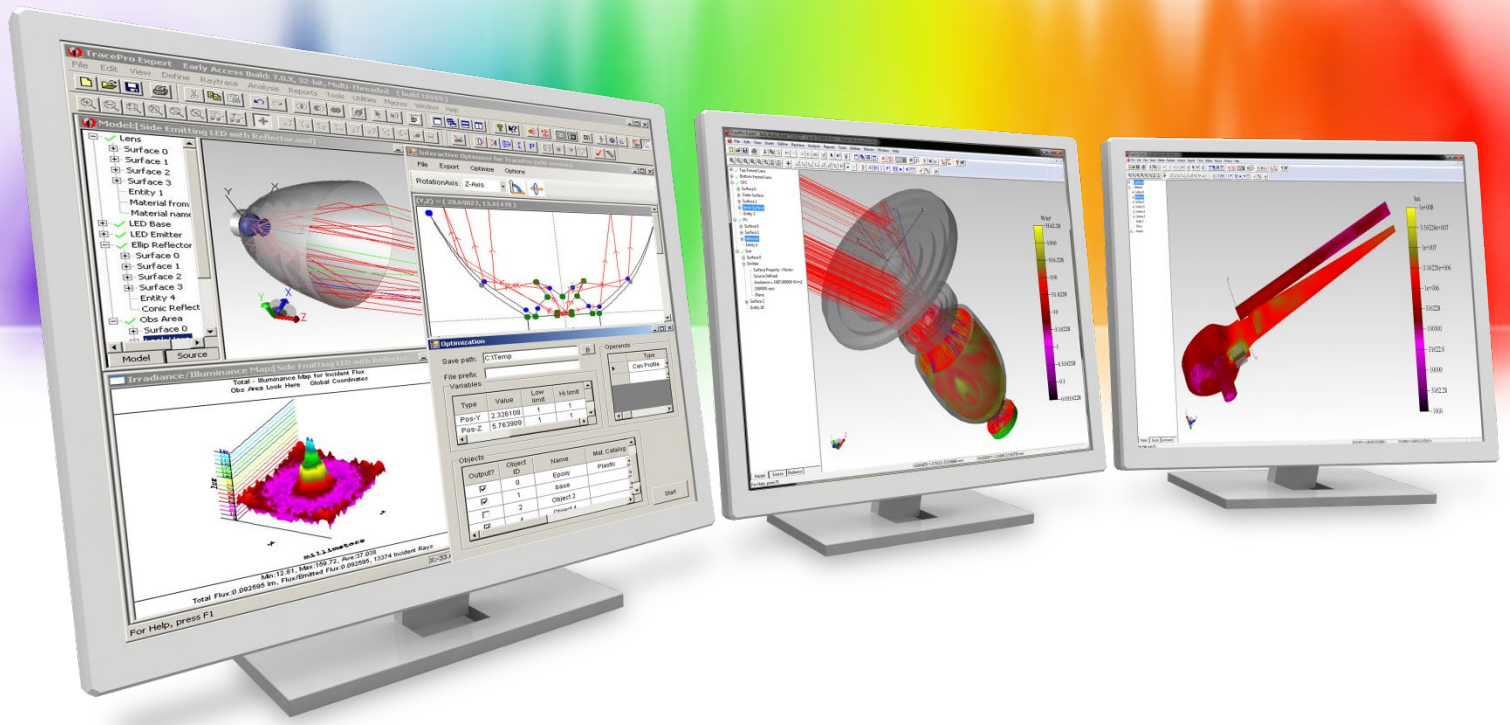
TracePro



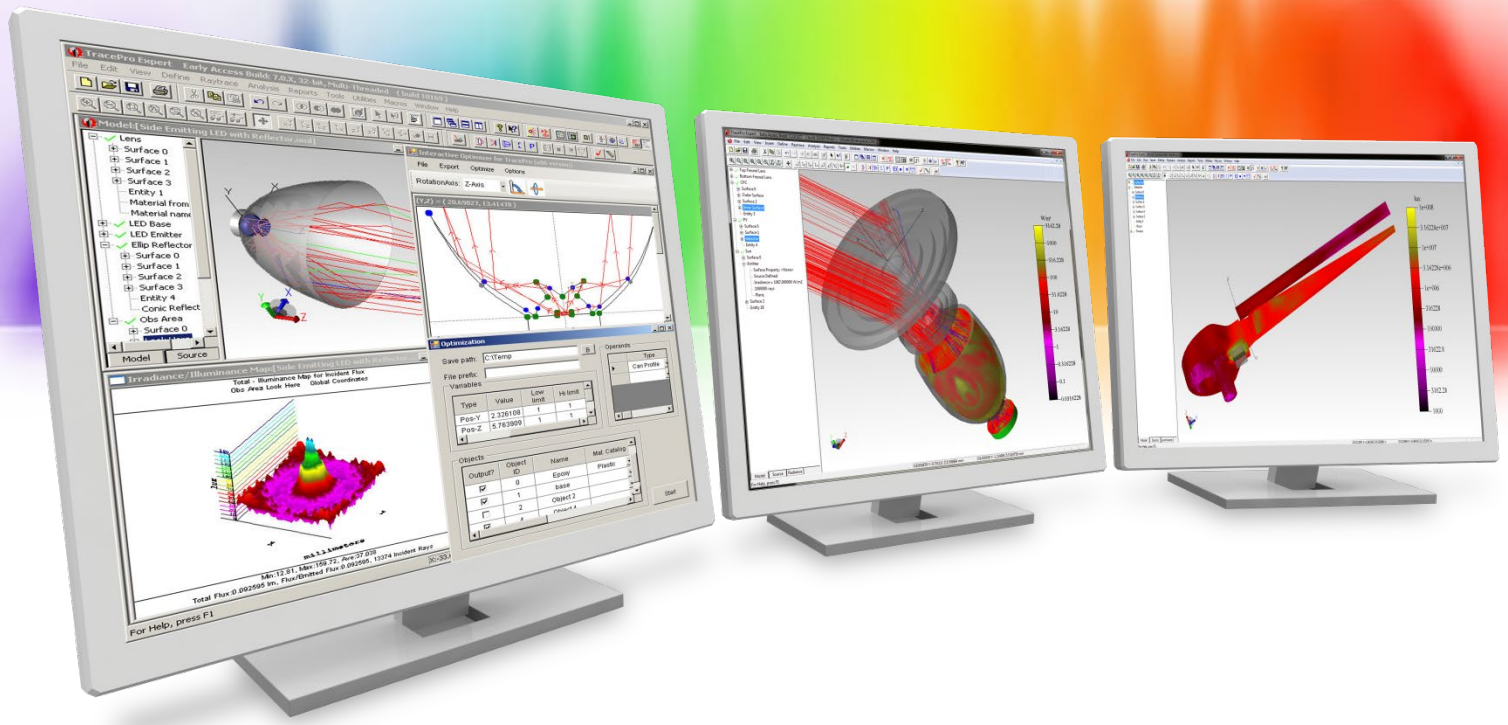
New Features in TracePro

LAMBDA RESEARCH CORPORATION

New TracePro Release Numbering

- TracePro has switched to a yearly naming scheme. TracePro 2023 version 23.1 was the first release of TracePro in 2023.
- Official releases of TracePro 2023 will debut approximately every 90 days, on or around the 10th of the month, starting in February.

TracePro



New Features in TracePro 2023 23.5

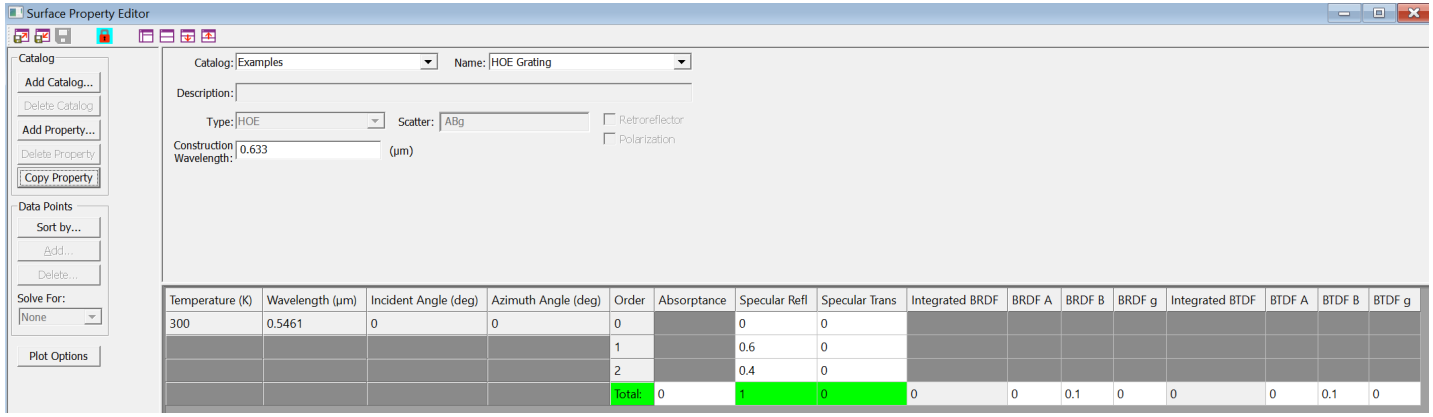
