Echtzeittesten mit MathWorks leicht gemacht
Simulink Real-Time

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Model-Based Design
Continuous Verification and Validation

- Requirements
- System Design
  - Environment
  - Physical Components
  - Algorithms
- Component Design
- Subsystem Design
- System-Level Specification

Verification and Validation

- Integration testing
- User Acceptance Testing
- Complete Integration & Test
- System-Level Integration & Test
- Code Verification and Validation

Implementation

- Embedded Software
  - C, C++
- Digital Electronics
  - VHDL, Verilog
- Subsystem Implementation
  - MCU, DSP, FPGA, ASIC
Model-Based Design
Continuous Verification and Validation
Simulink Real-Time Enables Simulation and Testing

Rapidly create real-time applications from Simulink models and run and test them with your hardware under test at normal operating frequencies, speeds, and timing.
Real-Time Simulation and Testing Tasks:

*Rapid Control Prototyping*
Real-Time Simulation and Testing Tasks: Hardware-in-the-loop (HIL) Simulation
Additional Real-Time Simulation and Testing Tasks:  
*Parametric Evaluation and Performance Assessment*

- **System robustness**
  - Monte Carlo analysis
  - Operational envelope testing

- **Human factors**
  - Human-in-the-loop simulation
  - Virtual reality simulators

- **Calibration**
  - Tune algorithmic coefficients
  - Optimize performance
How does Simulink Real-Time work?

*From desktop simulation to real time*

Creation of real-time applications from Simulink models and loading them onto dedicated target computer hardware in 3 automated steps:

1. Code Generation
2. Compile and Link
3. Download and Ready to Run
Simulink Real-Time provides a number of UI options that enable you to communicate with and control real-time applications running on the target machine:

- Simulink Real-Time Explorer – slrteexplr
- Simulink External Mode
- Simulink Real-Time APIs
- MATLAB UIs
- MATLAB command scripts

Use one or more of these tools based on your workflow and interface requirements.
Demonstration – Simulink Real-Time Explorer
Demonstration – Simulink External Mode
Demonstration – Batch Simulation
Control and Instrument Your Real-Time Application

*Built-in control and monitoring User Interface*
Create UIs in MATLAB

Graphical front end for your MATLAB scripts and apps
Simulink Real-Time Deployment

- Runs independently of Simulink
- One Simulink/Simulink Real-Time Target license
- Many target machines

✔ Field deployment
✔ Complete controller products
✔ Stand-alone HIL solutions
✔ Etc.
Speedgoat Real-Time Target Machines
Assembled based on your technical requirements

- Form factors available for office, lab, field, and classroom use
- Optimized for highest real-time performance (Multicore CPUs and FPGAs)
- Fully tested and works out-of-the-box
- Flexible, expandable architecture supporting a wide range I/O connectivity

* Custom engineering and I/O module development available
Simulink Real-Time

Summary

- Seamless integration into MATLAB/Simulink
- An easy way to test your application in a real-time environment
- Runs on Speedgoat target hardware