Realize Your Product Promise™

ANSYS®

Simplorer
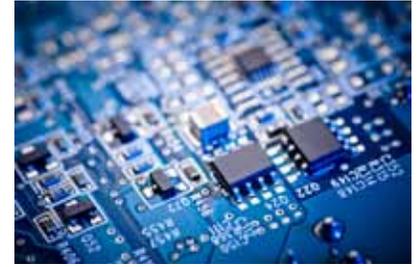
Simplify multidomain simulation from detailed components to the system level, all within a single design environment.

When you trust complex systems design to ANSYS Simplorer, you get an unequaled level of usability and numerical power.

ANSYS Simplorer® enables engineers to accurately and quickly design complex power electronic and electrically controlled systems. It is an intuitive, multidomain, multitechnology simulation program used to simulate, analyze, and optimize complex systems, including electromechanical, electromagnetic, power and other mechatronic designs. In industries such as automotive, aerospace and industrial automation, organizations use Simplorer to identify problems in the early design stages that other simulation or build-and-test methods cannot detect.

Today's rapidly evolving products include complex interactions between components, subassemblies and systems. With seamless integration of multiple system-based modeling techniques (including circuits, block diagrams, state machines and equations) and modeling languages within the same schematic, Simplorer is the ideal tool for accurate systems modeling.

Simplorer's unique simulator coupling and cosimulation technologies employ a data exchange backbone; its numerical algorithms are specifically tuned for the multidomain nature of dynamic systems. Embedded tools allow you to create high-fidelity models across multiple domains at different levels of abstraction, leading to simulation of an entire complex system.

If your product depends on precise interaction between electromechanical components, power electronic circuits, and system-based electrical and mechanical control, Simplorer cuts through the technological chaos and delivers an unequaled level of usability and numerical power.

Whether your challenge is to develop an electric propulsion system, integrate an electric drive with a motor, or create a new alternative energy system, Simplorer provides the technology to virtually explore every aspect of the design — and deliver it quickly, accurately and under budget.

Coil Current & Voltage

Armature Position & Force
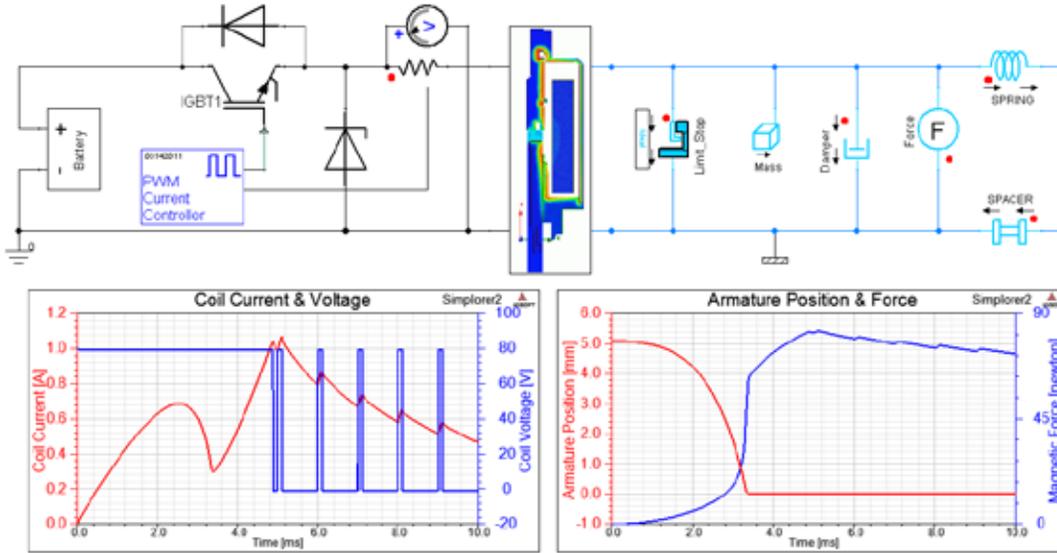
Simplorer simulates the precise interaction between electromechanical components, power electronic circuits and electrical/mechanical controls.