LAMBDA RESEARCH CORPORATION

TracePro 2023 23.5

- **TracePro**
  - Diffractive Optical Element capability
  - Updated Stray Light Analyzer

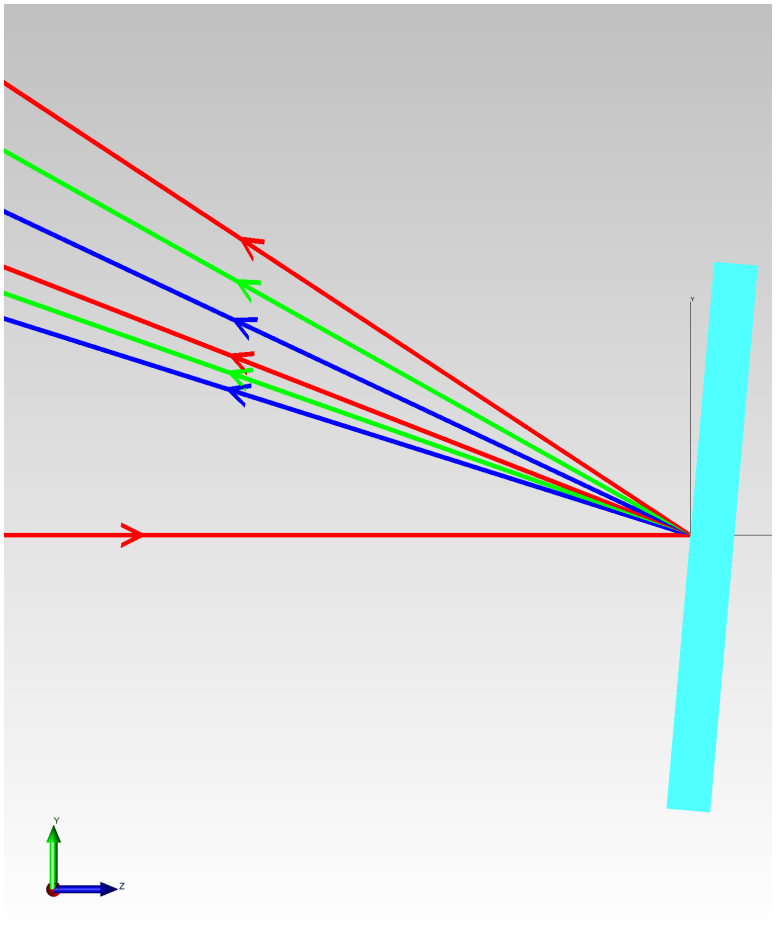
TracePro 2023 23.5

- **TracePro Standard and Expert**
  - TracePro can now model 3 different types of Diffractive Optical Elements
    - Holographic Optical Elements (HOEs)
    - Computer Generated Holograms (CGHs)
    - Zernike Phase
  - CGH surfaces can be:
    - Radially symmetric
    - Asymmetric x-y
    - Asymmetric (absolute value)

