

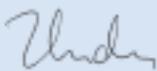
A History of Innovation

Ansoft has a long history of developing leading simulation solutions for the electronics industry.

By Mark Ravenstahl, Director, Marketing Communications, Ansoft LLC

Ansoft, a leading developer of high-performance electronic design automation software, is now a subsidiary of ANSYS, Inc. We founded Ansoft to meet the design challenges of modern high-performance electronic and electromechanical systems by linking electromagnetic field simulation with circuit and system-level design. Today's electronics products relentlessly become more dense, operate at higher speeds and grow in functionality. To be competitive in this dynamic market, engineers must be able to simulate the true behavior of these products by including the electromagnetic coupling. Additionally, the convergence of electronics and mechanics in many applications, such as hybrid electric vehicles, has driven the need to unite electromechanical system simulation with rigorous three-dimensional electromagnetic field modeling. Ansoft software allows engineers to simulate component-level behavior, combine this behavior with circuit elements and functional blocks, and optimize system performance under actual operating conditions. The key to Ansoft's success is solving the physics underlying electrical and electronics products using finite element and other simulation methods and enabling these physics-based solutions to be used in system-level simulations.

The Ansoft and ANSYS combination will address the exploding global demand for more automated and functional products in a wide range of industries: alternative energy, wireless technology, high-speed digital devices, and automotive and aerospace applications. The combination of our two world-class engineering organizations can already deliver many of the tools engineers require to meet these global trends. We are very excited about our future together — working as one company, we will deliver an unprecedented range of simulation technology, from electromagnetics to thermal, fluid flow to structural, physical to behavioral. Together we will deliver Simulation Driven Product Development across the entire spectrum of engineered products.

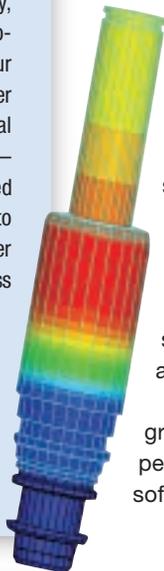


Zoltan Cendes
Chief Technology Officer and General Manager
Ansoft LLC

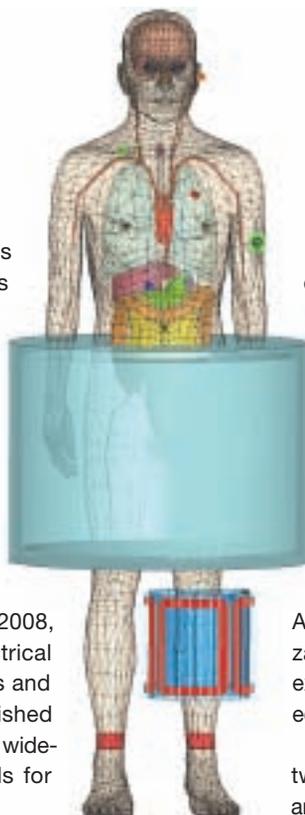
Ansoft grew out of research conducted at Carnegie Mellon University by Zoltan J. Cendes, Ph.D., and his colleagues. Dr. Cendes' early research focused on low-frequency magnetic and electrostatic field computations. The original software developed by Dr. Cendes and his colleagues — Maxwell — was equipped with a powerful Delaunay mesh-generation algorithm that automated the meshing process and made the software very easy to use. In 1984, with the technology developed to the point at which the principals believed it could be turned into a business and Dr. Cendes was convinced that electromagnetics was being under-utilized, Ansoft was formed.

In the 1980s, Ansoft started doing cutting-edge research on high-frequency microwave fields. Ansoft developed new types of elements — called edge elements — that ultimately solved the “spurious modes” problem that had been plaguing researchers in finite element modeling of electromagnetic (EM) devices. This development opened the door for the finite element method (FEM) to be employed in electrical engineering applications. In 1990, Ansoft shipped the first version of HFSS (High-Frequency Structure Simulator) technology, which has become the industry standard for computing electromagnetic properties of arbitrary 3-D components and structures. Following that, revenue from HFSS and other Ansoft-developed products for signal integrity analysis and electromechanical system simulation grew at a 25 percent compound average growth rate.

Propelled by the strength of HFSS, Ansoft grew to become a leading developer of high-performance electronic design automation (EDA) software. The unique ability of the products from



Ansoft to leverage electromagnetics across component, circuit and system design has allowed companies worldwide to design mobile communication, internet access, broadband networking components and systems, integrated circuits (ICs) and printed circuit boards (PCBs), as well as electromechanical systems such as automotive components and power electronics systems. In April 1996, Ansoft completed its initial public offering and began trading on the NASDAQ stock exchange under the symbol "ANST." In 2008, Dr. Cendes received the Institute of Electrical and Electronics Engineers (IEEE) Antennas and Propagation Society (AP-S) Distinguished Achievement Award for contributions to the widespread use of user-friendly software tools for electromagnetic analysis and design.



Ansoft has expanded its research and development efforts beyond electromagnetics to include circuit and system simulation. Today, the Ansoft product suite focuses on improving physical design by leveraging advanced electromagnetic-field simulators dynamically linked to powerful circuit and system simulation. These capabilities allow engineers to eliminate physical prototypes, maximize product performance and greatly reduce time to market.

With the acquisition of Ansoft by ANSYS, two world-class engineering organizations are brought together — including experienced professionals with depth of knowledge in both simulation and a variety of industries.

