

# Saber Automotive Overview

**Saber provides the industry-leading, proven solution for automotive design**

## Overview

Hybrid- and electric-vehicle development demand more and more accurate simulation of Automotive systems to achieve quality-, reliability- and cost-requirements.

Comfort and infotainment accessories proliferate and drive- by-wire controls are replacing traditionally mechanical functions. The increased energy demand compels car makers to improve power network (Powernet) performance and efficiency to enhance system reliability.

Additionally, ADAS (Advanced Driving Assistant Systems) and Functional Safety (i.e. ISO 26262) become more and more important.

Improving Powernet reliability requires a systematic development approach that ensures reliability issues are addressed as an integral part of the design process.

Design teams use robust design methodologies to manage complex energy generation and distribution problems, such as designing an alternator charging system, taking into account system and environmental variations that affect performance.



## Automotive System Design, Analysis, and Verification

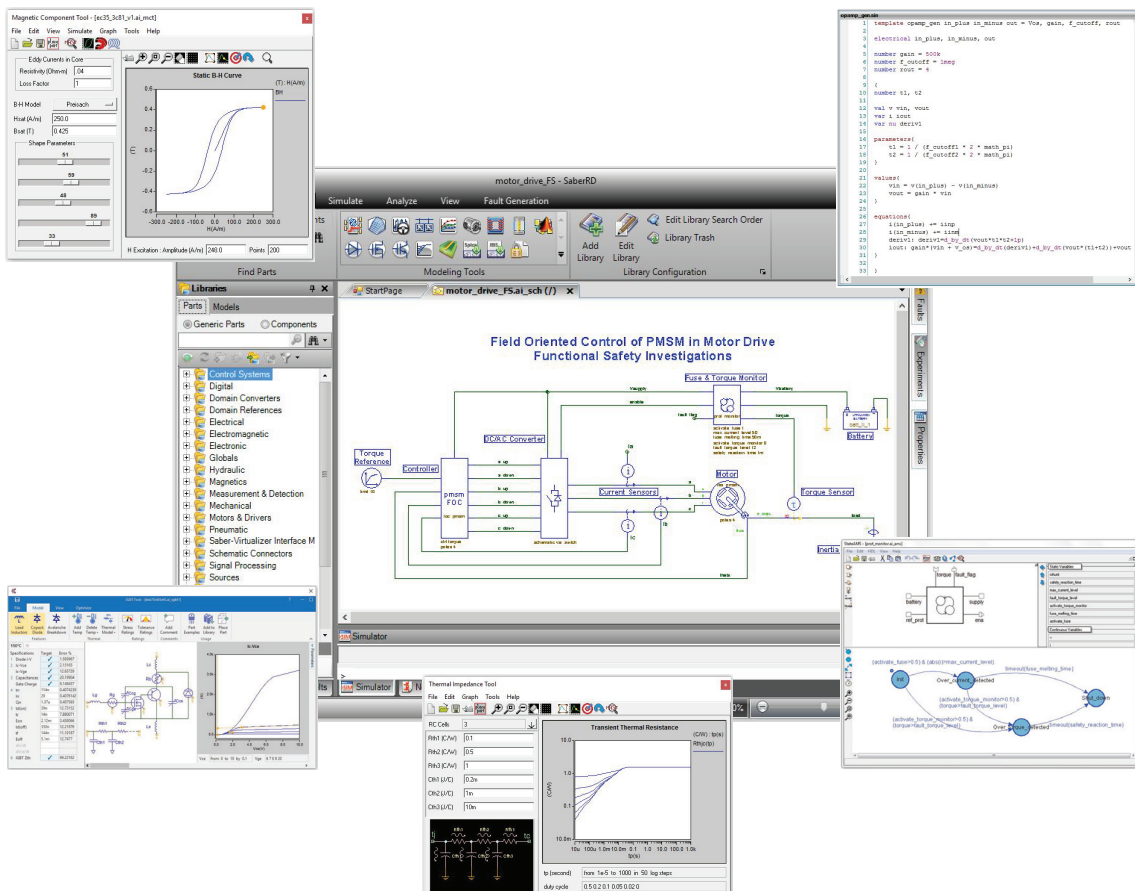
SaberRD® is the industry standard for Robust Design methods for mixed-signal, mixed-domain Power electronic and Mechatronic systems. SaberRD's highly acclaimed design modeling and powerful simulation tools provide designers the ability to simulate, analyze and verify interactions between multiple physical domains (electrical, magnetic, mechanical, thermal, hydraulic, etc.). With its advanced analysis and modeling capabilities – waveform analyzer, comprehensive model libraries, and multi-language model creation tools – designers can perform optimization, Robust Design, and Functional Safety on virtual prototypes of any system. Production proven with hundreds of successful designs in multiple industries, SaberRD continues to be the preferred solution for minimizing costs, reducing design iterations and increasing reliability.