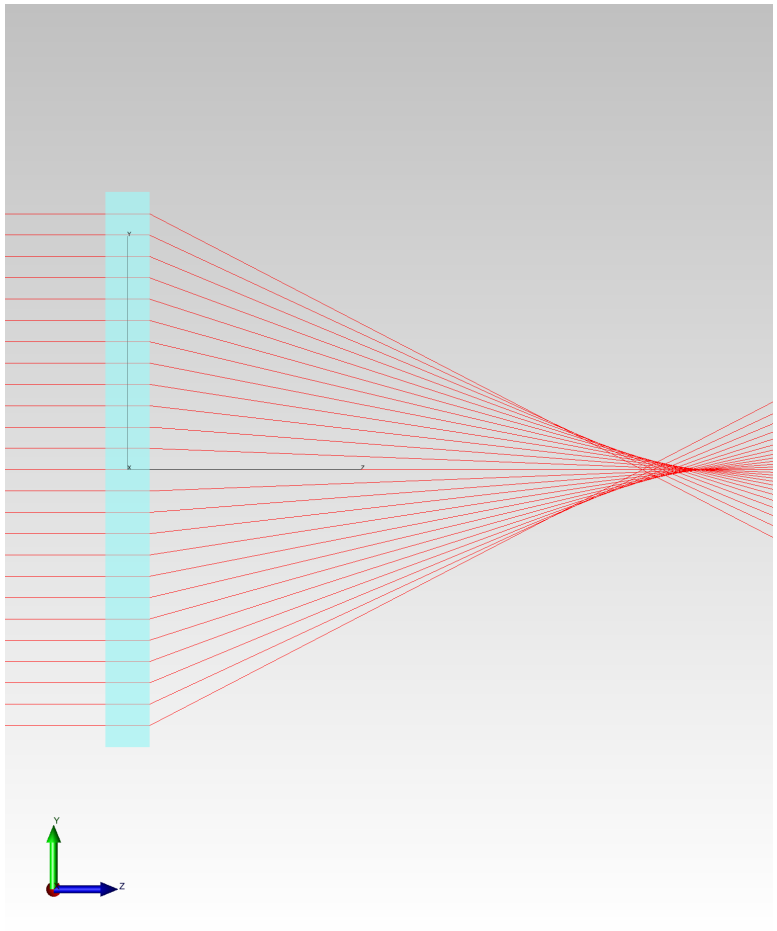


Surface Property Editor showing HOE surface for a reflection grating

TracePro 2023 23.5



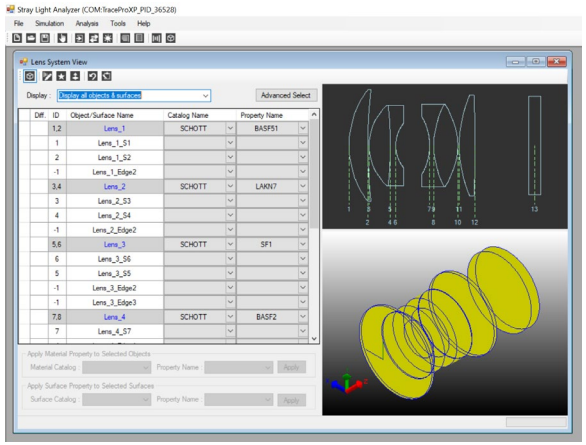
HOE reflection grating in TracePro

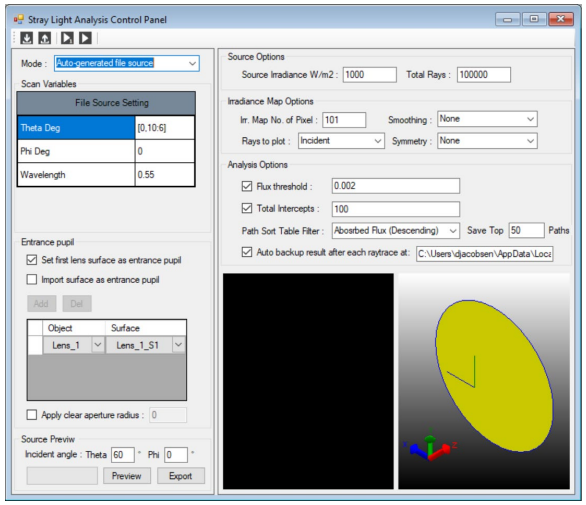


