

# What's New in LightTools 2026

Advancing Optical Modeling, Simulation, and Analysis

## Introduction

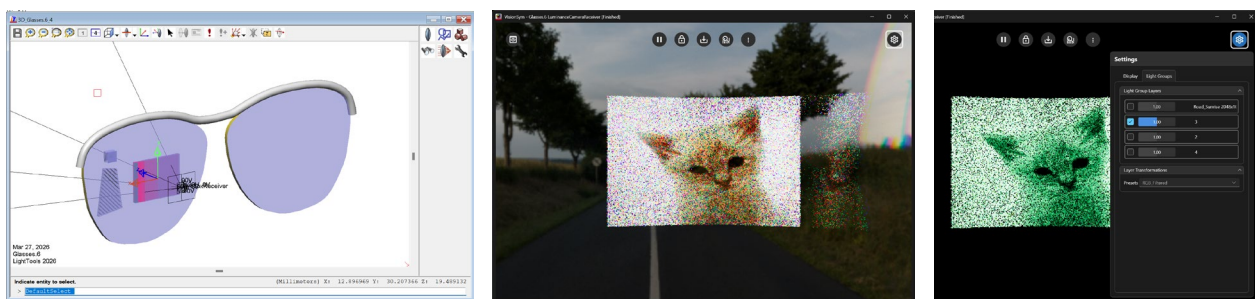
LightTools 2026 delivers significant enhancements across visualization, ray-tracing performance, stray-light analysis, AR waveguide design, meta-optic modeling, and CAD interoperability. These updates expand modeling fidelity, accelerate simulation workflows, and support a broader range of optical design applications.

## VisionSym Integration for High-Speed Backward Ray Tracing

LightTools 2026 introduces integration with VisionSym, a GPU-accelerated backward ray-tracing engine for fast, interactive luminance visualization. VisionSym enables:

- Real-time, progressively refined luminance rendering
- Automatic aiming for scatter surfaces directly exposed to sources
- 10–30× speed improvements and more compared to standard backward ray tracing
- Synchronization of camera orientation and simulation parameters between LightTools and VisionSym

This capability enhances visualization of luminance, color, and scattering behavior for lighting, display, and imaging systems.



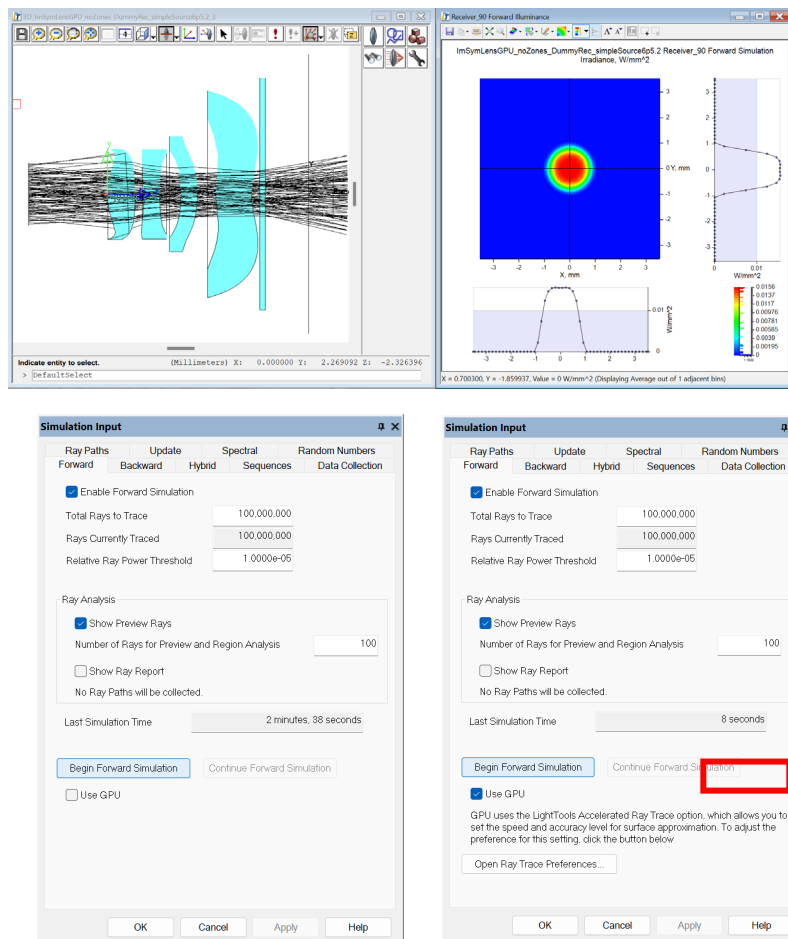
**Figure 1.** RGB angular apodized sources in mirror-based AR glasses (left), VisionSym window view through glasses (middle), using light groups to toggle the environment, R, and B sources (right).

