

Unmatched Versatility for System Simulation

ANSYS Simplorer® is a powerful platform for modeling, simulating, and analyzing virtual system prototypes. Simplorer enables product development teams to verify and optimize performance of their software-controlled, multi-domain systems designs.



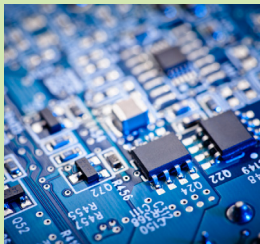
With flexible modeling capabilities that include tight integrations with ANSYS solutions for 3D multiphysics simulation and embedded software design, Simplorer helps product development organizations analyze design concepts, perform detailed analysis, and verify full system performance.

Read more about Simplorer capabilities for:

- [“Multi-Domain System Modeling”](#)
- [“Multi-Domain System Simulation”](#)
- [“Analysis and Reporting”](#)

Pedigree in Power Electronics

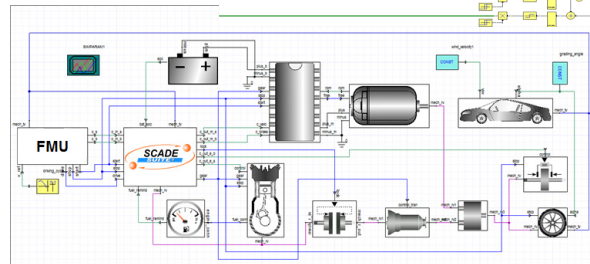
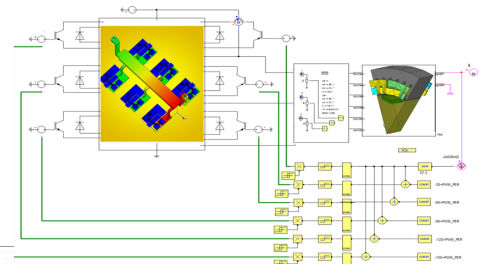
Simplorer has a long history of success in simulating and analyzing complex power electronic systems. Simplorer libraries include a broad range of state-averaged and switch-level components that support modeling at different levels of fidelity required through stages of power electronic system development. Simplorer’s proven solver technology is designed to handle the highly nonlinear nature of power circuits efficiently and accurately, including switching elements, analog and digital control, and a mixture of system time constants and multi-domain effects. Powerful waveform analysis tools give engineers the ability to analyze responses, extract measurements, and perform detailed studies of power system behavior.



Multi-Domain System Modeling

Powerful Graphical Modeling

- Create hierarchical schematics of complex power electronic circuits and multi-domain systems
- Model with standard languages and exchange formats, including:
 - VHDL-AMS (IEEE 1076.1)
 - Modelica
 - SML (Simplorer Modeling Language)
 - FMI (Functional Mock-up Interface)
 - C/C++
 - SPICE
- Use wizard-driven code editors to create VHDL-AMS, Modelica, SML, C/C++ and SPICE models
- Combine conserved (acausal), signal-flow (causal), and discrete event system behaviors
- Use on-the-fly design checking tools to assure consistency of connection types and physical domains



Access to Extensive Model Libraries

- Model complete electrical/electronic systems with libraries of analog and power electronics components, digital and logic blocks, sensors, and transforms
- Select from broad collections of characterized manufacturers, components, including Power Semiconductors, Power Management ICs, Magnetic Devices, and Ultracapacitors
- Include multi-domain effects with mechanical, hydraulic, and thermal components
- Use application-specific libraries for switch-mode power supplies, electric vehicle powertrains and aircraft electrical power systems
- Create and manage user and corporate model libraries with built-in graphical tools

Reduced-Order Model Generation from ANSYS 3D

- Use Reduced-Order Modeling (ROM) interfaces to generate accurate, compact models from detailed 2D and 3D physics simulations
- Link to a variety of ANSYS tools to create high performing models for electromagnetic machines & actuators, circuit parasitics and cables, excitations for EMI/EMC, electronics thermal networks, signal integrity, general flow and heat transfer characteristics and rigid-body dynamics
- Multiple ROM generation techniques (including state-space, electrical circuit equivalent, SVD, modal response) support a range of analysis requirements

Integrated with SCADE Suite® and SCADE Display® for Embedded Control Software and HMI Design

- Verify, optimize, and calibrate performance of safety critical software with the multi-domain physical system
- Use SCADE Suite or SCADE Display to interactively monitor and debug embedded control software or HMI execution