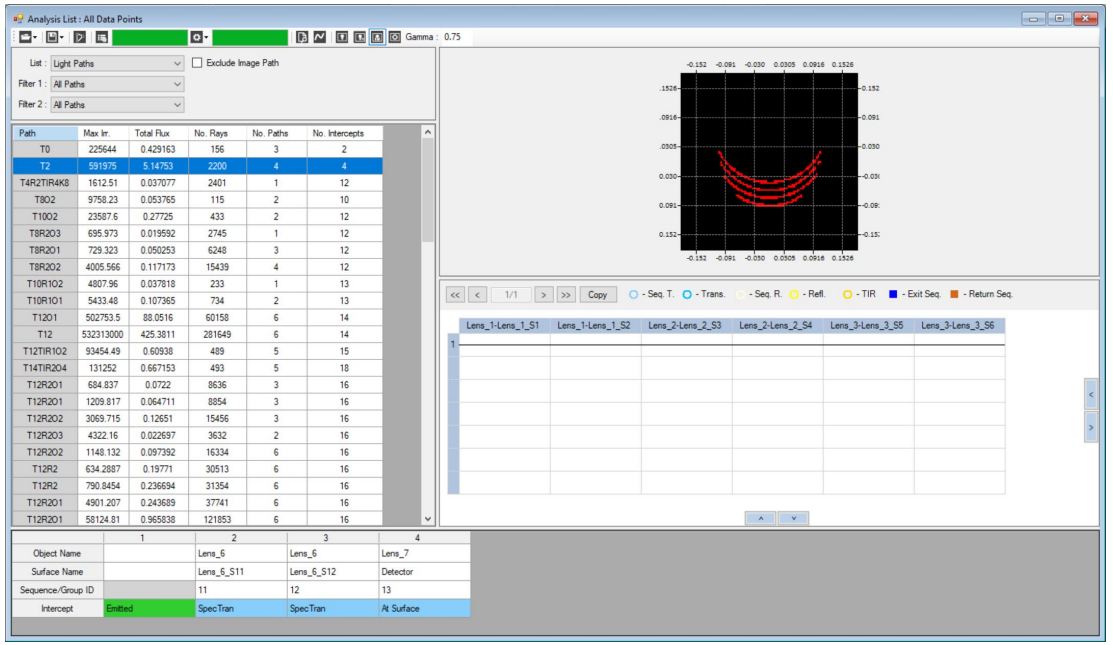
CGH lens example in TracePro

TracePro 2023 23.5

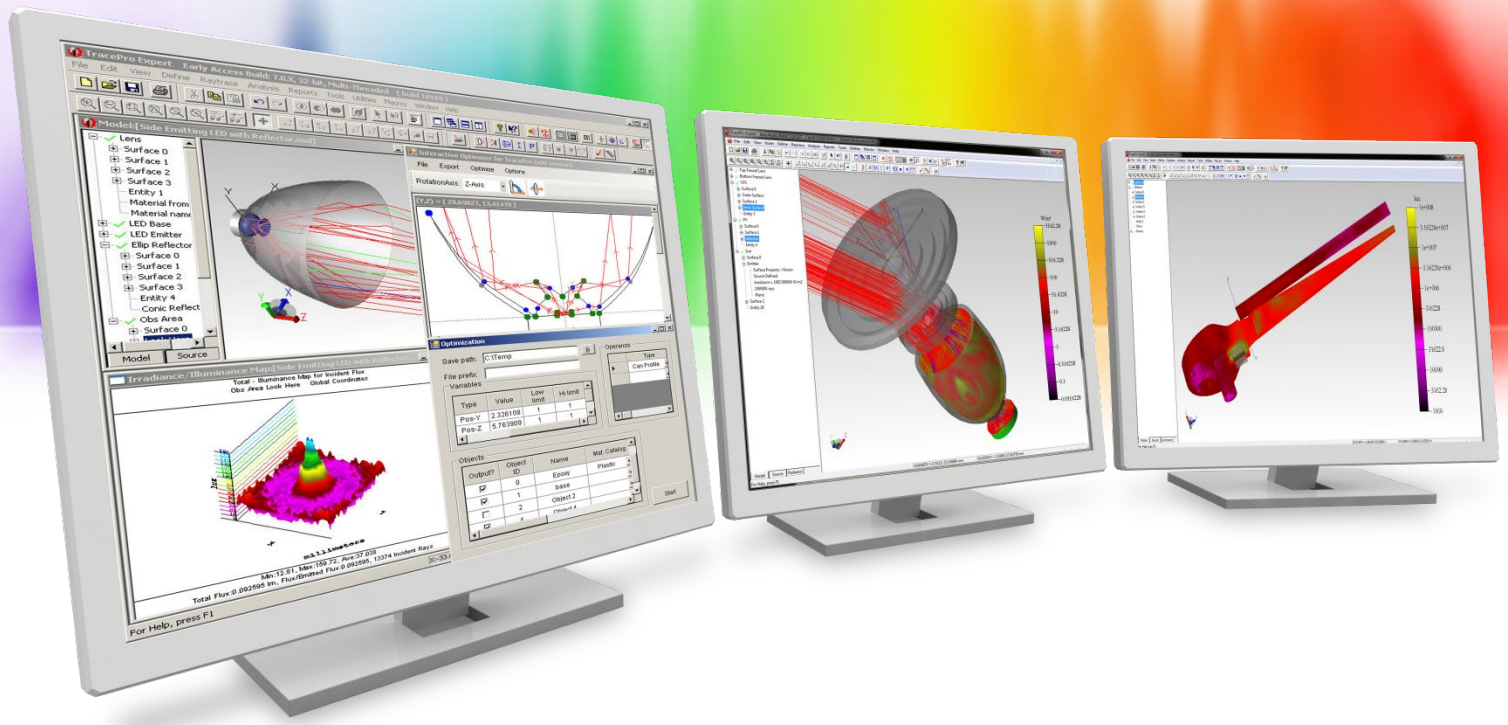
- **TracePro Standard and Expert**
  - The Stray Light Analyzer has been updated with added functionality