Our technology is ideal for modeling parasitic effects of power electronic and electrothermal behaviors in batteries, motors and inverters in HEV propulsion systems.
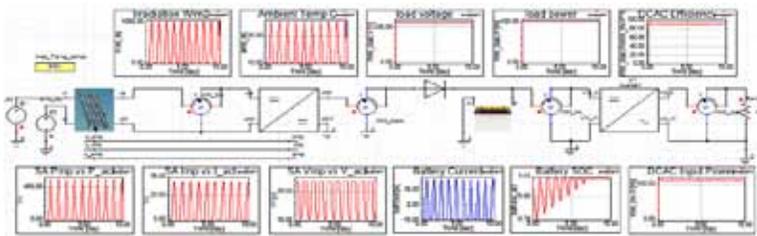
With Simplorer, you can couple critical multidomain components of power systems for detailed EMI, stability and power efficiency analysis.

Simplorer leverages ANSYS best-in-class EM field solvers, providing a precise physics-based systems modeling environment.

ANSYS Simplorer

ANSYS Workbench™

ANSYS Maxwell®

ANSYS SIwave™

ANSYS Q3D Extractor®

ANSYS HFSS™

ANSYS PExprt™

ANSYS RMxprt™

AnsoftLinks™
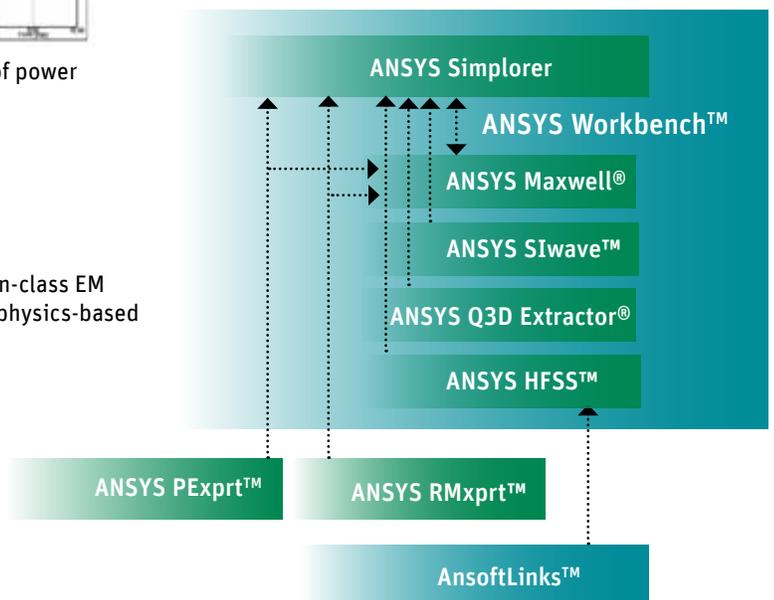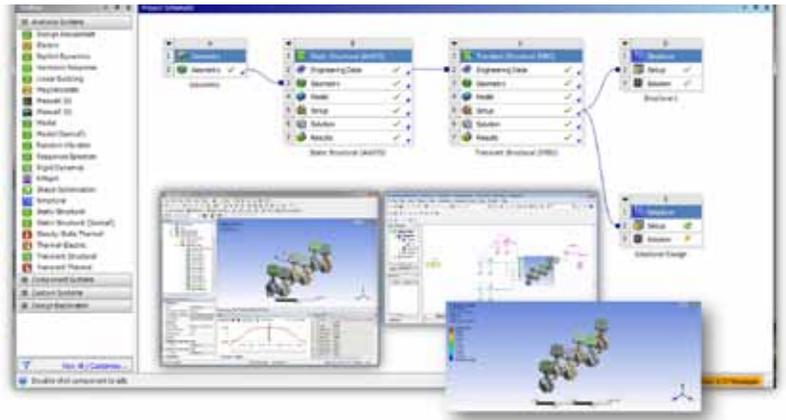
ANSYS Rigid Body Dynamics tools coupled with Simplorer

