Speedgoat: Unified Desktop and Real-Time Simulation and Testing

About Speedgoat

- Incorporated in 2006, offices in Germany, USA and Switzerland, distributors world-wide
- MathWorks associate company, joint development of real-time simulation and testing solutions
- Solution for office, lab, and field-use
- Unified workflow for desktop simulation and real-time testing tasks, including Rapid Control Prototyping and Hardware-in-the-Loop simulation

Why Real-Time Testing

Accelerate Time-to-Market

Adopt a prototyping solution independent from the production hardware configuration

Test and prove new ideas, integrate new components as you change requirements

One-click to build the real-time application, download and run on target computer

Detect Design Flaws at the Earliest Possible Stage

Leverage signal monitoring, data logging and parameter tuning capabilities

Analyze and compare desktop and real-time simulations to detect design flaws in your models and algorithms

Prove concepts, inject faults and test environmental conditions

Automated and Extensive Testing

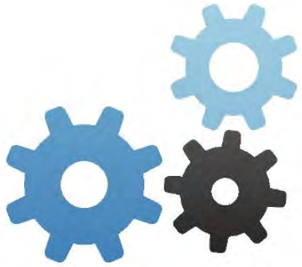
Perform and automate tests in a safe environment, without risks of damaging equipment or injuring operators

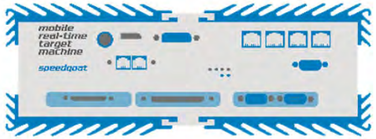
Simulate physical plants to enable continuous test and integration when the actual hardware is not available

Real-Time Simulation and Testing

Two companies form a turnkey solution

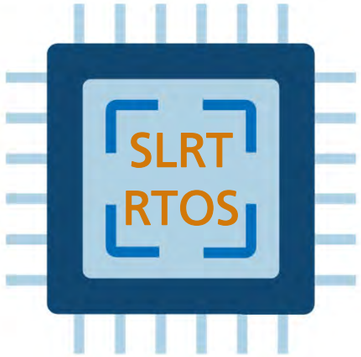
MathWorks
Simulink Real-Time





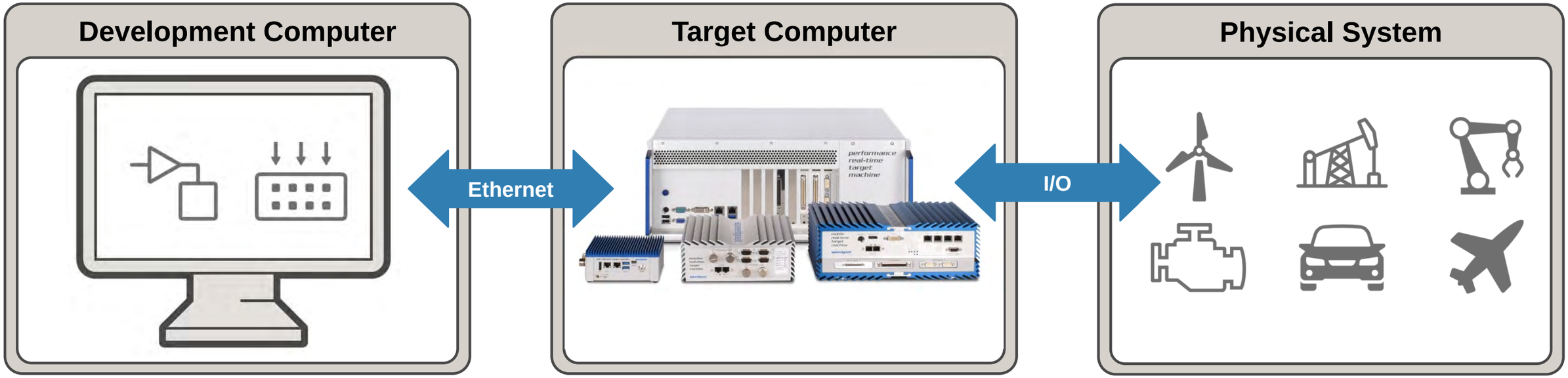
Speedgoat
Real-time Target Machines

- Real-Time Instrumentation
- Code Gen (C/VHDL)
- Toolboxes / Blocksets
- Simscape
- Simulink Test



