New approach of Test Management with Simulink Test

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# MathWorks V&V Product Portfolio

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<td>Author, execute, and manage simulation-based tests for models and generated code</td>
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Simulink Test

Capabilities to test simulation outputs throughout the project lifecycle

Do legacy subsystem models work in new application?
The model worked last week… does it still?
Another engineer modified the algorithm…still working ok?
Does the generated code performance match the model?
Does subsystem/system meet the design requirements?
# Product Overview

## 1. Test Harnesses
- Synchronized, simulatable test environment

## 2. Test Sequence Block
- Inputs and assessments based on logical, temporal conditions

## 3. Test Manager
- Author, execute, manage test cases
- Review, export, report

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![Test Harness Diagram](image1)

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![Test Sequence Diagram](image2)

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![Test Manager Diagram](image3)
Applying Simulink Test Case Study : Seat Belt Reminder
Design Seat Belt Reminder

**Inputs**
- Key Position
- Seat Belt Status
- Vehicle Speed

**Outputs**
- Seat Belt Reminder Warning Lamp
SBR Algorithm Model

Functional Requirements

MATLAB EXPO 2015
Conceptual Test with Dashboard
Simulink Test

Tool for authoring, managing, and executing simulation-based tests

1. Test Harnesses

✓ Synchronized testing environment
✓ Enables unit testing without requiring new model
✓ Component or system
✓ Configure, build, simulate
✓ Supports SIL, or PIL
✓ Supports direct “adhoc” testing

MATLAB EXPO 2015
Coverage metrics identifies untested portions of your model
Improving Test Suite for Coverage

- Need to create test inputs and assessments
- Test cases need to be designed with the combination of multiple inputs including temporal or logic-based scenarios

* Simulink Design Verifier supports test generation. But expected outputs still need to be analyzed.
Simulink Test
Tool for authoring, managing, and executing simulation-based tests

2. Test Sequence Block

- MATLAB Action Language
- Steps are temporal or logic-based
- Create complex test inputs and assessments
- Trouble shooting aids

“Formerly referred to as the reactive testing block”
Simulink Test
Tool for authoring, managing, and executing simulation-based tests

3. Test Manager

- Create Test Cases
- Group into Suites and Test Files
- Execute individual or batch
- View summary and detailed results
- Archive, export, report
Test Case Templates

1. Simulation Test

   Input → Output → ✔ Assessment Criteria

2. Baseline Test

   Input → Output → ✔ Assessment Criteria
   File → Expected Outputs → Output

3. Equivalence Test

   Input → Output → ✔ Assessment Criteria
1. **Simulation Test**  
Pass/Fail assessments with blocks (Assertion)

2. **Baseline Test**  
Regression test for float-to fixed-point conversion of low-pass filter

3. **Equivalence Test**  
Comparison between Normal and Software-In-the-Loop tests
Q&A