Power Electronic Device & Module Characterization

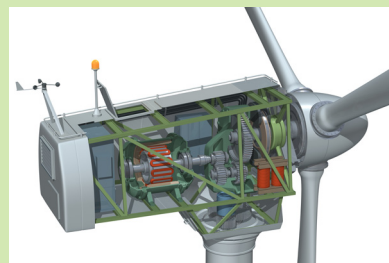
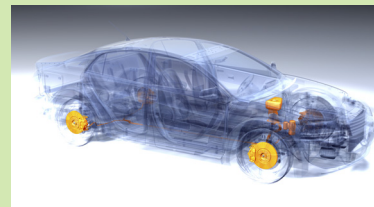
- Use wizard-driven graphical tools to create Power MOSFET, IGBT and Diode components from datasheet information
- Characterize DC/DC converter models or choose from a library of behavioral models for manufacturers' components

Model Exchange with External Tools

- Compatible with the Functional Mock-up Interface (FMI) for Model Exchange to import models from all FMI-compliant tools and export Modelica models as FMUs
- Create or reuse C/C++ models with the Simplorer C Interface
- Import MathWorks® Simulink® models using Simulink Coder™

How is Simplorer used?

Simplorer is a key part of model-based design flows in organizations around the globe to model and simulate multi-domain systems in the automotive, aerospace, electronics, energy, and industrial machinery segments.



With a unique ability to integrate power electronics, multi-domain dynamics, and embedded software, Simplorer is used for electric drives and electromechanical system design, power generation, conversion,

storage and distribution systems, EMI/EMC studies, and general multi-domain system optimization and verification.

Multi-Domain System Simulation

Robust Solvers

- Perform fast and accurate simulation of continuous-time, discrete-time, digital and analog/mixed-signal behaviors
- Achieve high numerical efficiency with sophisticated solver synchronization and adaptive time-step control
- Connect to High Performance Compute resources to increase throughput of simulation runs

Basic Simulation Experiments

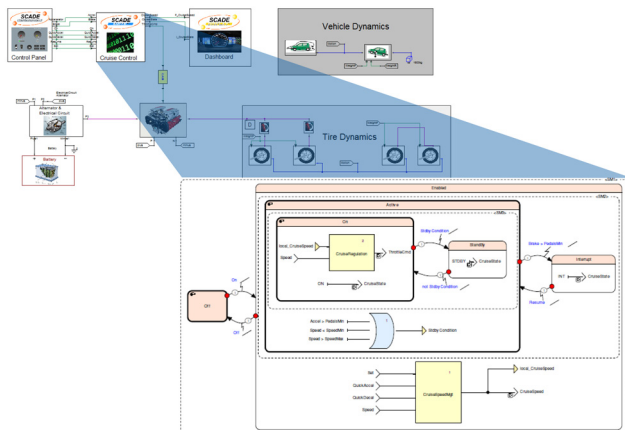
- Calculate Steady-State, Time-Domain and Frequency-Domain responses of the system
- Create multiple analysis configurations with options for fine-grain control of solver settings
- Replay simulations from existing results

Advanced Simulation Studies

- Sweep parameter values within defined ranges to identify effects on system response
- Optimize system performance based on cost functions of specified design variables
- Determine the sensitivity of performance metrics to variations in model parameters
- Analyze the effects of statistical variations (*e.g.*, manufacturing tolerances, environmental uncertainty, etc.) on system performance
- Change variable values interactively to tune performance of the model
- Connect with ANSYS Workbench to construct and manage simulation project workflows with 3D physics solvers
- Use ANSYS DesignXplorer to construct sophisticated design exploration studies

Tool Integration and Customization

- Connect with SCADE Suite® and SCADE Display® for interactive white-box and black-box simulation with embedded control designs



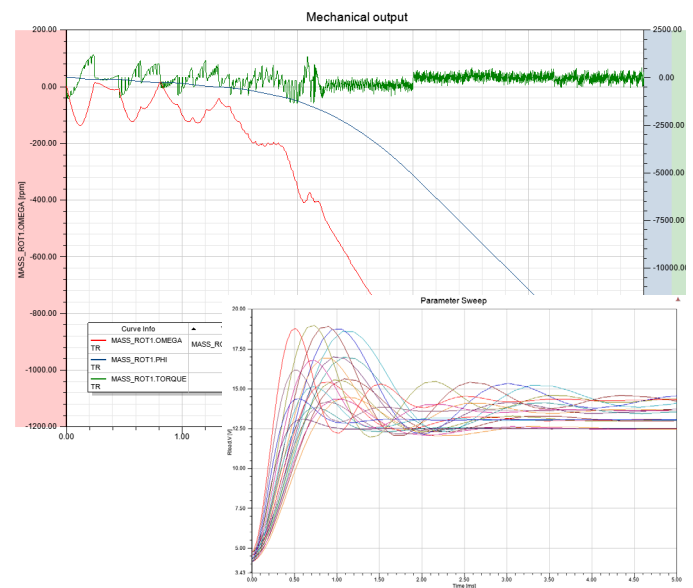
- Dynamically couple with ANSYS 2D and 3D electromagnetic (low and high frequency), CFD and mechanical solvers
- Build custom graphical panels with SCADE Test Rapid Prototyper to control and monitor Simplorer simulations
- Co-simulate with MathWorks Simulink and PTC® Mathcad