- I/O & Protocols Support
- Simulink I/O Blocksets
- FPGA-based Solutions
- Complete HIL-Rigs

Real-Time Simulation and Testing Workflow



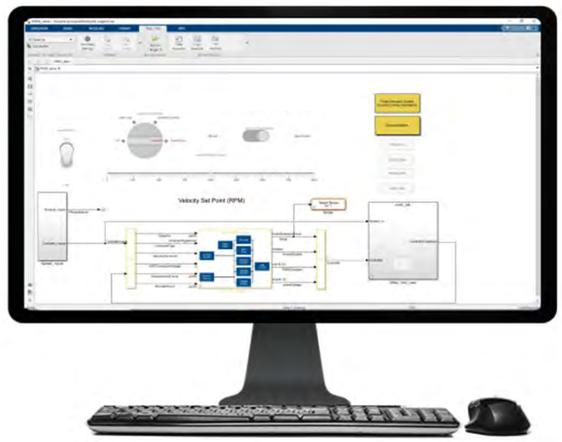
MathWorks | Speedgoat | Your Product

”…plug-and-play real-time platform for Simulink.”

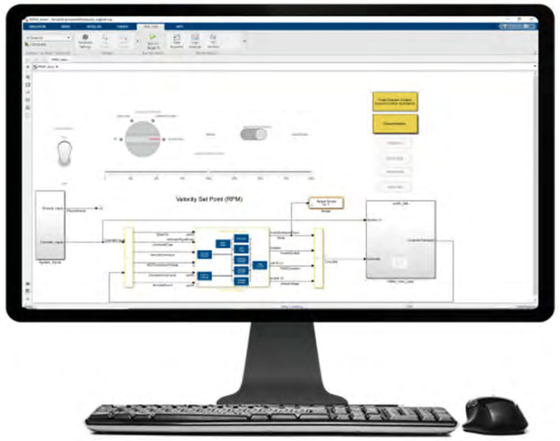
Joaquin Reyes, Controls Engineer, Proterra Electric Buses, USA

