked="" type="checkbox"/> <a href="#">Decrement button hold</a>	DriverSwRequest_Tests	Unknown	1.9.2

» See: [Review Requirement Verification Status Metrics Data](#)

# Agenda

- Importing requirements
- Tracing requirements to implementation
- Tracing requirements to tests
- **Requirement change**
- Reporting
- Programmatic interface

SIMULINK PROJ... PROJECT SHORT... D DOORS P PEC G GalileanCannon E ESS F Flutter W WindTurbine Snippets C Cleanup

Custom Tasks Run Checks References Details Project Path Startup Shutdown Preferences Git Details Refresh Commit Fetch Push Pull Remote Branches Submodules Stashes

TOOLS ENVIRONMENT SOURCE CONTROL

Demos > General > WindTurbine > Requirements >

ine

All	Project (268)	Modified (5)							
Name ^	Status	Type	Size	Classification	Release	Export	ModelCon		
CodeGen	✓	Folder							
Models	✓	Folder							
Requirements	✓	Folder							
WindTurbineControllerRequirements.slreqx	✓	Requirements ...	25 KB						
WindTurbineControlSystem.slmx	✓	Traceability da...	4 KB						

C:\fmacmill\Demos\General\WindTurbine\Requirements\WindTurbineControlSystem.slmx

# Link Set Comparison support

## Track changes to requirements links by comparing Link Set files

- View added / removed / modified links compared to previous revision.
- Improved change tracking by leveraging Simulink Project and SCM integration
- Use `visdiff` for invoking from command-line.

The screenshot illustrates the workflow for comparing Link Set files. In the top window, the 'Current Folder' browser shows the file 'crs\_controller.slmx' selected. A context menu is open, and the 'Compare to Revision' option is highlighted. A blue arrow points from this menu to the 'Comparison - crs\_req.slmx' window. This window displays a side-by-side comparison of two Link Set files. The left pane shows the current state, and the right pane shows a previous revision. The comparison highlights changes in link types and metadata.

Link	Left Pane (Current)	Right Pane (Previous)
Link #6	crs_req:21 Related to crs_req_func_spec.slreq:15	crs_req:21 Derives crs_req_func_spec.slreq:15
modifiedOn	09-Jan-2018 17:38:20	17-Aug-2017 14:41:42
linktype	Related to	Derives
revision	6	1
Link #9	crs_req:22 Refines crs_req_func_spec.slreq:13	crs_req:22 Refines crs_req_func_spec.slreq:13

# Agenda

- Importing requirements
- Tracing requirements to implementation
- Tracing requirements to tests
- Requirement change
- **Reporting**
- Programmatic interface



View: Requirements

Search

Index	ID	Summary	Implemented	Verified	Definitions	Lat
WindTurbineControllerRequirements	#26	Justifications	<input type="checkbox"/>	<input type="checkbox"/>		
3						
Import1	00000320	References to WindTurbineControllerReq...	<input type="checkbox"/>	<input type="checkbox"/>		
1	SRD-CONTROL-1	Front Matter	<input type="checkbox"/>	<input type="checkbox"/>		fm
2	SRD-CONTROL-5	Controllers	<input type="checkbox"/>	<input type="checkbox"/>		fm
2.1	SRD-CONTROL-6	Signal Conditioning	<input type="checkbox"/>	<input type="checkbox"/>		fm
2.1.1	SRD-CONTROL-7	Wind speed filtering attenuation shall be...	<input type="checkbox"/>	<input type="checkbox"/>		fm
2.1.2	SRD-CONTROL-35	Wind speed filtering attenuation shall be...	<input type="checkbox"/>	<input type="checkbox"/>		fm
2.1.3	SRD-CONTROL-29	Wind direction filtering attenuation shall ...	<input type="checkbox"/>	<input type="checkbox"/>		fm
2.1.4	SRD-CONTROL-34	Wind direction filtering attenuation shall ...	<input type="checkbox"/>	<input type="checkbox"/>		fm
2.2	SRD-CONTROL-26	Supervisory Control	<input type="checkbox"/>	<input type="checkbox"/>		fm
2.2.1	SRD-CONTROL-36	Normal Operation	<input type="checkbox"/>	<input type="checkbox"/>		fm
2.2.2	SRD-CONTROL-32	The turbine shall start if all the following...	<input type="checkbox"/>	<input type="checkbox"/>	Yaw error = direction of nacelle - directi...	fm
2.2.3	SRD-CONTROL-84	Electrical power generation shall be ena...	<input type="checkbox"/>	<input type="checkbox"/>		fm
2.2.4	SRD-CONTROL-37	Abnormal Conditions	<input type="checkbox"/>	<input type="checkbox"/>		fm
2.2.5	SRD-CONTROL-33	The turbine shall stop if wind speed exc...	<input type="checkbox"/>	<input type="checkbox"/>		fm
2.3	SRD-CONTROL-9	Pitch Control System	<input type="checkbox"/>	<input type="checkbox"/>		fm
2.3.1	SRD-CONTROL-10	when in power generation mode the rot...	<input type="checkbox"/>	<input type="checkbox"/>	[RotorNominalSpeed] shall be calculated...	fm
2.3.2	SRD-CONTROL-11	Under inertial load only (zero aerodyna...	<input type="checkbox"/>	<input type="checkbox"/>	rise time shall be measured as the time ...	fm
2.3.3	SRD-CONTROL-12	Under inertial load only (zero aerodyna...	<input type="checkbox"/>	<input type="checkbox"/>	settling time shall be measured as the ti...	fm
2.4	SRD-CONTROL-18	Yaw Control System	<input type="checkbox"/>	<input type="checkbox"/>		fm
2.4.1	SRD-CONTROL-19	The yaw rate magnitude shall be less th...	<input type="checkbox"/>	<input type="checkbox"/>	Yaw rate as measured at tower hub	fm
2.4.2	SRD-CONTROL-101	The commanded yaw torque per actuat...	<input type="checkbox"/>	<input type="checkbox"/>		fm
3	SRD-CONTROL-94	User Interface	<input type="checkbox"/>	<input type="checkbox"/>		fm
Import2	00000321	References to WindTurbineStructuralReq...	<input type="checkbox"/>	<input type="checkbox"/>		
WindTurbineSystemRequirements			<input type="checkbox"/>	<input type="checkbox"/>		

