

# TracePro 2D and 3D Optimization

## Interactively Refine Your Design to Achieve Ideal Results

### Optimization For Prototype Process Streamlining

TracePro streamlines the prototype-to-manufacturing process for optical and illumination systems using 2D symmetric and 3D non-symmetric optimizers. Different from traditional optimizers, TracePro offers an easy-to-use and unique capability to interactively monitor and control the process every step of the way.

### Beginning the Design Process

You start the design process by sketching the starting design, digitizing variable limits directly into the CAD sketch utility and establishing a merit function using intensity, efficiency, irradiance, color, and/or uniformity parameters.

The merit function uses weights to balance the multiple operands based on your desired targets.

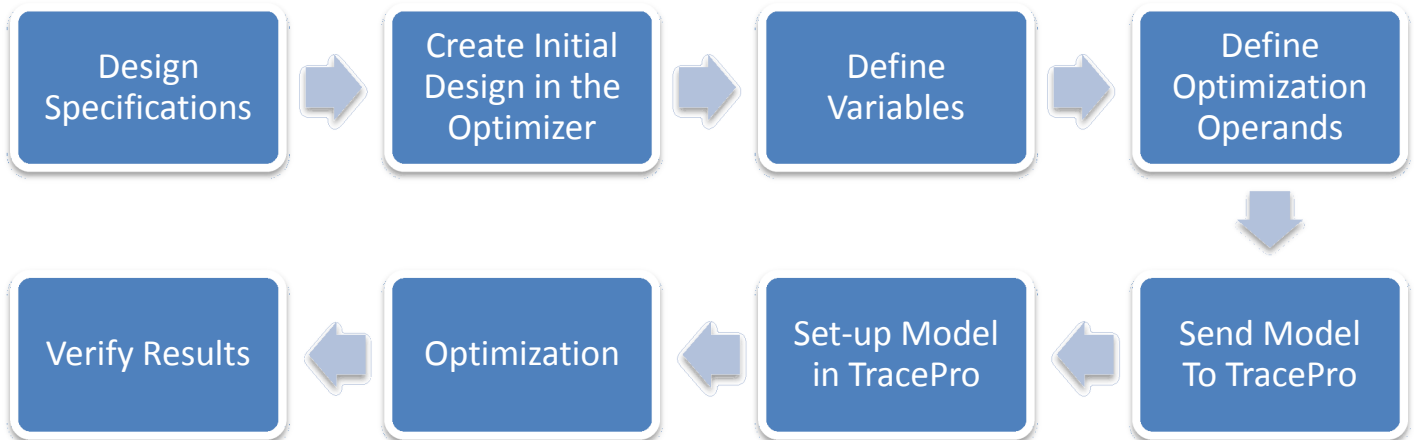
### Macro Language Capabilities

You can use TracePro's powerful macro language to control interaction with the created geometry, modify optical properties for each surface and solid object, and control positioning of solid objects. Each variable can be visually checked before, during, and after optimization.

### Optimization Methods

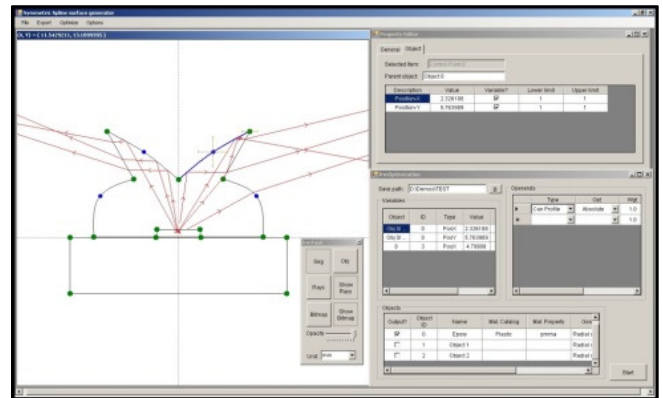
The TracePro 2D and 3D optimizers use the Optimization Algorithm, also known as Nelder-Mead, method for optimization.