Real-Time Simulation and Testing Workflow

Desktop Simulation

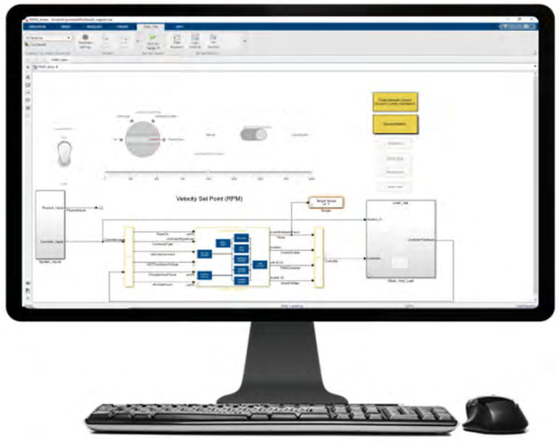


Rapid Control Prototyping



Real-Time Simulation and Testing

Hardware-in-the-loop Simulation



Quickly Prototype and Test Control Designs

HDL Coder™

Simulink Control Design™

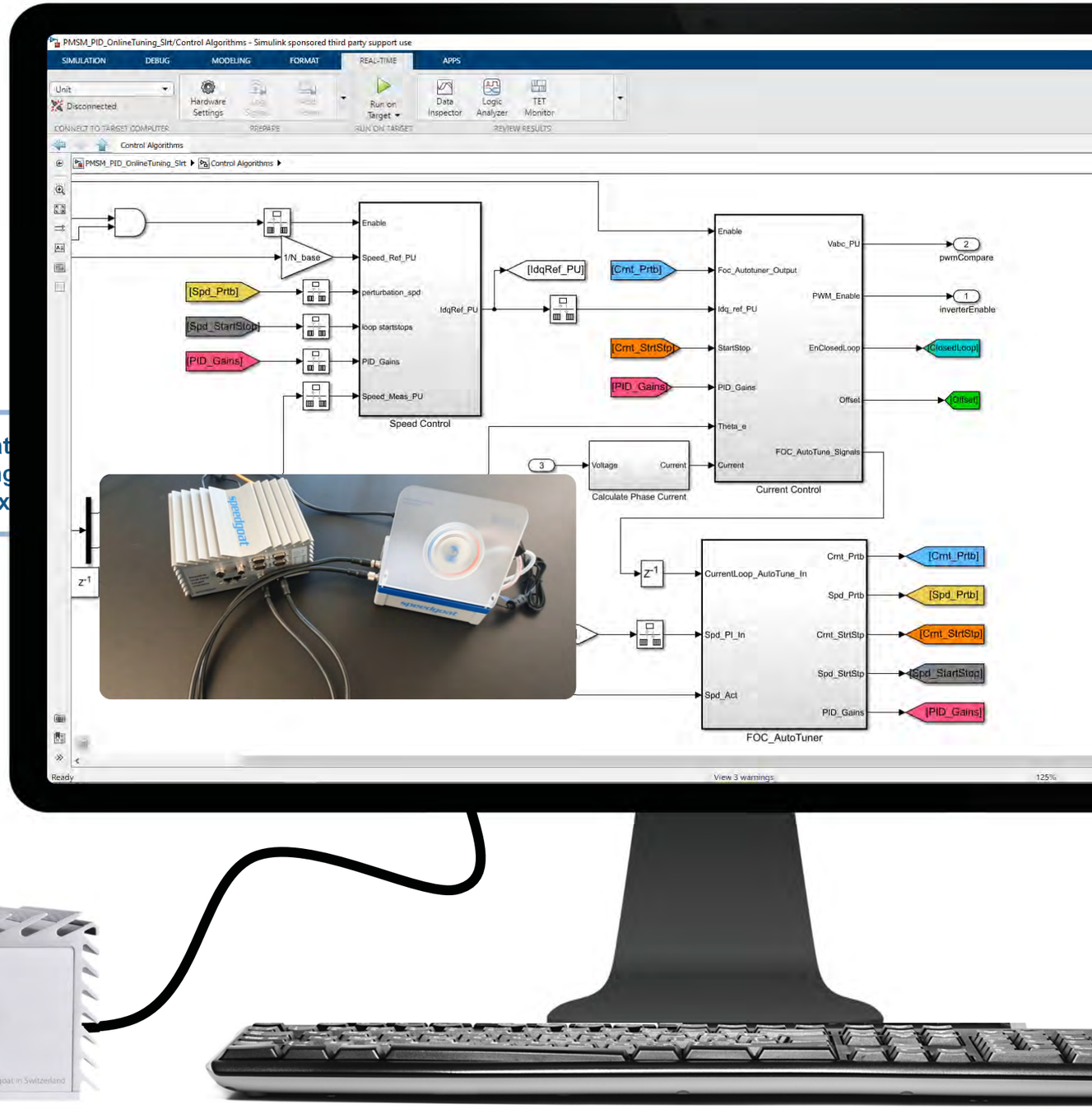
Motor Control Blockset™

Control System Toolbox™

Model Predictive Control Toolbox™

