# Synopsys Expands LightTools Capabilities for Predicting and Controlling Manufacturing Costs of Illumination Optical Systems

Version 8.6, Now Available, Adds Tolerance Manager for Fast, Accurate Illumination System Tolerance Calculations

MOUNTAIN VIEW, Calif., June 12, 2018 /PRNewswire/ -- Synopsys, Inc. (Nasdaq: SNPS) today announced the release of version 8.6 of its LightTools® illumination design software for the modeling, analysis, and optimization of illumination optics. LightTools 8.6 introduces the Tolerance Manager, which enables designers to predict the manufacturability of their illumination systems and control manufacturing costs. This new feature is particularly useful for illumination systems that require precision manufacturing, including LED-based light guides, LiDAR, and illumination components in imaging systems.

The LightTools Tolerance Manager offers a comprehensive set of tools for setting tolerance bounds on model parameters, defining performance measures, and running sensitivity and Monte Carlo analyses. It provides insights early in the design process into potential problem areas to achieve predictable quality and minimize production costs while maintaining performance goals. The Tolerance Manager can also be used to analyze systems already in production to determine if tolerances can be adjusted to further reduce manufacturing costs, or to get an understanding of what component and assembly tolerances should be tested during production to improve manufacturing yields.

The LightTools Tolerance Manager is included with the Optimization Module and provides the following key capabilities:

- Sensitivity analysis to evaluate how sensitive each performance measure is to changes in tolerances that affect the illumination system. This feature gives engineers insight into which tolerances are driving system performance and can help them make decisions early in the design process to reduce design sensitivity.
- Interactive tolerancing to fine tune tolerance limits and instantly see the performance impact of changes, such as impacts on illuminance distribution, color distribution, intensity distribution, and power efficiency.
- Direct Monte Carlo tolerance analysis for fast, accurate predictions of system performance.
- Quadratic Fit Monte Carlo feature that greatly increases analysis speed for many types of systems.

"Effective tolerance analysis is the key to controlling illumination system manufacturing costs, since it identifies achievable component and assembly tolerances," said George Bayz, vice president of Synopsys' Optical Solutions Group. "The LightTools Tolerance Manager enables the design of robust, cost-effective illumination systems by providing a fast, accurate, and complete understanding of how tolerances affect the systems."

New enhancements in LightTools version 8.6 also include:

- **Support for NURBS and Interpolated Curves:** LightTools can now create native NURBS (non-uniform rational basis spline) and interpolated curves for swept light guides in place of imported geometry created in 3D CAD programs. The native curves are parametrized and available for illumination system optimization and tolerancing.
- **Ray Data Source Support for Backward Simulations:** LightTools 8.6 adds support for measured ray data files in backward simulations, allowing designers to perform more efficient luminance calculations.
- **Freeform Design Enhancements:** LightTools enables the design of innovative freeform illumination systems with features that model freeform reflective and refractive surfaces that are automatically shaped to form the resulting light pattern. LightTools 8.6 expands freeform design options with analysis support for extended sources.
- **Light Guide Designer:** The LightTools Light Guide Designer includes a new option to enable path angle optimization concurrently with spatial optimization, making the design process faster and more efficient, particularly for light guides with sources on one end.

**About Synopsys LightTools Software**
LightTools is a 3D optical engineering and design software product that supports virtual prototyping, simulation, optimization, tolerancing, and photorealistic renderings of illumination applications. Learn more at https://www.synopsys.com/optical-solutions/lighttools.html.

**About Synopsys**
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electronic products and software applications we rely on every day. As the world's 15th largest software company, Synopsys has a long history of being a global leader in electronic design automation (EDA) and semiconductor IP and is also growing its leadership in software security and quality solutions. Whether you're a system-on-chip (SoC) designer creating advanced semiconductors, or a software developer writing applications that require the highest security and quality, Synopsys has the solutions needed to deliver innovative, high-quality, secure products. Learn more at www.synopsys.com.

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