# GPU Acceleration for Forward Ray Tracing

The 2026 release introduces LightTools GPU acceleration for forward ray tracing, delivering substantial performance gains across a wide range of applications. Observed speed improvements range from 10× to over 50× depending on hardware and model complexity. LightTools GPU acceleration supports many sources, optical properties, materials, and receiver types. For example:

- Point and surface sources, including immersed sources
- Measured BSDFs and Microfacet scattering
- Optical contact and cementing
- Most receiver types and meshes

These enhancements significantly reduce simulation time for many optical system types.

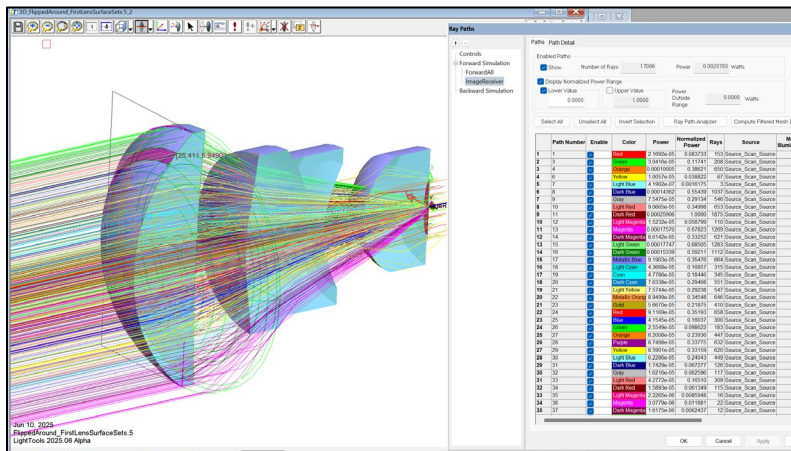


**Figure 2.** Compact aspheric lens example where the GPU trace of 100 million rays yielded a 20x faster simulation time of 8 seconds.

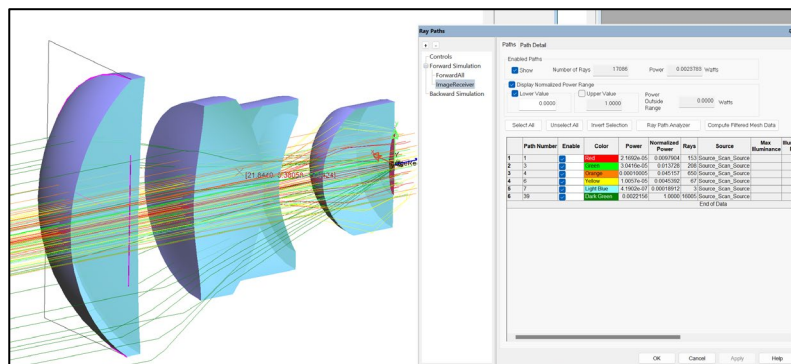
# Stray Light Analysis Enhancements

LightTools 2026 introduces new tools that streamline stray light workflows and improve analysis repeatability:

- Options for importing and exporting ray path files for consistent path ordering and trace reproducibility, which is also compatible with saving ray data, so you don't have to trace rays again to look at ray path information.
- Limit rays per path to reduce memory usage from paths with a large number of rays that are not relevant for stray light analysis
- Faster computation of filtered mesh data, with only enabled paths calculated and the number of rays per path limited
- Improved surface set selection and visualization, which enables you to group complex CAD surfaces into sets
- Updated Ray Path Analyzer with filtered path sequence generation



**Figure 3.** Lenses imported from a CAD model with many surfaces. Each surface contributes to a separate ray path.



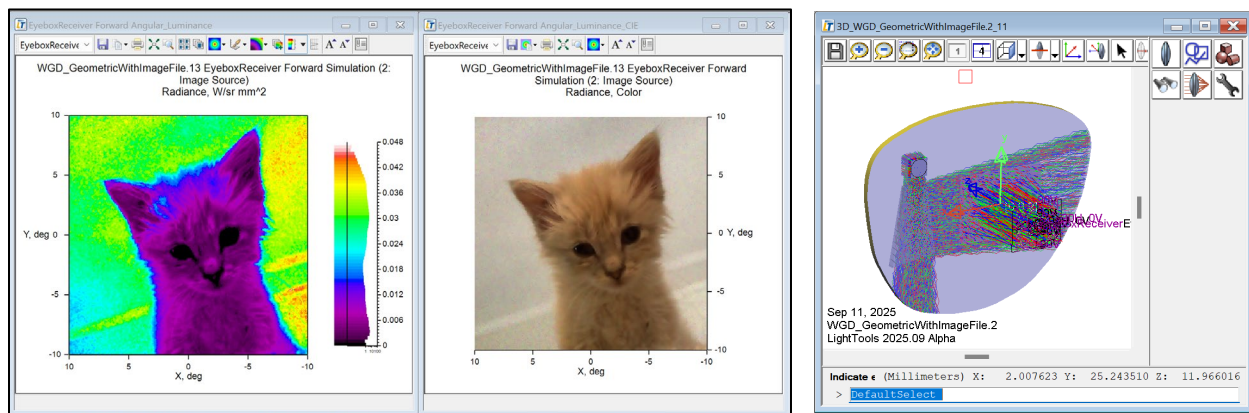
**Figure 4.** By combining the separate surfaces into a surface set for each lens, LightTools treats all the surfaces in each set as a single surface (for ray paths), and the number of ray paths is dramatically reduced.