Engineers around the world develop the most complex multidomain, multitechnology designs using advanced Simplorer functionality.
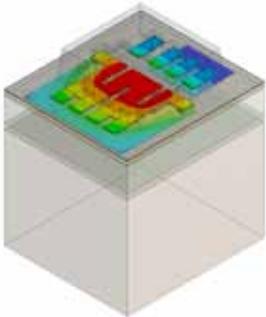
Multidomain, Multitechnology Capabilities

Simplorer's multiple modeling techniques allow you to work at the circuit, block diagram, state machine or equation level. You can render these simulations using several modeling languages, including IEEE® standard (1076.1) VHDL-AMS, Simplorer modeling language (SML) and C/C++. VHDL-AMS provides continuous time- and event-driven modeling semantics for mixed-signal and multidomain systems, so it is suitable for analog, digital and analog/digital circuits. It also handles systems that include a combination of electrical, mechanical, thermal, hydraulic and magnetic models. Our tools facilitate easy model exchange between different simulation tools that adhere to the VHDL-AMS standard; at the same time, they ensure compatibility between software tools and preserve legacy models.

You can use different languages concurrently for modeling analog, digital and mixed-signal designs. This flexibility eliminates the need for the mathematical transformations and model analogies often used by single-domain simulation tools, which can introduce errors.

Physics-Based Modeling

For system component models that require the highest level of accuracy, Simplorer provides a direct link to other ANSYS industry-leading

electromagnetic field simulation software packages: Maxwell, Q3D Extractor, RMxprt, PExprt, HFSS and SIwave as well as ANSYS Icepak®, ANSYS Rigid Dynamics and ANSYS Mechanical™ products. The coupling technology and model reduction techniques give you the capability to incorporate detailed physics-based models within Simplorer.

Statistical Analysis and Optimization

Simplorer includes capabilities for parametric, optimization, sensitivity, statistical and tuning analysis. These advancements mean that you can optimize your design based on a set of performance measurement criteria and provide insight into design variations and trade-offs. The Simplorer statistical analysis feature fully integrates the SAE VHDL-AMS statistical package.

Device Characterization Tools

Our software supports powerful device and system component characterization tools, including IGBT model generation and DC–DC converter behavioral modeling. Developed in collaboration with industry-leading experts, the tools aid in creating behavioral, average and dynamic models for use in Simplorer.

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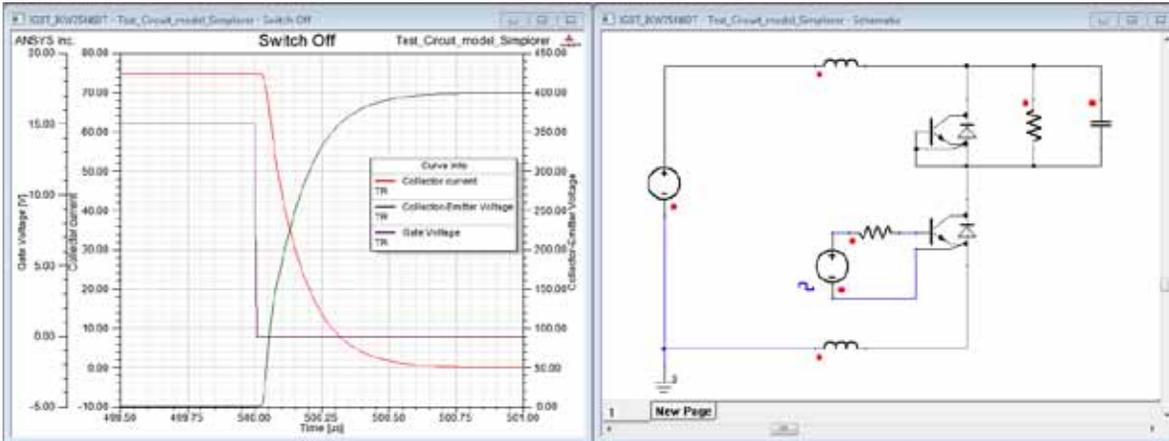
Simplorer includes a powerful IGBT characterization tool that can create behavioral, average and dynamic models of these critical devices.