The Downhill Simplex method is a local optimizer that converges to the local minimum solution closest to the starting point. During an optimization, you have complete control of the process and can monitor the interim solutions. You can stop the optimizer and change the initial starting parameters, then re-start the optimization. This allows you to control the process and test for better solutions in less time.

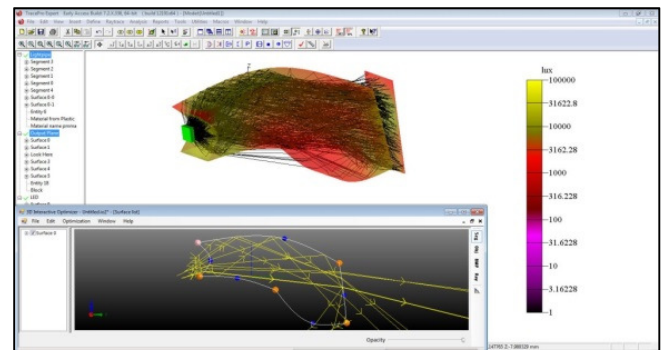


**TracePro's 2D and 3D Optimizers are highly intuitive tools easily mastered by any optical or design engineer. The main functions of the tool include:**

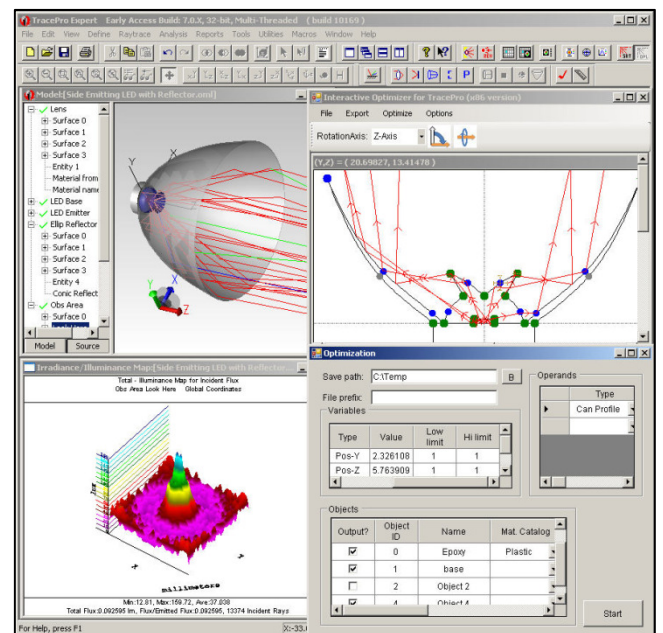
- Surface List**  
 Includes available surface types used to draw the objects, such as Planar, BSpline (free, X, Y, XY), Parametrized (biconic surface), 2D profile (asymmetric, symmetric, elliptical), and user-defined Path (2D, 3D).
- Object View**  
 Lists the types of objects such as Radial Symmetry, Extrusion, Lens, Sweep, and Biaxial; establishes initial parameters that can be adjusted in the Property Editor.
- Property Editor**  
 Varies depending on the selection, generally includes origin, tilt center and angle (X, Y, Z), tilt then shift, thickness, material type, surface properties, draft angle, and refractive index.
- Optimization**  
 Utilizes operands to specify multiple values on which to optimize, including: flux, color space (CIE), irradiance distribution, irradiance profile, intensity, candela profile, and uniformity. Users can also define their own optimization targets.



**Figure 1:** Profile of a side emitting lens with interactive rays traced.



**Figure 2:** 3D Optimization - complex non-symmetric designs are supported with the 3D optimizer, which is perfect for designing unusually shaped complex light pipes and LED lenses.



**Figure 3:** Optimized LED optical component with optimization parameters

REV 3/15