▼ Properties

Filepath: C:\fmacmill\Demos\General\WindTurbine\Requirements\WindTurbineControllerRequirements.sreqx  
 Revision: 7  
 Created by: fmacmill  
 Created on: 07-Sep-2018 15:14:35  
 Modified by: fmacmill  
 Modified on: 13-Sep-2018 13:50:04

Description:

► Custom Attribute Registries

# Agenda

- Importing requirements
- Tracing requirements to implementation
- Tracing requirements to tests
- Requirement change
- Reporting
- **Programmatic interface**

# Programmatic interface

## Requirements Definition

<code>slreq.ReqSet</code>	Work with Requirements sets
<code>slreq.Reference</code>	Work with external requirement proxy objects
<code>slreq.Requirement</code>	Work with Requirement objects
<code>slreq.clear</code>	Clear requirements and links from memory
<code>slreq.convertAnnotation</code>	Convert annotations to requirement objects
<code>slreq.editor</code>	Open Requirements Editor
<code>slreq.find</code>	Find requirement, reference, and link set artifacts
<code>slreq.import</code>	Import requirements from external documents
<code>slreq.load</code>	Load requirements/link set
<code>slreq.new</code>	Create requirements set
<code>slreq.open</code>	Open requirements set

## Requirements Traceability and Consistency

<code>slreq.LinkSet</code>	Work with link sets
<code>slreq.Link</code>	Work with link objects
<code>slreq.clear</code>	Clear requirements and links from memory
<code>slreq.createLink</code>	Create traceable links
<code>slreq.find</code>	Find requirement, reference, and link set artifacts
<code>slreq.load</code>	Load requirements/link set

## Requirements Verification

<code>slreq.Justification</code>	Work with <code>slreq.Justification</code> objects
----------------------------------	--

## Requirements Comparison and Change Tracking

<code>slreq.generateReport</code>	Generate report for requirements set
<code>slreq.getReportOptions</code>	Get default report generation options
<code>slreq.refreshLinkDependencies</code>	Refresh requirement link dependencies

HOME PLOTS APPS EDITOR PUBLISH VIEW D.: DOORS P.: PEC G.: GalileanCannon E.: ESS F.: Flutter W.: WindTurbine Snippets C.: Cleanup datetime Fraser

New Open Save Find Files Compare Print Go To Find Insert Comment Indent Breakpoints Run Run and Advance Run Section Advance Run and Time

Editor - C:\fmacmill\Demos\General\WindTurbine\Requirements\tableOfRequirements.m

```
1 function tableOfReqts = tableOfRequirements
2
3 % PURPOSE:
4 % Create a summary MATLAB table of requirements
5 home
6
7
8
9
```