Codesign Support

Simplorer's powerful environment allows you to develop virtual prototypes that you can share among hardware and software design groups, making it possible to emulate hardware and simulate the software. Simplorer libraries can be shared between different users over a network, expanding codesign opportunities.

To customize code, you can integrate your C/C++, MATLAB®/Simulink®, ModelSim®, QuestaSim®, Mathcad® and other specialized code directly into Simplorer. This direct integration of models in their native environments avoids model translation, saves design time, and fosters communication and model exchange across departments as well as between suppliers and OEMs.

Smooth Design Flow

Simplorer's powerful scripting feature opens APIs in the Simplorer environment so you can embed Simplorer into existing design flows. The scripting capability, including script recording, is language independent, so it works with popular scripting languages such as Visual Basic® and Java®. It also interacts easily with other tools supporting the Microsoft® interface.

Distributed Analysis

Six sigma analysis, statistical analysis and parametric studies often require many large simulations. Simplorer leverages available computing power across your network with distributed analysis options for fast turnaround of the largest variations.

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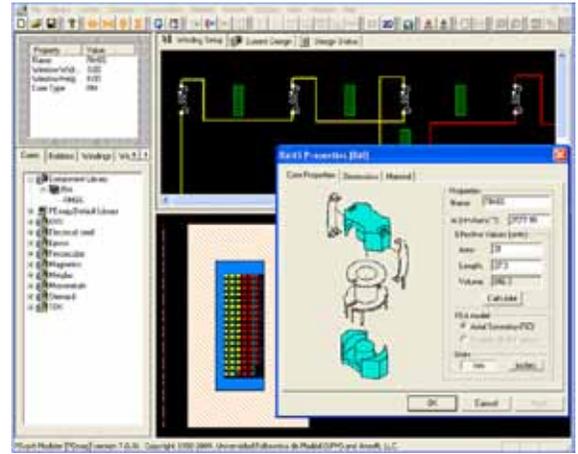
Add ANSYS PExprt to your power electronics simulation toolkit to design, analyze and optimize transformers and inductors.

ANSYS PExprt uses a combination of classical and finite element analysis (FEA) techniques to evaluate performance and power efficiency in transformers and inductors used in power electronic applications. Specifically, the tool determines components' appropriate core size and shape, air gaps, and winding strategy for optimal reliability and performance or other user-specified criteria. PExprt provides unique insight into design issues such as gap energy, current density in windings, leakage flux (leakage inductance), winding capacitance, proximity and skin effects, interleaving, and integrated windings. This specialized software provides Simplorer with the detailed models it needs to simulate magnetic and thermal effects in the complete design.

PExprt is ideal for use in designing automotive and aerospace converters, switch-mode power supplies, and electronic ballasts. You can quickly calculate all possible combinations of core size, core material, wire gauge, turns and gap length that satisfy user-supplied electrical specifications. The resulting virtual designs are then refined and optimized to predict effects such as magnetizing and leakage inductance, interwinding capacitance, peak flux density, DC winding resistance, eddy current effects and core loss.