- Write or record Python or Visual Basic scripts to automate simulation workflows
- Build custom toolkits with Simplorer comprehensive Python API
- Add new model libraries and application extensions from the ANSYS ACT Store

Analysis and Reporting

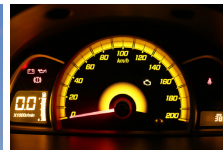
Creating Graphical and Tabular Reports

- Select from a broad range of graphical and tabular reports for displaying and analyzing simulation results
- Plot time-domain and frequency-domain waveforms and parametric relationships in 2D and 3D
- Display frequency-domain responses as Bode and Nyquist plots
- Generate data tables and numeric displays
- Display graphical reports directly on system diagrams and update them as the simulation progresses
- Apply a range of transformations, markers, and measurements to waveform traces



Export to Other Environments

- Quickly export diagrams, plots, and tables to Microsoft® Excel® or a variety of image formats
- Automatically generate Design Summary reports in HTML



System Requirements

OS Platforms	Microsoft Windows 7 Professional and Enterprise Editions (64-bit) Microsoft Windows 8 / 8.1 Professional and Enterprise Editions (64-bit) Microsoft Windows HPC Server 2008 (64-bit) Microsoft Windows Server 2012 Standard (64-bit) Microsoft Windows 10
Supported Compilers	Microsoft Visual Studio 2010 Microsoft Visual Studio C++ 2010 Express Microsoft Visual Studio 2008 Microsoft Visual Studio C++ 2008 Express Microsoft Visual Studio 2005 Microsoft Visual Studio C++ 2005 Express
CPU	2 GHz or faster
RAM	2 GB minimum (4GB or higher recommended)
Disk Space	10 GB recommended
Graphics	DirectX 9 graphics device with WDDM 1.0 or higher driver

Simplorer Product Line

Simplorer Basic:

- Integrated modeling & simulation environment
- SML, C/C++ and SPICE support
- Model libraries of basic and multi-domain components
- Model libraries of analog and power electronics components
- Model libraries of characterized manufacturers components
- Reduced-Order Model (ROM) creation from ANSYS 3D
- Co-simulation with ANSYS 2D and 3D solvers
- FMI for Model Exchange – Import
- Device characterization tools for IGBTs, MOSFETs, Diodes
- Time-domain, frequency-domain, and steady-state analyses
- Optimization, sensitivity, and statistical analyses (Optimetrics)
- Waveform analysis and reporting
- Application scripting and automation

Simplorer Multi-Language (ML):

Simplorer Basic plus VHDL-AMS language support:

- VHDL-AMS model libraries of basic and digital components
- Application-specific model libraries for Electric Vehicles, Aircraft Electrical Systems, and Industrial Power Systems
- Digital and mixed-signal simulation
- VHDL-AMS model encryption

Modelica language support:

- Modelica Standard Library
- Modelon Hydraulics Library and Pneumatics Library

Simplorer Advanced:

Simplorer ML plus 3rd party interfaces:

- MathWorks® Simulink® co-simulation
- PTC Mathcad® co-simulation
- FMI for Model Exchange - Export (for Modelica subsystems)

SMPS Power Package Add-on

- DC/DC converter modeling tool
- Switch-Mode Power Supply Model Library

Simplorer Control Option

Add-on to Simplorer Basic

- MathWorks® Simulink® co-simulation

Contact Information

Submit questions to ANSYS Customer Portal at

<https://support.ansys.com/portal/site/AnsysCustomerPortal>

Contact one of our Sales representatives at

ansysinfo@ansys.com

Direct general questions about Esterel Technologies to

ansysinfo@ansys.com

Discover the latest news on our products and technology at

<http://www.ansys.com/Products/Systems/ANSYS+Simplorer>

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Revision: SMP-TDS-R16 - 12/01/16