TracePro



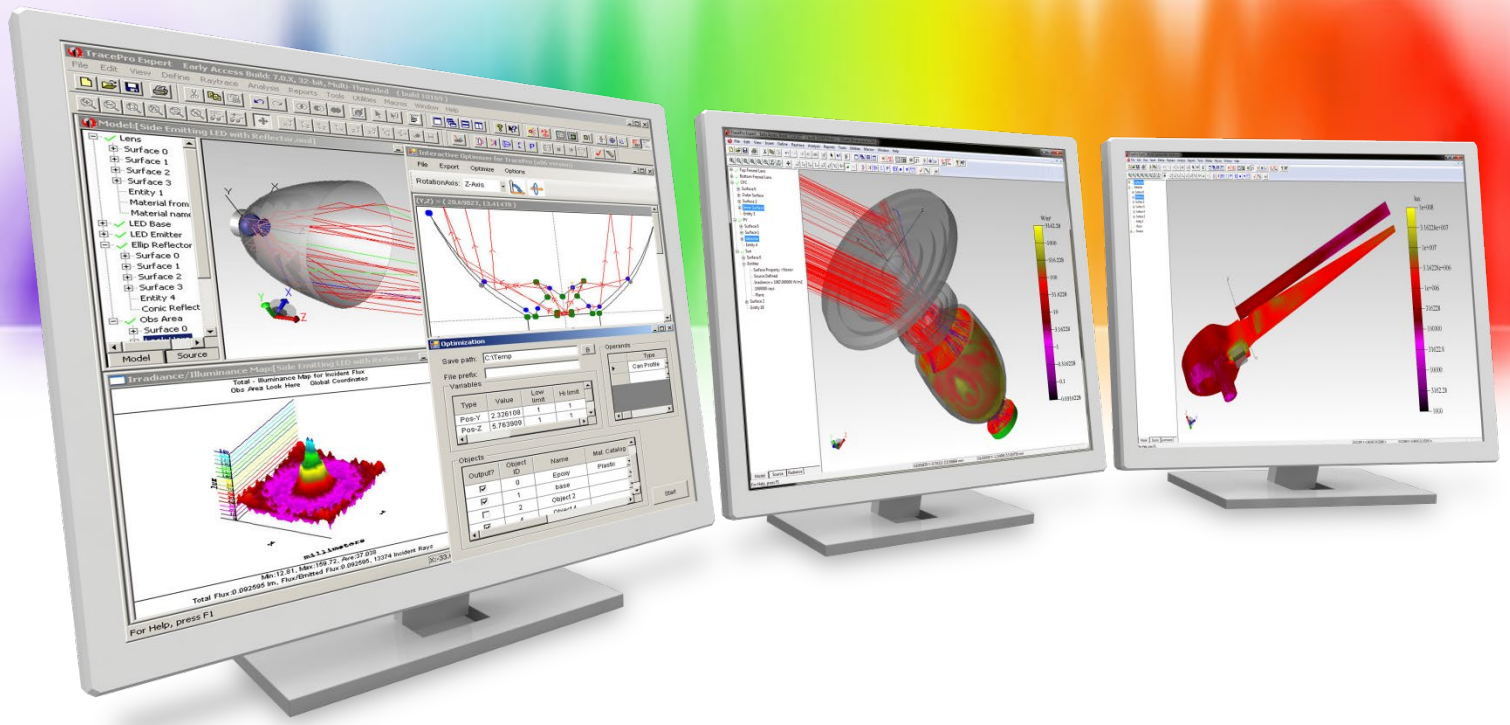
New Features in TracePro 2023 23.2

LAMBDA RESEARCH CORPORATION

TracePro 2023 23.2

- **TracePro**
  - Improved ray trace performance
  - Increased Scheme processing stack size for complex Scheme programs
  - New macro commands
    - Vector3d:cross
    - Vector3d:dot
    - Vector3d:normalize

