WELCOME TO THE FUTURE

For years, ANSYS has worked to realize the promise of systems-level simulation. With recent advancements in hardware and HPC environments, the future is finally here.

By Jim Cashman, President and CEO, ANSYS, Inc.

There have been many simulation advancements over the last decade, and one of the most promising is systems-level engineering. As products become more complex — such as cars with safety features, hybrid engines and smart electronics — ensuring product integrity, across every component, has never posed a greater challenge. Every assumption in a system, whether it relates to existing componentry, prematurely detailed CAD geometry or status-quo tenets, imposes constraints on innovation. These demands are increasingly difficult to tackle incrementally.

Thirty, 20 or even 10 years ago, the engineering community was often bound by pragmatism. Simulation wasn't yet robust enough, so it took months or years of testing physical prototypes, because you had to be sure your design would work in the field. In areas of insufficient experience, designing conservatively was the best way to preserve brand quality.

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Three decades ago, we couldn't fully comprehend how computers would revolutionize the way we work, live and communicate. A similar revolution is afoot that will eliminate pragmatic bounds — much the way that desktop publishing and the Internet revolutionized information dissemination. We'll be constrained only by our imagination. Think about how enabling it will be to make virtual changes in minutes, compared to not even considering it because it takes too long to evaluate in the real world.

Today, by simulating an entire product system early in the design cycle, manufacturers can address the most likely sources of system failure before those sources are locked into the design. While the idea of simulating a system may be new to ANSYS users, it's a future that we anticipated since the first jumbo jet was put into commercial service. In the recent past, we've witnessed a "perfect storm" of technology advancement, including hardware and high-performance computing (HPC), that places systems-level simulation within the grasp of today's engineers. Such technology allows us to focus on the parametric definition of a product's functional specification, prior to providing detailed descriptions that might constrain system greatness.

ANSYS has the industry's strongest multiphysics portfolio — enabling engineering teams to analyze the many forces that impact a complete product system, all the way down to the chip level. Furthermore, our portfolio supports collaboration and real-time information sharing among geographically dispersed team members.

As a result, engineers can leverage systems-level analysis to make intelligent trade-offs in a low-risk, cost-effective virtual design environment. When a structural engineer in Europe makes a product design change, that modification will be immediately visible to fluids engineers in North America solving a turbulence issue, as well as a supplier in Asia working on electronic components.

Well before manufacturers procure materials, make supplier and customer commitments, and reserve production capacity, they can operate with a high degree of confidence that their product systems will deliver the highest possible level of integrity in the real world. What better future can any of us imagine?

The best part: We're only scratching the surface. Just as the electronics and mechanical worlds gave rise to mechatronics, life sciences, nanotechnology and others will drive the convergence of information technology, of hardware and software interaction, at the concept stage. They all become part of the system, and if the system doesn't succeed, few will care about whether the components did.