SMPS Model Library

Simplorer's switched mode power supply (SMPS) model library provides predefined power electronic circuit topologies and related control algorithms for the design of power converters and power systems. The DC–DC characterization tool creates detailed models of the DC–DC converter based on vendor data sheets, so these blocks can then be used in system-level power distribution topology studies, sizing and stability analyses.
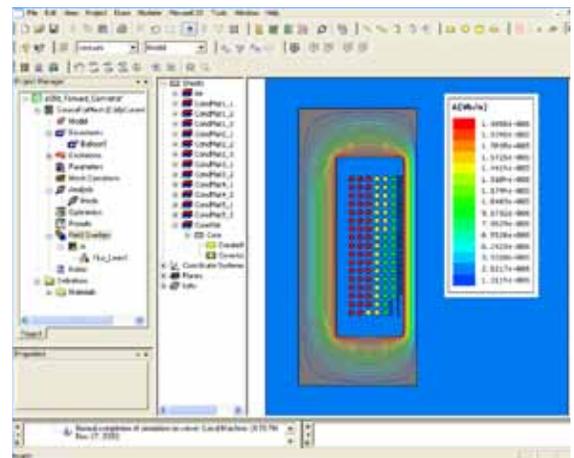
Virtually explore every aspect of your design with the ANSYS suite.

ANSYS Simplorer and related electromagnetics tools are part of our suite that delivers cutting-edge functionality — depth, breadth, a plethora of advanced capabilities and integrated multiphysics — providing confidence that your simulation results reflect real-world outcomes.

The comprehensive range of solutions gives you access to virtually any field of engineering simulation that a design process requires. Organizations around the world trust ANSYS to help them realize their product promises.

ANSYS Simplorer

Modeling Techniques

Circuits
Block diagrams
State machines
Equations

Modeling Language
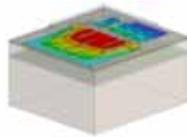
VHDL-AMS
SML
C/C++

Physics-Based Modeling
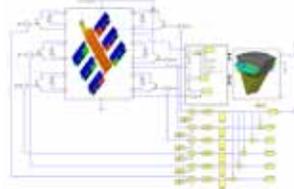
Maxwell
HFSS
Q3D Extractor
SIwave
ANSYS Structural
ANSYS CFD

Cosimulation

Simulink
QuestaSim
ModelSim
Mathcad

Pre-Processing   **Simulation**   **Post-Processing**   **Archive**

Other ANSYS Engineering Simulation Capabilities

ECAD
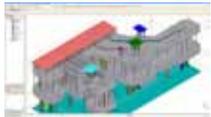
The ANSYS suite provides modeling and geometry creation functions as well as tools for importing CAD data from various sources. In addition, we collaborate with leading CAD developers to ensure an efficient workflow.

Integration

ANSYS Workbench is the framework for the industry's broadest and deepest suite of advanced engineering simulation technology. It delivers unprecedented productivity, enabling Simulation-Driven Product Development™.

Multiphysics
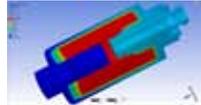
To help ensure a successful product, R&D teams must accurately predict how complex products will behave in a real-world environment. The ANSYS suite captures the interaction of multiple physics: structural, fluid dynamics, electro-mechanics and systems interactions. A single, unified platform harnesses the core physics and enables their interoperability.

HPC

High-performance computing enables creation of large, high-fidelity models that yield accurate and detailed insight. ANSYS offers scalable solutions and partners with hardware vendors to ensure that you get the power and speed you need.

Design Optimization
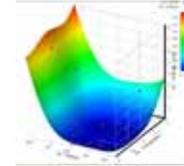
Good design starts with identifying the relationship between performance and design variables. ANSYS DesignXplorer enables engineers to perform design of experiments (DOE) analyses, investigate response surfaces and analyze input constraints in pursuit of optimal design candidates.

Data Management

ANSYS EKM™ addresses critical issues associated with simulation data, including backup and archival, traceability and audit trail, process automation, collaboration and capture of engineering expertise, and IP protection.

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ANSYS is dedicated exclusively to developing engineering simulation software that fosters rapid and innovative product design. Our technology enables you to predict with confidence that your product will thrive in the real world. For more than 40 years, customers in the most demanding markets have trusted our solutions to help ensure the integrity of their products and drive business success through innovation.

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