TracePro



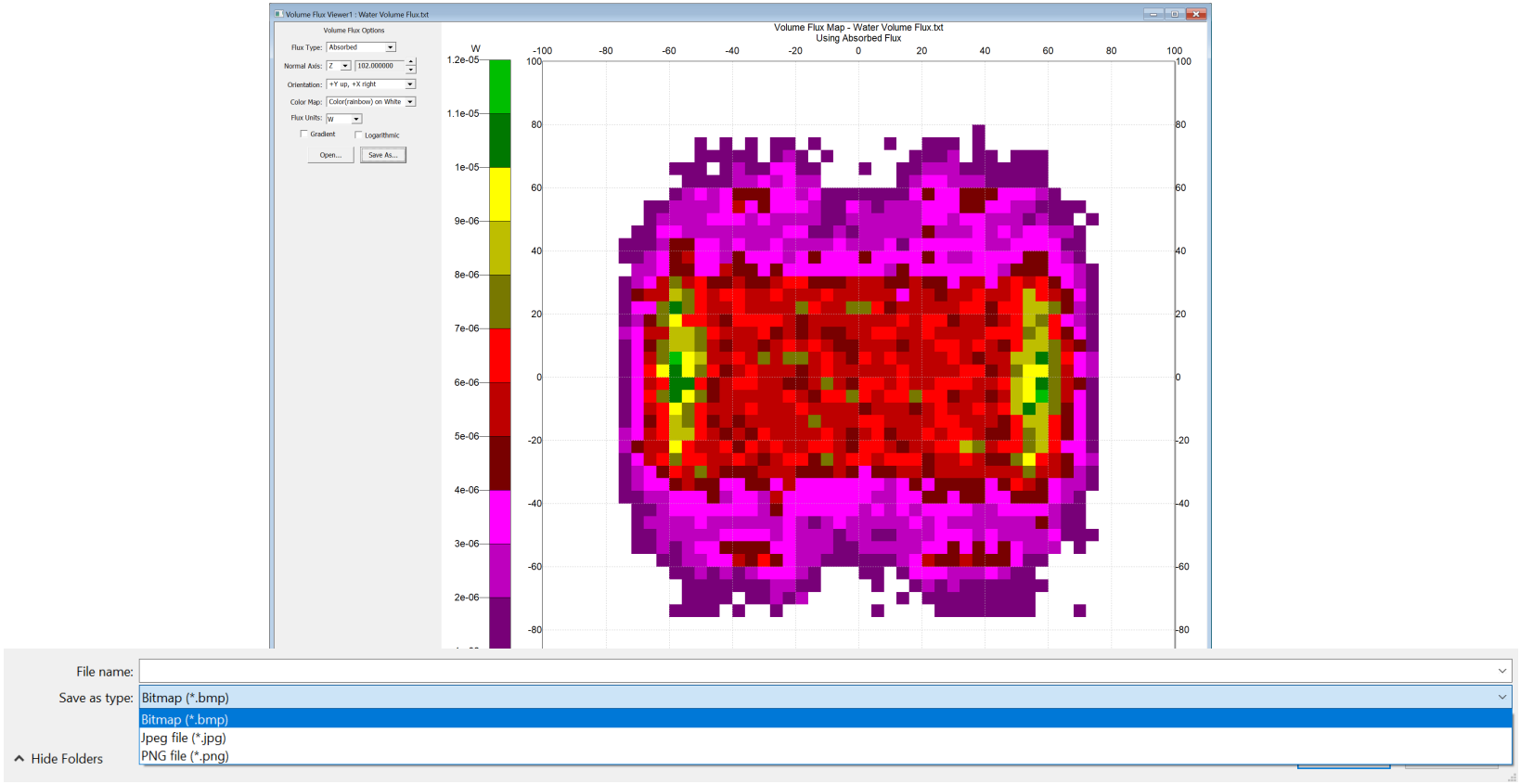
New Features in TracePro 2023 23.1

LAMBDA RESEARCH CORPORATION

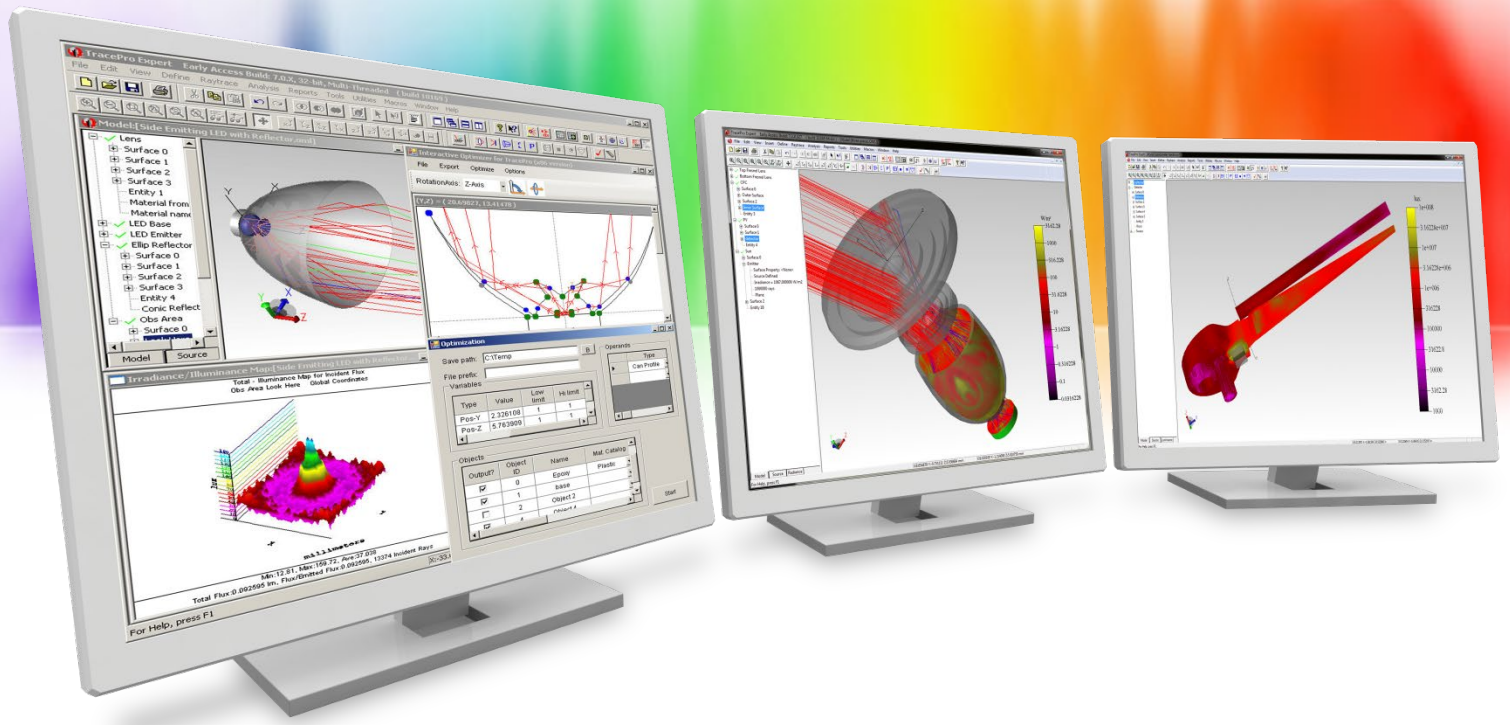
TracePro 2023 23.1

➢ TracePro

- ➢ Added ability to save image files (jpg, bmp,wmf) to Volume Flux Viewer



TracePro

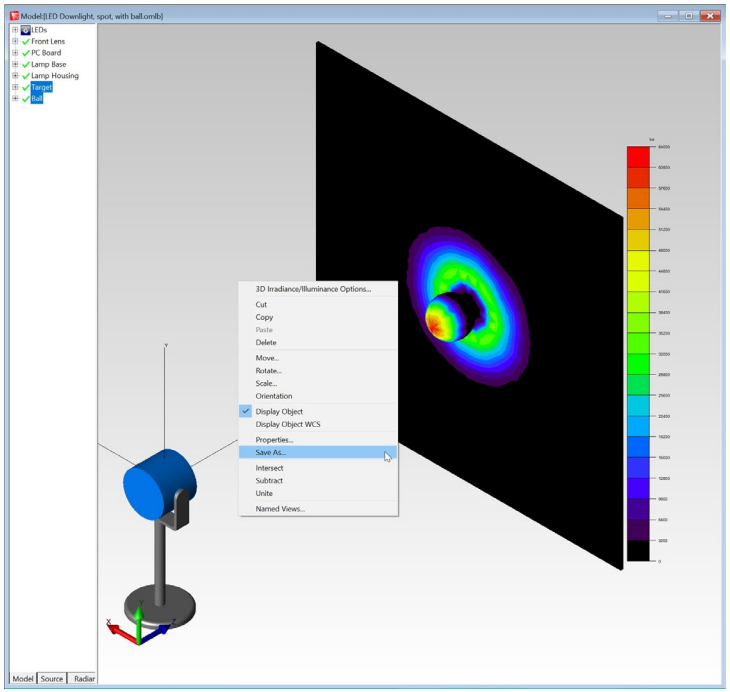


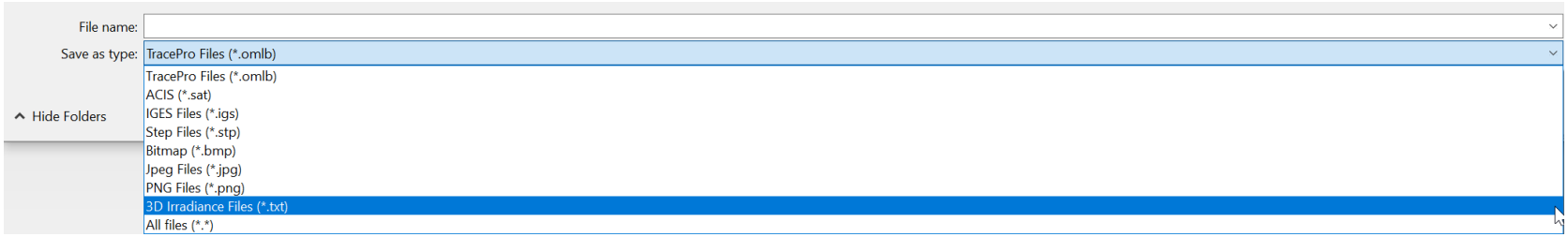