Ansoft's target applications are divided into two segments: high-performance electronics and electromechanical systems. ■

High-Performance Electronics

RF and Microwave

Radio frequency (RF) and microwave applications are a prime segment of the high-performance electronics market. These applications include high-frequency components and circuits found in the transmitter and receiver portions of communication systems, radar systems, satellites and cellular telephones. Market demands for reduced cost, size, weight and battery consumption force component and system developers to consider electromagnetic effects within the design process. Modern high-performance RF modules have continually increasing design complexity, density, package parasitics and chip-to-chip interactions. The Ansoft high-performance RF and microwave solution targets these challenges with full-system verification, multi-chip simulation and package interconnect parasitic extraction, ensuring successful development of next-generation RF and microwave designs.

Signal and Power Integrity

Engineers designing servers, storage devices, multimedia personal computers, entertainment systems and telecom systems have driven the industry trend to replace legacy shared-parallel buses with high-speed, point-to-point serial buses. Standard interfaces like XAUI, XFI, Serial ATA, PCI Express™, HDMI™ and FB-DIMM have emerged to provide greater throughput using serial signaling rates of 3 to 10 gigabytes per second. While this trend has greatly reduced the number of traces and connections within the system, it creates electromagnetic interference between the multiple connectors, transmission lines and vias on PCBs. High package pin count and gigahertz-speed data rates translate into extremely fast I/O switching and high transient power sinking. Simultaneously, the average PCB size is decreasing, power density is increasing, and power delivery requirements are tightening. Engineers apply full-wave electromagnetic field simulation to precisely analyze power nets and planes using layout geometry. The signal- and power-integrity solutions of Ansoft allow engineers to solve these gigahertz-speed and power-integrity design challenges.

High-Performance Electronics Products

HFSS is a 3-D full-wave FEA-based product that allows users to extract parasitic parameters (S, Y, Z), visualize 3-D electromagnetic fields (near- and far-field) and generate *Full-Wave SPICE* models. HFSS utilizes a 3-D full-wave finite element method field solver to compute the electrical behavior of complex components of arbitrary shape and user-defined material properties.

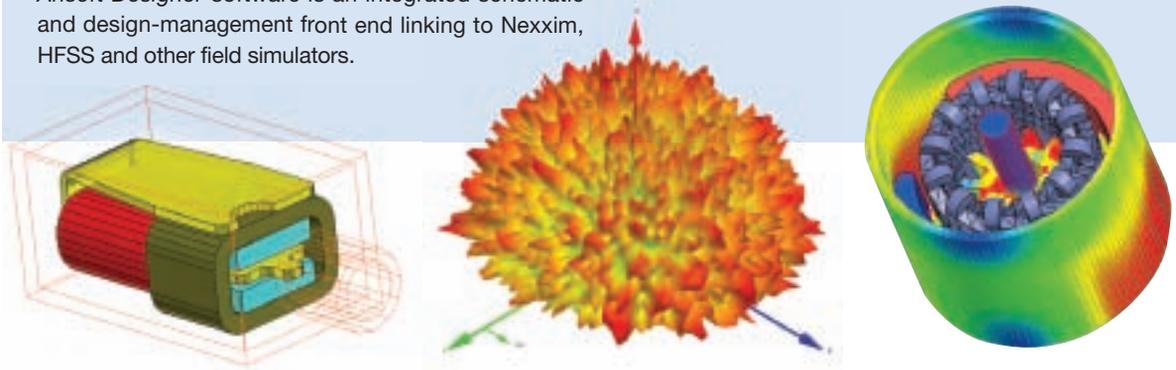
The *Nexxim* product is an advanced circuit simulator that addresses the increasingly complex, nonlinear and full-wave circuit behavior of gigabit-speed serial interconnects, radio frequency complementary metal oxide semiconductor circuits and GaAs/SiGe radio frequency integrated circuits.

Ansoft Designer software is an integrated schematic and design-management front end linking to Nexxim, HFSS and other field simulators.

The *SIwave* product analyzes complex PCB and IC packages.

Q3D Extractor software efficiently performs the 3-D and 2-D quasi-static electromagnetic field simulation required for the extraction of resistance, inductance, capacitance and conductance (RLCG) parameters from an interconnect structure. It automatically generates an equivalent SPICE subcircuit model.

The *Turbo Package Analyzer (TPA)* tool automates the analysis of — and produces lumped or distributed resistance, inductance and capacitance (RLC) models for — all complex semiconductor packages.



Electromechanical Systems

Electromechanical systems are another major segment for Ansoft products. The software is used in the automotive, aerospace and industrial automation industries. The technologies integrate mechanical, electronic and control technology to create synergistic physical systems: This convergence of electronics with mechanics has rendered ineffective iterative design methodologies in which individual design groups are focused on a single aspect of a system. From the initial design stage, modern electromechanical systems are designed with consideration of both the system and the interoperability of components and circuits. The Ansoft electromechanical design solution captures the interactions between electromechanical components, electronic circuits and control logic. This powerful multiple domain approach to design captures the underlying physics that governs all electrical behavior, allowing engineers to accurately model, simulate and validate the component, circuit and system-level performance required for electromechanical system design.

Electromechanical Systems Products

The *Maxwell* comprehensive electromagnetic field simulation software package assists engineers tasked with designing and analyzing 3-D and 2-D structures, such as motors, actuators, transformers and other electric and electromechanical devices.

The *Simplorer* multi-domain simulation software tool is used for the design of complex power electronic and drive systems.

RMxpert software speeds the design and optimization process of rotating electric machines.

The *PExpert* product speeds the design and optimization process of transformers and inductors for power electronics.

For more information on products from Ansoft, visit www.ansoft.com.