Command Window

```
fx >> tableOfReqts = tableOfRequirements
```

# Conclusions

# Simulink Requirements

## Work with requirements and design together

- Author, edit and organize requirements
- View and link requirements within the Simulink graphical editor
- Track status and manage requirement changes

Index	Summary	Implemented	Verified
crs_req_func_spec	-	<div style="width: 100%; height: 10px; background-color: blue;"></div>	<div style="width: 10%; height: 10px; background-color: green;"></div>
1	Driver Switch Request Handling	<div style="width: 80%; height: 10px; background-color: blue;"></div>	<div style="width: 20%; height: 10px; background-color: green;"></div>
1.1	Switch precedence	Implemented: 16, Justified: 0, Total: 19	
1.2	Avoid repeating commands	<div style="width: 100%; height: 10px; background-color: blue;"></div>	
1.3	Long Switch recognition	<div style="width: 70%; height: 10px; background-color: blue;"></div>	
1.4	Cancel Switch Detection	<div style="width: 100%; height: 10px; background-color: blue;"></div>	<div style="width: 100%; height: 10px; background-color: red;"></div>
1.5	Set Switch Detection	<div style="width: 100%; height: 10px; background-color: blue;"></div>	
1.6	Enable Switch Detection	<div style="width: 100%; height: 10px; background-color: blue;"></div>	<div style="width: 100%; height: 10px; background-color: green;"></div>
1.7	Resume Switch Detection	<div style="width: 100%; height: 10px; background-color: blue;"></div>	
1.8	Increment Switch Detection	<div style="width: 80%; height: 10px; background-color: blue;"></div>	<div style="width: 40%; height: 10px; background-color: green;"></div>
1.8.1	Increment Short Switch Detection	<div style="width: 100%; height: 10px; background-color: blue;"></div>	<div style="width: 100%; height: 10px; background-color: green;"></div>
1.8.2			

Implementation and Verification Status

Source	Destination	Change Information
Changed source: 3/12	Changed destination: 4/12	Source: Revision: 1 (Time Stamp: 25-Jul-2017 11:34:04)
Enabling cruise control	#9 Enable Switch Detection	<b>Issue: Destination Changed.</b> Stored: Revision: 15 (Time Stamp: 20-May-2017) Actual: Revision: 18 (Time Stamp: 20-May-2017)
Disabling cruise control	#7 Cancel Switch Detection	
Activating cruise control	#8 Set Switch Detection	<input type="button" value="Clear Issue"/>
Deactivating cruise control	#8 Set Switch Detection	
Target Speed Increment	#11 Increment Switch Detection	
Target speed decrement	#15 Decrement Switch Detection	
Target speed decrement	#16 Decrement Short Switch Detection	
Target Speed Increment	#12 Increment Short Switch Detection	
Successive Target Speed Increment	#13 Increment Long Switch Detection	
Successive Target Speed Increment	#14 Intermediate state	
Successive Target Speed Decrement	#17 Decrement Long Switch Detection	
Successive Target Speed Decrement	#18 Intermediate state	

Notification of Requirement Changes

# What next...

More information:

[mathworks.com/products/simulink-requirements.html](https://mathworks.com/products/simulink-requirements.html)

The screenshot shows the MathWorks website for the Simulink Requirements product. The page features a navigation bar with links for Products, Solutions, Academia, Support, Community, and Events. Below the navigation bar, the product name "Simulink Requirements" is displayed with a "NEW PRODUCT" badge. A search bar is located on the right side of the navigation bar. The main content area includes a sub-navigation menu with links for Overview, Features, Model Examples, Videos, Webinars, and Product Pricing. A "Trial software" button and a "Contact sales" link are also visible. The main heading reads "Author, manage, and trace requirements to models, generated code, and test cases". Below this, a paragraph describes the product's capabilities: "Simulink Requirements™ lets you author, analyze, and manage requirements within Simulink®. You can create rich text requirements with custom attributes and link them to designs, code, and tests. Requirements can be imported from external sources, and you can receive automatic notification when requirements change. You can view the requirements and design together, establish links with drag and drop, annotate diagrams with requirements content, analyze requirements traceability, and navigate between requirements, designs, generated code, and tests." To the right of the text is a graphic showing a helicopter and a Simulink block diagram with a callout box that says "Prior to using the data from an AHRS, the flight control software shall verify the AHRS data is valid." Below the graphic is a "Learn more" button.

Feedback:

[fraser.macmillen@mathworks.co.uk](mailto:fraser.macmillen@mathworks.co.uk)