A Closer Look at Optical Simulation

With its acquisition of OPTIS, ANSYS has expanded its industry-leading software portfolio to include the engineering simulation of light, human vision and physics-based visualization.

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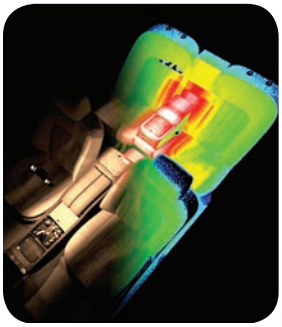
For more than 30 years, optical simulation has proven to be critical for manufacturers of lighting products, including lasers, scanners, lenses and lighted displays. By simulating how these products will perform under a variety of real-world lighting situations, product developers can optimize actual performance — for example, ensuring that a dashboard display or a taillight is visible at night — without investing in expensive physical prototypes.

Over the last decade, the demand for accurate optical simulation has grown exponentially, leading to significant advances in software capabilities in this area. With the advent of virtual reality and autonomous vehicles, the engineering spotlight has never shone brighter on optical sensors, displays and related technologies.

To meet its customers' growing need to incorporate optical sensing and lighting components in their products, ANSYS recently acquired OPTIS, a premier provider of software for the scientific simulation of light, human vision and physics-based visualization. Accurate optical simulation is of special importance to the automotive industry, but the company's customer list also includes world leaders in aerospace, cosmetics and many other industries.



Autonomous Vehicles: Putting Optics in the Spotlight

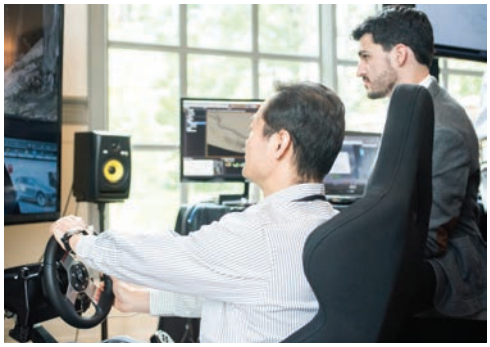
As the global automotive and aerospace industries race to develop safe autonomous vehicles, accurate sensor development is critical. Optical sensors replace the human eye, enabling the vehicle to distinguish important objects like lane markings and dividers, other vehicles, pedestrians and signs. This process is incredibly complex. Not only must driverless cars "see" a traffic signal, they must identify its color accurately, at any time of day or night, under a variety of weather conditions. Sensors need to distinguish between dense fog or precipitation and real physical objects. They are mission-critical, as human safety depends on their accurate, reliable performance.

"By tightly integrating OPTIS solutions into its industry-leading multiphysics simulation portfolio, ANSYS is accelerating the development and delivery of innovative products to the marketplace."

ANSYS has already created simulation solutions specifically for autonomous vehicle (AV) development, and now offers a comprehensive AV simulation solution. ANSYS simulation capabilities now cover visible and infrared light, electromagnetics and acoustics on the physics side — as well as ISO 26262 certified embedded software controls, graphics development tools and systems safety analysis tools.

PRODUCT SPOTLIGHT: VRX

VRX is a unique optical simulation solution that supports an exploration of the driving environment, exactly how a real driver would see it. By replicating a real-world physical environment in 3D and creating a real-time, virtual-reality–based driving experience, VRX allows product developers to experience an autonomous vehicle under many daytime and nighttime driving scenarios, taking into account road and weather conditions. Extensive content libraries enable the creation of unlimited scenarios. Engineers can be confident that the vehicle is accurately "seeing" traffic, pedestrians, road signs and markings — as well as observing safe driving regulations and standards.



These best-in-class simulation capabilities enable product developers to design the underlying technology for camera-, radar- and lidar-based sensing systems. They can perform closed-loop simulations that integrate embedded software intelligence with the 3D physical environment their autonomous vehicles will navigate, including road conditions, weather and one-way streets.

A Spectrum of Customer Applications

Beyond manufacturers of autonomous vehicles, new optical simulation capabilities from ANSYS have wide-ranging applications for many customer businesses.

Optical simulation helps designers perfect the physical appearance of every product and package under virtually any possible lighting condition.

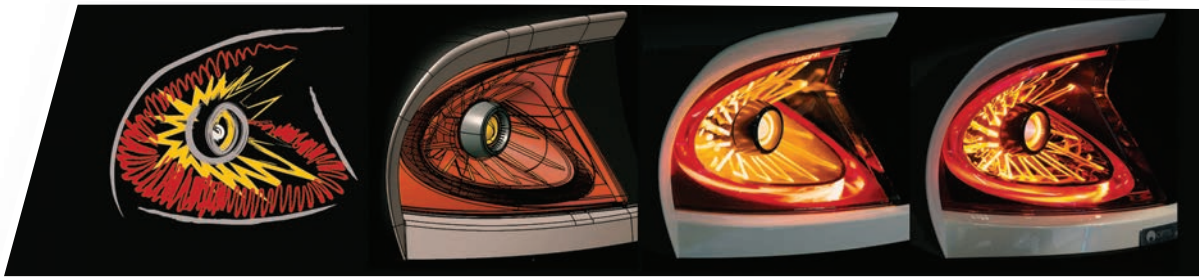
"By providing the most accurate and comprehensive multidisciplinary and *cross-functional simulation* technology on the market, ANSYS — along with OPTIS technology — will help bring safe, reliable *autonomous vehicles* to market sooner."

Optical simulation also supports the development of ultraviolet solutions for water purification, bacteria decontamination and electronic wafer insolation — as well as the development of infrared solutions for defense and satellite applications.

Effective simulation of lighting conditions and solar energy levels is also essential for architects, artificial lighting designers, engineers of solar

PRODUCT SPOTLIGHT: SPEOS

SPEOS enables product developers to predict how light will affect their designs, without the need for a physical prototype. By supporting the creation of a virtual mock-up, SPEOS equips designers with the ability to "see" how their product will look and perform under various lighting conditions. This powerful solution supports the development of advanced lighting technologies — such as backlit displays, sensors, augmented reality glasses, fingerprint recognition systems and biomedical equipment — and also car paints and interiors, aircraft cockpits and passenger cabins. SPEOS simulates human vision within a virtual illuminated environment, providing ultrarealistic visualization of what the human eye will see. Companies can benefit from this solution's ability to generate an exact visual representation of products as customers will actually perceive them — resulting in an accelerated decision-making process and designs that are optimized for light.



panels and solar farms, healthcare product developers focused on skin cancer detection, and other market needs.

For manufacturers, new visualization tools from ANSYS help predict manufacturing variations and their impact on perceived product quality. By identifying potential variations at the earliest possible design stage, engineers can ensure that products are produced to the highest possible quality standards, the first time and every time.

An Expanded Vision

For more than 40 years, ANSYS has built a tradition of supporting product excellence and innovation by simulating multiple physical forces, including mechanical and fluid stresses, temperature variations and electromagnetics — as well as by supporting embedded software controls development, systems safety analysis and holistic systems simulation.

With light emerging as a critical product consideration for today's autonomous, smart and connected products, it only makes sense for ANSYS to offer the world's leading software for optical simulation. By tightly integrating OPTIS solutions into its industry-leading multiphysics simulation portfolio, ANSYS is accelerating the development and delivery of innovative products to the marketplace, while lowering design costs and enhancing the safety of many diverse product systems.

ANSYS Acquires OPTIS
ansys.com/optis