Aerospace Blockset™

Automat Driving Toolbox



Leverage powerful multi-core CPUs and FPGAs

Simulink®

Fixed-Point Designer

HDL Coder

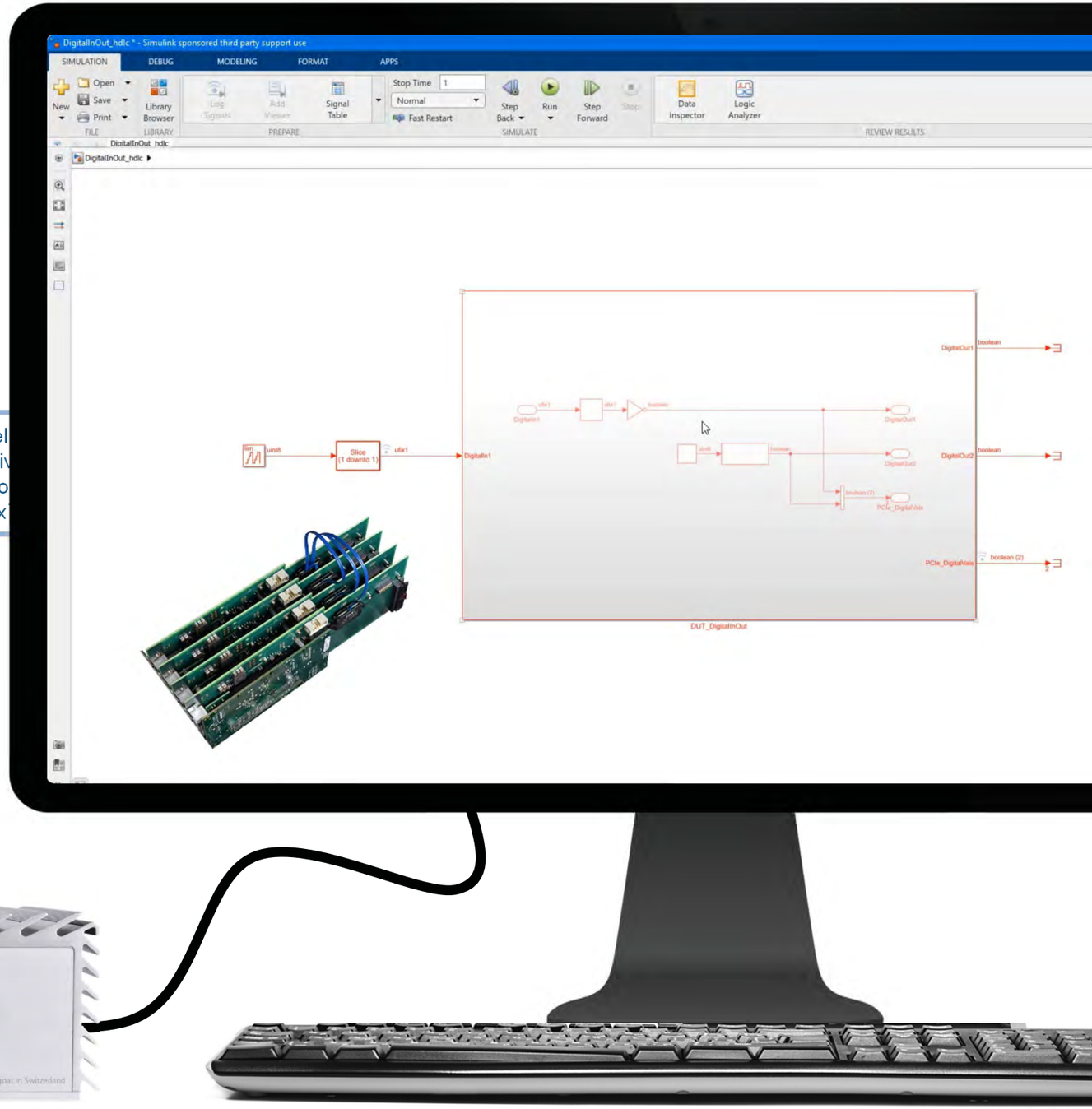
Simulink Control Design

Motor Control Blockset

Control System Toolbox

Model Predictiv Contro Toolbox

- Achieve closed-loop sample rates up to the MHz range
- Scalable to hundreds of I/O
- Future proof (SiC, GaN)

