OPTIS in the Press
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innovation

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Jacques Delacour, president and CEO of OPTIS.

Unique sensory perception software **with OPTIS**

By Malcolm Babbin

Ground-breaking software that is the first to emulate a human sense – sight – is helping designers and manufacturers to design safer vehicles and more visible controls and instruments.

It has been developed by OPTIS, whose customers include Porsche, Audi, Daimler Benz, Visteon, Honda, Continental, PSA, Valeo, Magneti Marelli, Magna, Delphi, Temic and BMW.

Automotive Industries (AI) asked Jacques Delacour, President and CEO of OPTIS to share the company's expansion plans.

Delacour: We recently opened an office in Detroit to be at the heart of the motor industry. Our global development strategy focuses on the markets of USA, Japan, China, India as well as the emerging East European countries.

AI: How do your solutions and lighting consultancy help industry?

Delacour: They help industry engineers, ergonomists and designers to manage all the light phenomena they meet. Whether their design criteria is uniformity, visual signature, reducing size, reducing the number of light sources, visibility, legibility, glare, lack of contrast or several of these, our software can help.

AI: What are the trends in automotive lighting design, simulation and prototyping?

Delacour: The trend is towards efficiency of energy use and materials, as well as waste management. At the moment we are seeing that LED technology being used more often because it is virtually eternal, less bulky and more versatile than old types of light sources. SPEOS is fully integrated in the industry standard, CATIA V5. This means the CATIA V5 user can manage all light and vision issues in the same environment, and simultaneously study other physical phenomena such as thermal, dynamics and vibration.

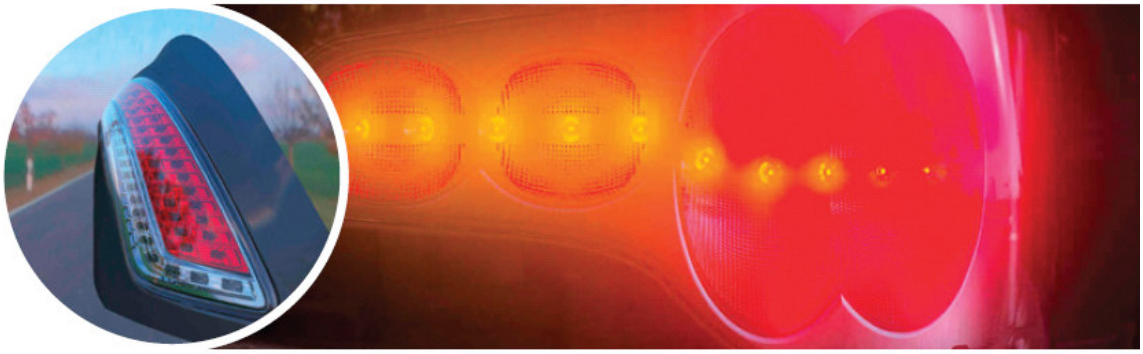
AI: Tell us about simulating light and human vision within a virtual reality environment.

Delacour: Before SPEOS, a user could not have both physically accurate simulation results and display them in a virtual reality environment. The results were physics-based but displayed on a traditional computer screen, or the results were displayed in fully immersive 3D. However they weren't guaranteed to be fully realistic, because they weren't based on physical measurements. SPEOS merges physics-based simulation within a virtual reality environment, giving the engineer an accurate image of how their design will be perceived.

AI: Tell us about OPTIS' work in physics-based simulation.

Delacour: The software was born out of scientific research, and most of our ▸

LEFT: Simulated in OPTIS software : unlit appearance of Lancia Delta taillamp.
RIGHT: Simulated in OPTIS software : Simulatedin OPTIS software : lit appearance of turn indicator.



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LEFT: Simulated in OPTIS software : GPS Screen as it would be visible with oncoming sun.
RIGHT: Simulated in OPTIS software : unwanted reflections of dashboard screens in windshield.

technical staff are trained optical engineers. The first releases of the software were dedicated to optical simulation for the design of microscopes, telescopes and lasers. Our models were so accurate that the French Defense Agency awarded us as best technology in 1994.

My goal was to answer industrial needs - seeing optics as a tool to manage light. I noticed that manufacturers lacked a user-friendly tool to scientifically analyze light in the design of their products. The result was SPEOS. In order to help tailor its products towards the automotive industry, OPTIS acquired the services of Pete Moorhouse, an expert in automotive interior and exterior design.

Automotive Industries asked Moorhouse to tell us about the company's CAD platform for embedded cockpit designs for the civil and military markets.

Moorhouse: The legibility of controls and instrumentation along with the effects of reflection and glare are critical safety issues in aeronautic cockpit design. OPTIS has developed a suite of solutions aimed at simulating the influence of interior and environmental light sources on the flight monitoring equipment and the glass structure of the windshield or canopy of aircraft.

OPTIS solutions cover the visible part of light as well as the ultraviolet and infrared part of the spectrum. The infrared waveband is particularly important as night vision and vision through fog can be enhanced using electronic sensors. These types of sensors can be used to detect "hot spots", providing an audio or visual alert, and also to initiate an image on a display. The software has been designed to cover the entire development cycle, from the 3D scene with its spectral properties, sensors ranging from UV to IR, displays and finally the human who will visualize all of this information.

AI: How has your simulation with a model of the human eye changed the way automotive designers work?

Moorhouse: The exact way in which an observer perceives a scene depends directly on the light hitting the eye. To handle such phenomena, OPTIS created a human perception model. This was the first time a human sense had ever been modeled and offered inside a software product.

"OPTIS solutions are unique in that they are based on a physiological model of the human eye."

AI: How will this software develop in the future?

Moorhouse: Current projection systems are unable to address the high dynamics of human vision making it a necessity to embed the human eye model in order to obtain true fidelity with reality. The OPTIS approach of applying the optical properties to all materials and light sources within the simulation ensures the ultimate representation of reality. In our continuing pursuit of innovation we are now beginning to offer this level of realism inside Virtual Reality (VR) centres.

AI: What new developments has OPTIS created in automotive exterior lighting and detection systems?

Moorhouse: For exterior lighting we introduced "3D Textures". This technology allows the user to apply a 3D microstructure to any design surface of a model, regardless of the complexity of shape. These millions of micro shapes manage light dispersion, uniformity and reflection and can, for example in automotive lighting, create a unique visual signature, not only contributing to the design and branding but also to meet regulations and standards.

Our windshield analysis tools have been developed through close partnership with industrial specialists and play an important role in the simulation of "Head Up Displays" (HUD) and the visual distortion caused by the actual shape of the glass. Rearview cameras, blind spot analysis and parking assistance sensors can also be accurately simulated.

AI: How do you cater for factors such as sun glare?

Moorhouse: OPTIS solutions are based on a physiological model of the human eye. This means they take into account all the light and physical phenomena to give a resulting image precisely as the object or scene would be perceived by the human eye. Our Visual Ergonomics application specifically addresses real issues such as veiling glare, visibility, contrast, blooming, color perception, peripheral vision, and can even take into consideration the age of the driver. AI