- Select devices from the industry's largest library (>30,000) of behavioral and characterized simulation models
- Model complete Automotive systems using industry standard hardware description languages MAST® and VHDL-AMS
- Analyze and verify at the system, circuit, device, or component level across domains
- Choose from over 60 performance measurements to quickly analyze simulation results
- Improve design reliability with advanced stress, sensitivity, fault, and statistical analyses
- Automate simulation and results analysis tasks
- Increase analysis throughput with distributed simulations across multiple CPUs

## Flexible Modeling Options

SaberRD supports complete model coverage with an extensive range of modeling capabilities.

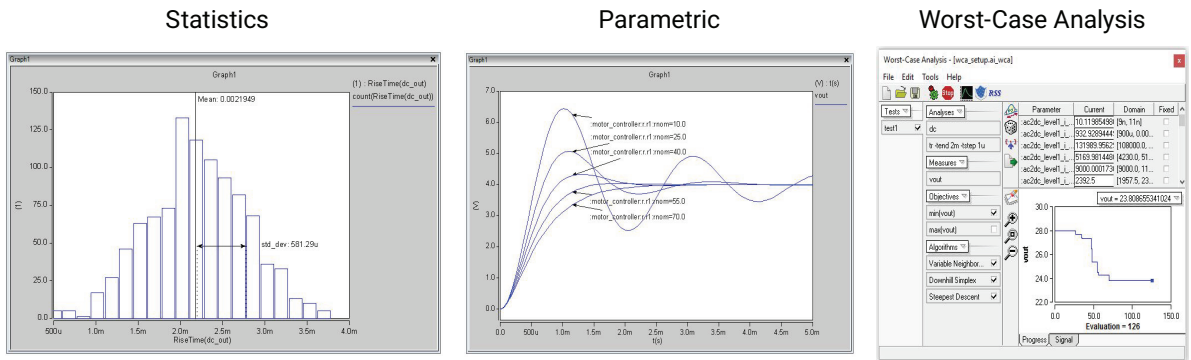
- Industry-standard modeling languages
  - MAST, VHDL-AMS, C, FORTRAN
  - HSpice and PSpice
- Modeling Tools
  - StateAMS, table lookup
  - Diode, MOSFET, IGBT, magnetic, battery, fuse, motor, thermal
- Co-simulation
  - Synopsys Virtualizer and VCS
  - MATLAB® and Simulink®
  - Mentor Graphics® ModelSim®
  - Integrated in leading co-simulation tools



# Design for Manufacturing and Robust Design

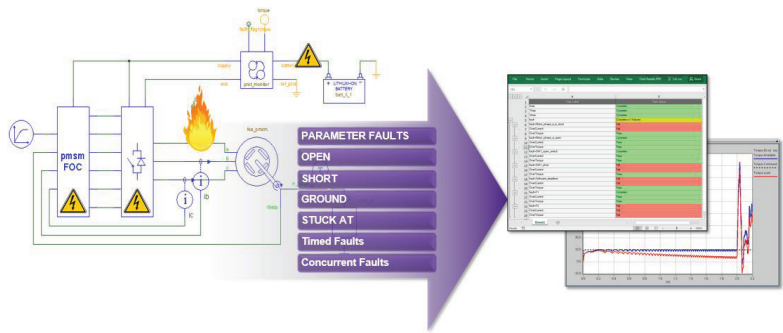
SaberRD enables comprehensive system design beyond Parametric by using statistical, sensitivity, stress, and worst-case analyses.