## AR Waveguide Designer

The AR Waveguide Designer provides an integrated environment for geometric and grating-based waveguide development. New capabilities include:

- Automated setup of input couplers, pupil expanders, and output couplers and waveguides
- K-space-driven design and visualization
- Spatially varying grating support using RSoft UDOP data
- Uniformity and eyebox analysis tools
- Stray light path identification for both geometric and grating waveguides
- Integrated display image sources created using angular apodization and receivers set up automatically for true-color visualization

These tools accelerate AR optical system design and optimization.



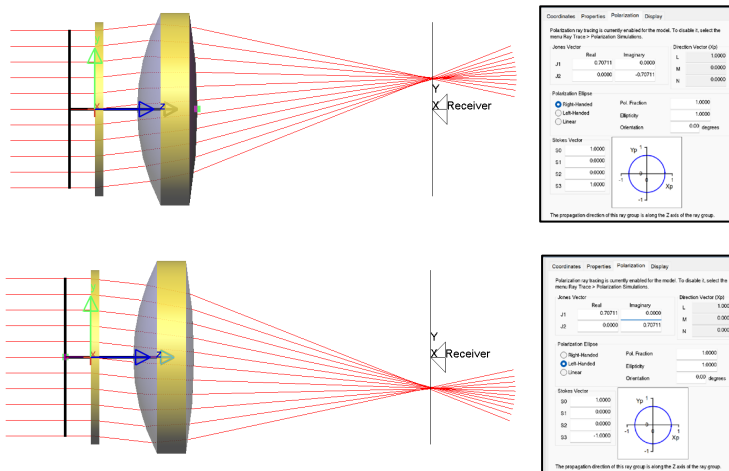
**Figure 5.** You can load an image file in Waveguide Designer and apply that image as an angular apodization to the display source.

## Meta-Optic Lens Modeling

LightTools 2026 offers a new feature to support meta-optic lens design similar to what is offered in CODE V with:

- Phase and transmission evaluators
- Wrapped and unwrapped phase/transmittance plots
- Support for RSoft meta-atom libraries and the same library shipped with CODE V meta-lens
- As in CODE V, you can control a meta-optic lens parameter polynomial to adjust the meta lens functionality; for instance, to focus rays at order 1.

Meta-optic lenses are compatible with LightTools polarization ray tracing, so you can also use it to design lenses that have different behaviors for differently polarized input light. This enables you to model compact, polarization-sensitive meta-surfaces for advanced imaging and display applications.

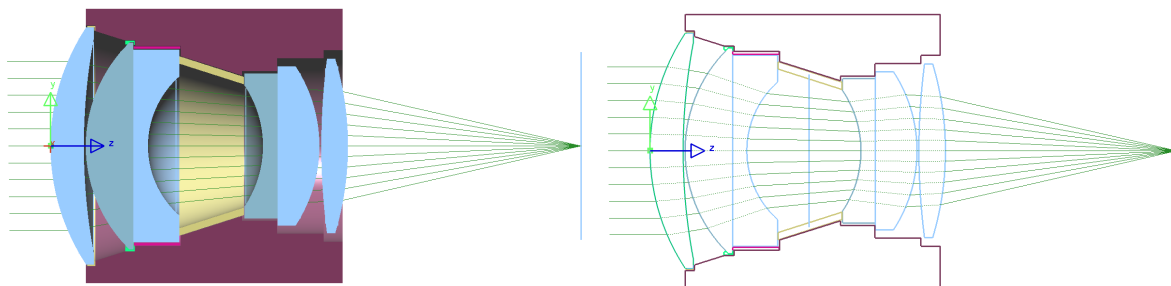


**Figure 6.** Meta Lens Nano-fin Example with Two Focal Points that occur for RCP and LCP polarized light, respectively

## Expanded CAD Model Import

LightTools now supports additional CAD formats, including NX, Creo, and Rhino, as well as allowing you to preserve more information from your CAD file. The updated import workflow:

- Preserves assembly hierarchy, naming, and color information
- Separates multi-body parts into individual primitives
- Supports surface-level artifacts and optical property assignment
- Includes a beta feature for synchronized CAD updates



**Figure 7.** In LightTools, the surfaces and wireframe color can be set to use Object Color from the CAD data.

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