Real-Time Testing Observer Library
Monitor safety-critical requirements continuously in real time

Highlights
- Real-time validation for supplementing classic test methods
- Greater test depth for safety-critical applications
- Optimal integration and cross-platform use

Application Areas
Safety-critical applications are common in many kinds of fields, such as automotive, aerospace, medical engineering, and manufacturing. Even when complexity is high, the functionality needs to be guaranteed and formally validated as, for example, recommended by the ISO 26262 standard for testing the functional safety of road vehicles. By using the Real-Time Testing (RTT) Observer Library, you can use requirement observers that were created with BTC EmbeddedSpecifi er on dSPACE platforms to continuously monitor your requirements.

Key Benefits
By integrating the RTT Observer Library and BTC EmbeddedSpecifi er in the dSPACE tool chain, you can supplement any existing model-in-the-loop (MIL), software-in-the-loop (SIL) or hardware-in-the-loop (HIL) environment with observers to continuously validate safety-critical requirements in real time. This combination of test methods increases the achievable test depth enormously, within the same amount of time. The optimal integration into the dSPACE tool chain for HIL and virtual validation lets you work comfortably in a familiar environment.

Efficient Tool Chain
This solution for continuously monitoring safety-critical requirements uses a combination of various tools, which can vary from application to application. This involves any of the following tools (see also p. 190):

- **Real-Time Testing Observer Library** – Take requirement observers generated with BTC EmbeddedSpecifi er® and execute them on dSPACE platforms.
- **BTC EmbeddedSpecifi er** – Transfer informal requirements into a formal representation and then into requirement observers, even without expert know-how. This formal, tool-supported method also increases the quality of the requirements.
- **dSPACE platform** – SCALEXIO®, DS1006-based HIL simulators, or VEOS® – the right platform for each test phase.
- **ControlDesk®** – The universal, modular experiment and instrumentation software. Requirement observer-specific layouts and the ability to load, start, and stop observers lets you monitor the state of each requirement throughout the entire execution. If any requirement is violated, this is shown directly in the layout.
- **AutomationDesk** – The powerful tool for test authoring and automation. The monitored requirements are checked in line with the defined test workflow. The test reports also include the results from the observers, so it is easy to trace the reasons for any requirement violations.
## Functionality Overview

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Description</th>
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</table>
| **General**                                      | - Execution of requirement observers, generated by BTC EmbeddedSpecifier, on dSPACE platforms  
- Continuous validation of requirements during test scenarios  
- Requirement observers can be added to the running model execution as independent routines. Recompilations of the model are not necessary. |
| **Setup package (additionally provided with RTT Observer Library license)** | - ControlDesk layout generator  
- AutomationDesk test template  
- BTC Observer Simulink® block  
- Product documentation  
- Demo files                                                                                                                                 |
| **Supported dSPACE platforms**                   | - SCALEXIO, SCALEXIO MC/MP<sup>1</sup>  
- DS1006, DS1006 MC/MP<sup>1</sup>  
- VEOS, VEOS MC<sup>1</sup>                                                                                                                                   |

### Order Information

<table>
<thead>
<tr>
<th>Product</th>
<th>Order Number</th>
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<tbody>
<tr>
<td>Real-Time Testing Observer Library</td>
<td>RTT_OBSERVER_LIB</td>
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### Relevant Software and Hardware

#### Software

<table>
<thead>
<tr>
<th>Software</th>
<th>Order Number</th>
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<tbody>
<tr>
<td>Included</td>
<td>Setup package (see table “Functionality Overview”)</td>
</tr>
<tr>
<td>Required</td>
<td>BTC EmbeddedSpecifier&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Optional</td>
<td>ControlDesk&lt;sup&gt;c&lt;/sup&gt;</td>
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<tr>
<td></td>
<td>AutomationDesk</td>
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<tr>
<td></td>
<td>VEOS&lt;sup&gt;c&lt;/sup&gt;</td>
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#### Hardware

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<tbody>
<tr>
<td>Optional</td>
<td>SCALEXIO&lt;sup&gt;c&lt;/sup&gt;-based real-time simulation system</td>
</tr>
<tr>
<td></td>
<td>DS1006&lt;sup&gt;c&lt;/sup&gt;-based real-time simulation system</td>
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</tbody>
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<sup>1</sup> Multicore and multi-processing support limited to observers that operate on core-local variables.
Tool Chain Overview

Validating safety-critical requirements on a dSPACE platform permanently with generated, real-time-capable observers.

Example: Integration in ControlDesk

Full overview at a glance: Requirement observers can be started, stopped, loaded, and reset. Compliance with requirements (green), non-compliance (red), and not yet evaluated observers due to unmatched preconditions (grey) are visible immediately.