- Use Parametric analysis to fine-tune key parameters in a design
- Statistical analysis to predict how component tolerance variations affect system performance, allowing designs to achieve Six Sigma goals.
- Sensitivity analysis for determining which parameters most affect system performance
- Stress analysis to evaluate the degree of component stress in a system during operation
- Worst-Case to identify the most critical design-behavior and design parameters by applying optimization algorithms



# Functional Safety

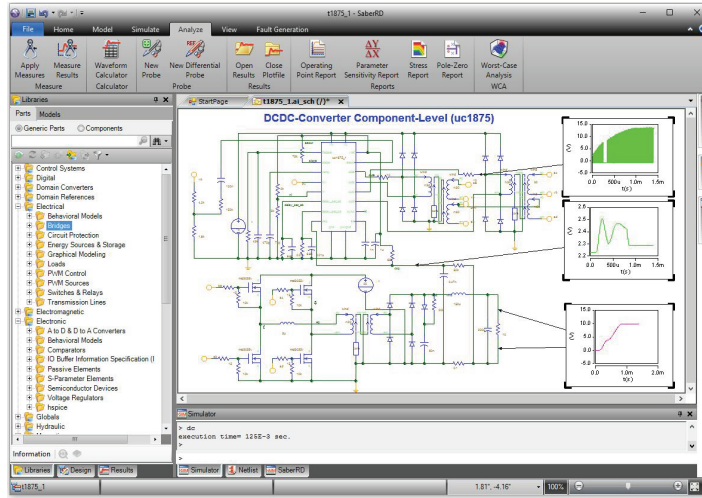
Simulate and analyze systems under various fault conditions. A matrix of faults representing hardware and abstract software failures can be easily set up to evaluate system performance during each fault condition. Automatically generated reports help designers quickly assess the reliability of the complete system design.



# Schematic Capture and Simulation

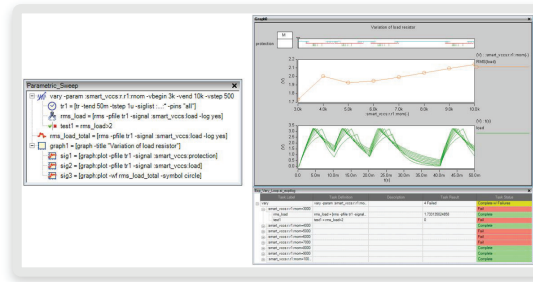
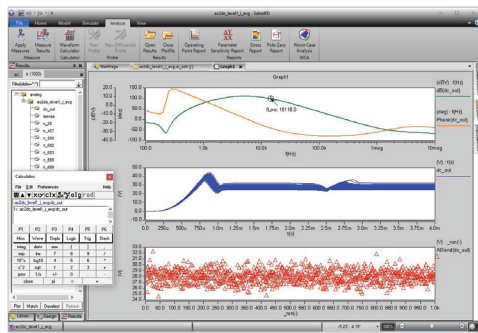
SaberRD allows an easy-to-use schematic capture providing users with an intuitive graphical interface to quickly search for desired components, create design schematics, and run simulations which can be automated by SaberRD's Experiments and scripts. Users easily set up simulation and plotting, back annotation, and display of simulation results directly on the schematic. SaberRD seamlessly supports multi-sheet designs and multiple levels of hierarchy, as well as mixed-domain (electrical, mechanical, thermal, etc.) and mixed-signal (digital and analog) components.