New Features in TracePro 2022 22.6

LAMBDA RESEARCH CORPORATION

TracePro 2022 22.6

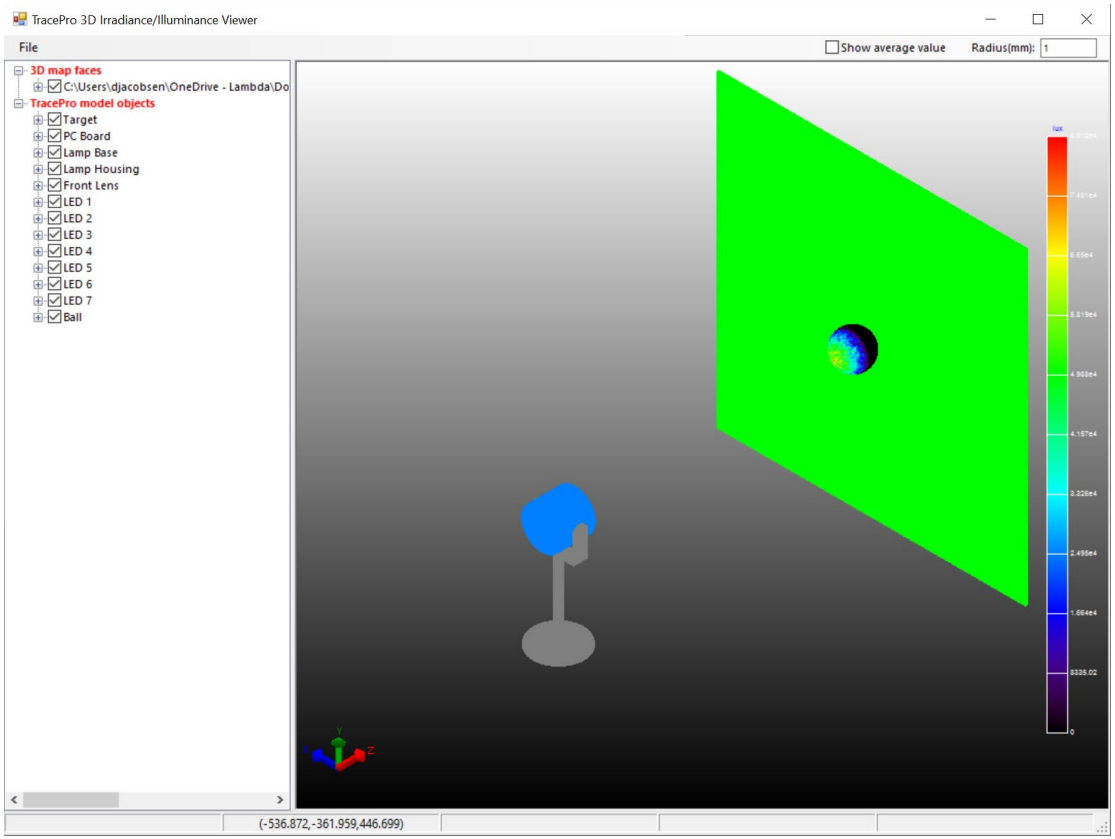
➢ New capability to save 3D Irradiance/Illuminance Map





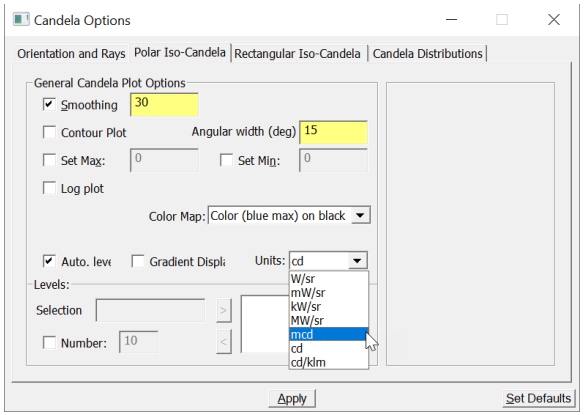
TracePro 2022 22.6

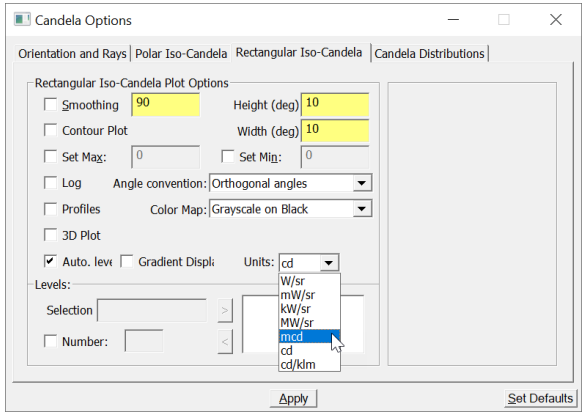
➢ New 3D Irradiance/Illuminance Viewer in Tools menu

