Ansys

CASE STUDY /

Ansys + LightPath Technologies

"With OpticStudio, I can optimize not only on performance but also on manufacturability. Using merit function operands, macros, and optimization tools, it's easy to add parameters around manufacturability."

Jeremy Huddleston
Optical Engineering Manager / LightPath Technologies

Ansys

CASE STUDY

OpticStudio's Built-In Flexibility Helps LightPath Design Across a Range of Solutions

LightPath creates high-quality, high-performing compact imaging designs that fit within thinner and lighter housings quickly and cost effectively. As a vertically integrated business that fuses world-class design and innovative lens fabrication with low-cost manufacturing, LightPath produces a diverse number and range of sophisticated products and solutions within tight time frames. For Optical Engineering Manager Jeremy Huddleston and his team, designing for manufacturability is key to their success, and Ansys OpticStudio is an essential tool in getting there.

/ Challenges

LightPath uses aspheric optics (smoother and flatter lens applications) for many of their flagship products to meet customer mandates for quality and cost within a given set of constraints. Aspheric lenses simplify and shrink optical systems by replacing several conventional lenses to deliver optimal performance. However, designing for aspherics is tremendously complex due to a larger number of design options when compared to traditional spherical designs, so many businesses avoid them because they can be expensive to machine.

/ Ansys Products Used

- OpticStudio Professional

/ Engineering Solution

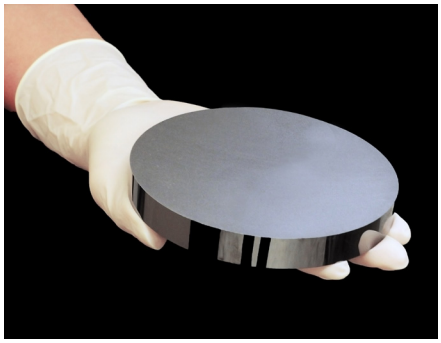
Optimization is crucial in creating lens designs that overcome limitations and deliver the highest manufacturing yield. LightPath designers looked to OpticStudio to create aspheric designs for manufacturability with relative ease. Using state-of-the-art optimization tools in OpticStudio, Huddleston's team vastly improved the performance of their optical designs based on user-defined constraints and design goals.

The software enabled local and global optimization, hammer optimization (which allows you to look for other design solutions outside the local space you're in), and sometimes even contrast optimization. With OpticStudio, the team could optimize on spot size, wavefront, or directly on modulation transfer function (MTF) – or the optical performance potential of the lens – to achieve their goals.

Thanks to OpticStudio, LightPath could also write custom merit functions to circumvent poor convergence in their design iterations and support direct optimization based on a designer's intuition and expertise, rather than relying on the software exclusively to dictate design.

/ Benefits

- OpticStudio's optimization toolbox offers multiple ways to optimize, making it easy to use different techniques at different points in the process so designers could work in the most efficient way possible. This ensures quality while cutting costs and time to market.
- Designers could optimize not only performance, but also manufacturability. Using merit function operands, macros, and optimization tools helped them to put more defined parameters around manufacturability.
- The Zemax Programming Language (ZPL) in OpticStudio enabled designers to write their own macros to automate repetitive processes and realize significant time savings.



- Writing a macro and working with a merit function to determine the best method for measuring lens parameters, then optimizing on that method as opposed to paraxial approximations, ensured that all lenses achieved the same values as those in the optical design.
- OpticStudio simplified LightPath's adoption of a new infrared-transmission material BD6 chalcogenide glass in their thermal lenses, enabling the addition of custom materials instead of being limited to the library of materials provided with the software.
- OpticStudio helped designers overcome chromatic aberration, a problem that can occur with BD6 that can degrade imaging quality. Using the software, LightPath could apply a diffractive surface for color correction.

Company Description

For 35 years, LightPath Technologies has been a leader in optics and photonics solutions in Orlando, Florida, with manufacturing plants in China and Latvia. LIghtPath designs, manufactures, and distributes optical and infrared components, such as molded glass aspheric lenses and assemblies, infrared lenses and thermal imaging assemblies, and fused fiber collimators. The company also offers full engineering design support for both optics and mechanics.

ANSYS, Inc.
Southpointe
2600 Ansys Drive
Canonsburg, PA 15317
U.S.A.
724.746.3304
ansysinfo@ansys.com

If you've ever seen a rocket launch, flown on an airplane, driven a car, used a computer, touched a mobile device, crossed a bridge or put on wearable technology, chances are you've used a product where Ansys software played a critical role in its creation. Ansys is the global leader in engineering simulation. We help the world's most innovative companies deliver radically better products to their customers. By offering the best and broadest portfolio of engineering simulation software, we help them solve the most complex design challenges and engineer products limited only by imagination.

Visit www.ansys.com for more information.