Users can quickly export graphics from SaberRD to standard format (jpg, tiff, bmp, etc.) for complete design documentation.



## Data Visualization and Analysis

SaberRD includes a full featured waveform analyzer with advanced features for viewing and analyzing simulation data. These features include more than 60 standard measurements for evaluating critical aspects of mixed-domain simulation results, a patented Waveform Calculator for performing mathematical operations on signals, and simple graphics export for ease in documenting simulation results. Waveform operations and measurements can also be easily automated by SaberRD's Experiments and scripts.



## Comprehensive Model Libraries

SaberRD has the largest multi-domain library in the industry to speed the development of virtual systems. The library provides comprehensive support for the critical design needs of the Automotive, Aerospace, and Power industries.

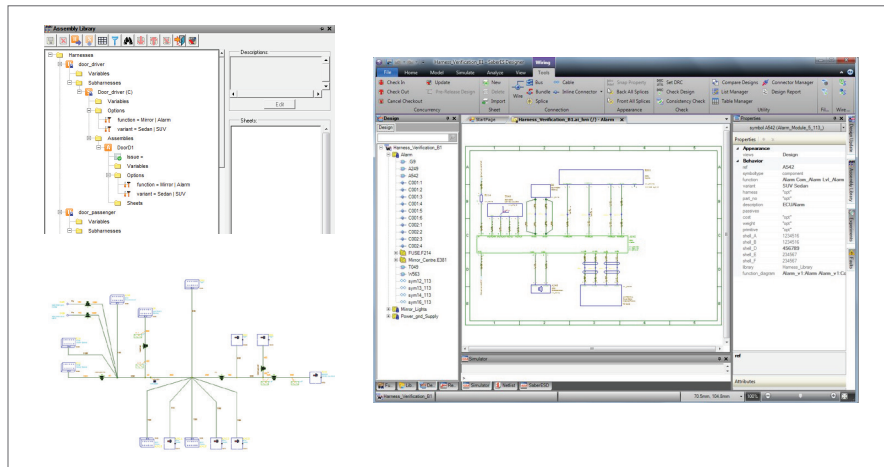
These characterized libraries provide various levels of abstraction, from high-level idealized models to the detailed, specific device level. Written in MAST and VHDL-AMS, these models reflect real-world behavior and allow easy exchange between OEMs and suppliers.

## Electric System and Wire Harness Design

SaberES Designer provides industry-leading capability for wire harness design, layout, and analysis. SaberES Designer analyzes the complete system to determine optimal wire size, fuse load, voltage drops, power distribution, and connectivity. SaberES Designer provides:

- Complete data flow for electrical system design from concept to manufacture
- Single database architecture—no data re-entry, supports design re-use, DRCs, etc.
- Advanced design variant/option handling
- Utilities to streamline design processes (connector management, automatic parts selection, DRCs, etc.)
- Full simulation and analyses—DC, transient, statistical, parametric, and fault
- Automatic generation of 2-D harness layout drawings and manufacturing information (e.g. DSI)
- Integration with leading MCAD tools (UGS®, CATIA V5®, Pro/E®)

SaberES Designer incorporates subsystem, system, wiring, and physical harness design with full system verification in a single tool. With its comprehensive simulation and analysis capabilities, SaberES Designer is the preferred solution for advanced wire harness design.



## Summary

Saber provides the industry-leading, proven solution for automotive design and verification supporting robust design methodologies. State-of-the-art schematic capture, leading-edge simulation and analysis, extensive model libraries, industry standard language support, and powerful modeling capabilities make Saber the most powerful mixed-domain simulation solution available, and the top choice among automotive and aerospace engineers worldwide.

For more information about the Saber product family, visit us on the web at [synopsys.com/saber](http://synopsys.com/saber) or contact your local sales representative.