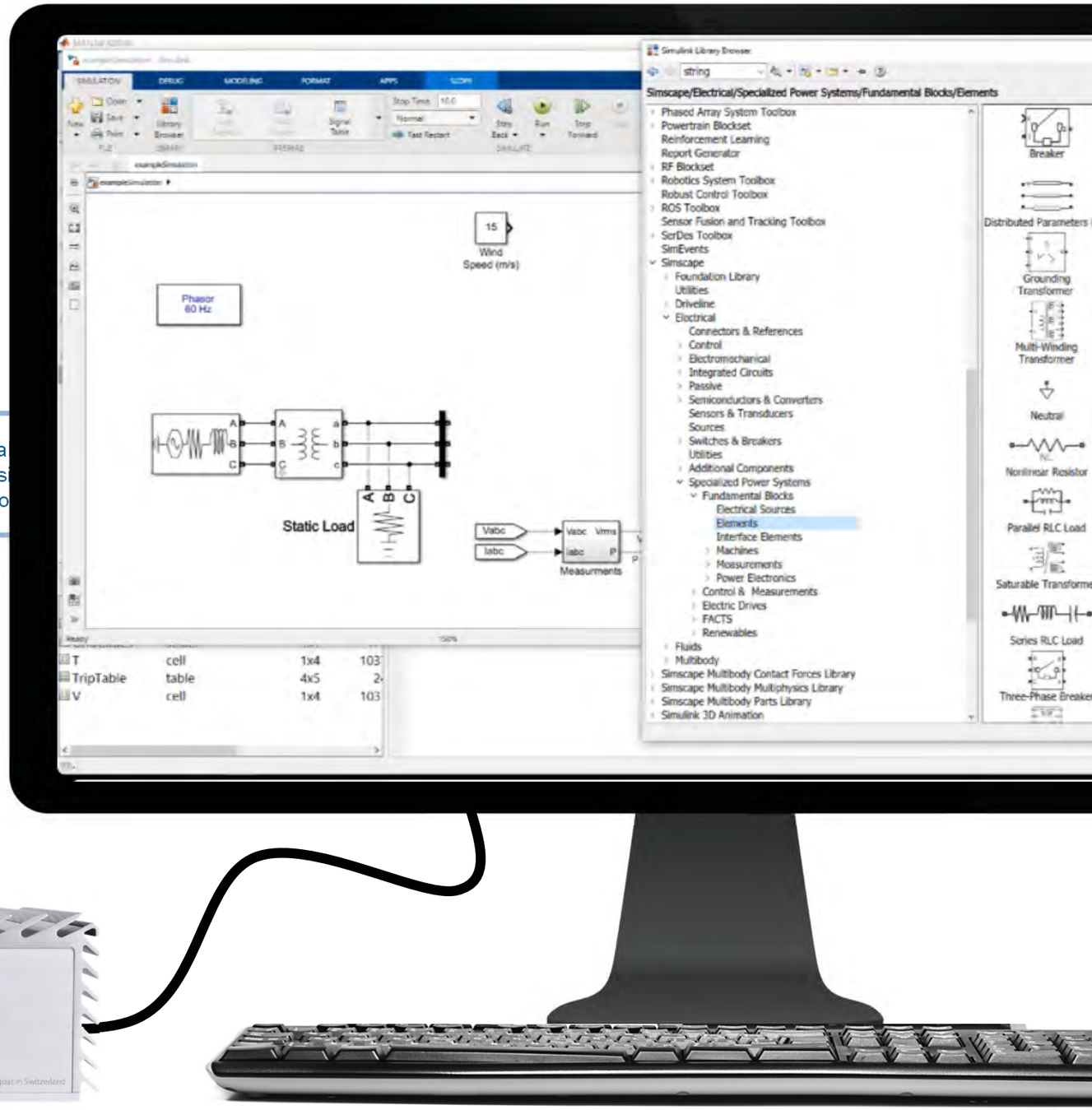


Test Controllers Against High-Fidelity Plant Models

Vehicle Network Toolbox | **Vehicle Dynamics Blockset** | **Motor Control Blockset** | **Powertrain Blockset** | **Simscape Electrical** | Predictive Maintenance Toolbox | Signal Processing Toolbox

Test Controllers for:

- Power Electronics
- Traction
- Transmission
- DC/DC
- Charging
- Thermal
- Battery



Test with Virtual 3D Environments

Control System Toolbox

Model Predictive Control Toolbox

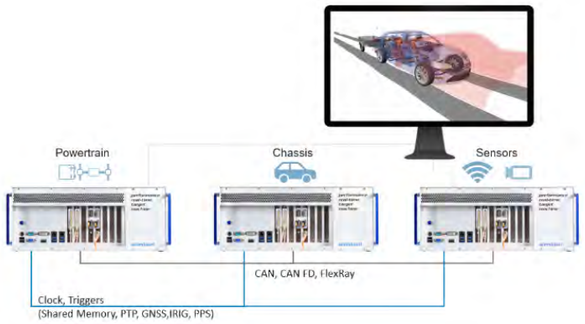
Automated Driving Toolbox

Vehicle Network Toolbox

Vehicle Dynamics Blockset

Powertrain Blockset

Simsca Multibo



Perform Test Automation

MATLAB | MATLAB Compiler SDK | **Simulink Test** | Simulink Coder | Simulink® | Fixed-Point Designer | HDL Coder™

- Or any ASAM XIL interfaced testing software (R2021b)