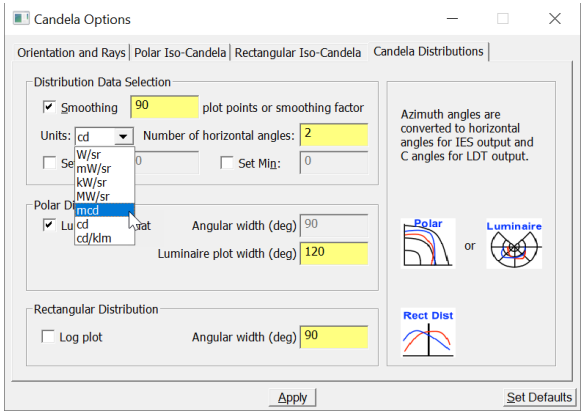


TracePro 2022 22.6

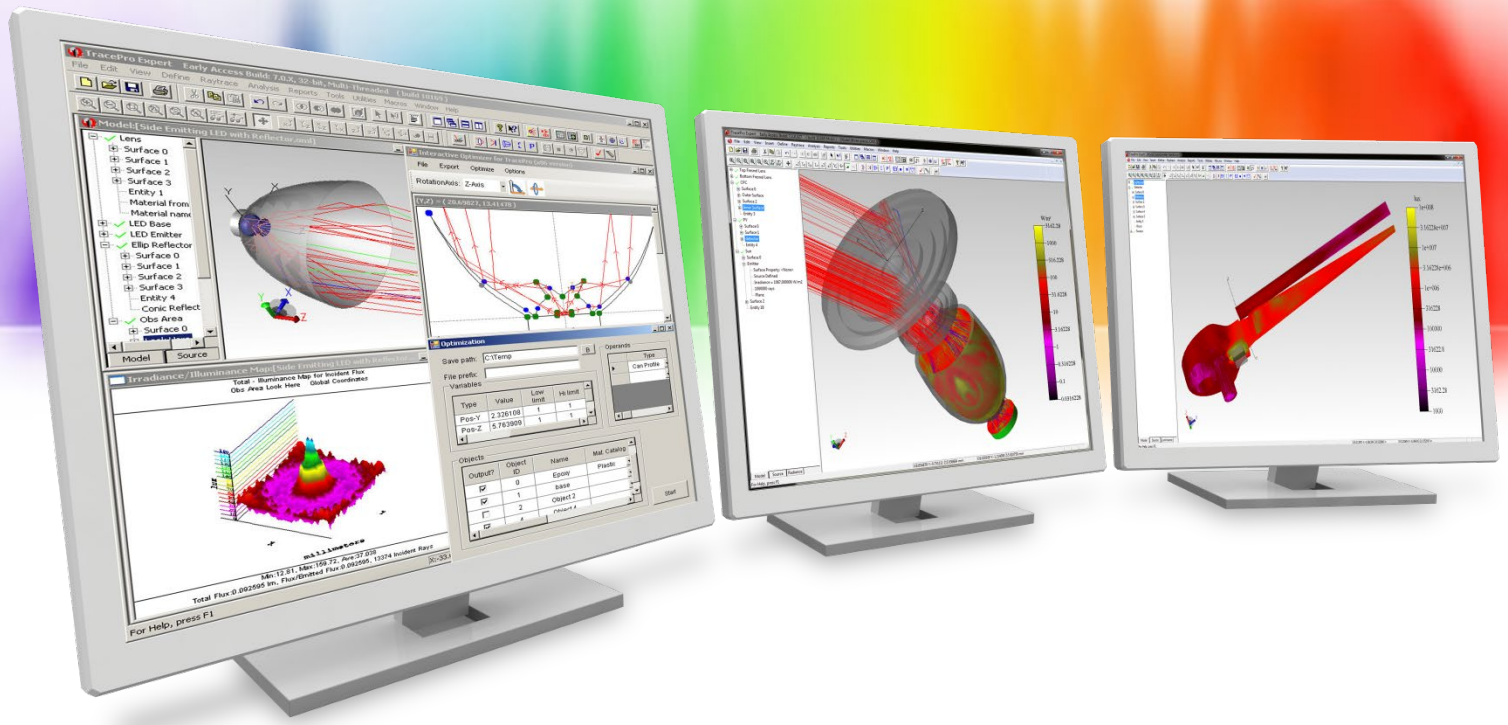
- **TracePro**
  - Added mcd (millicandela) unit option to Candela Plots







TracePro



New Features in TracePro 2022 22.5

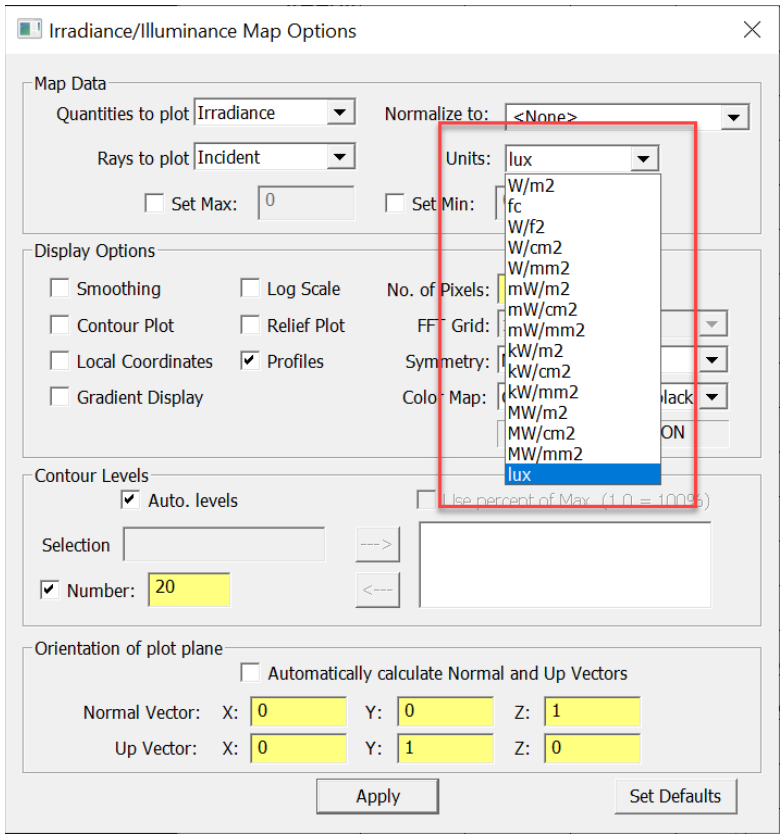
LAMBDA RESEARCH CORPORATION

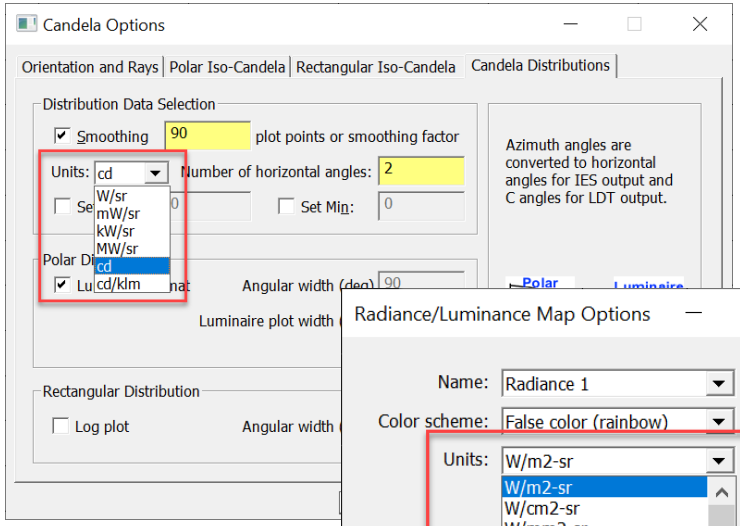
TracePro 2022 22.5

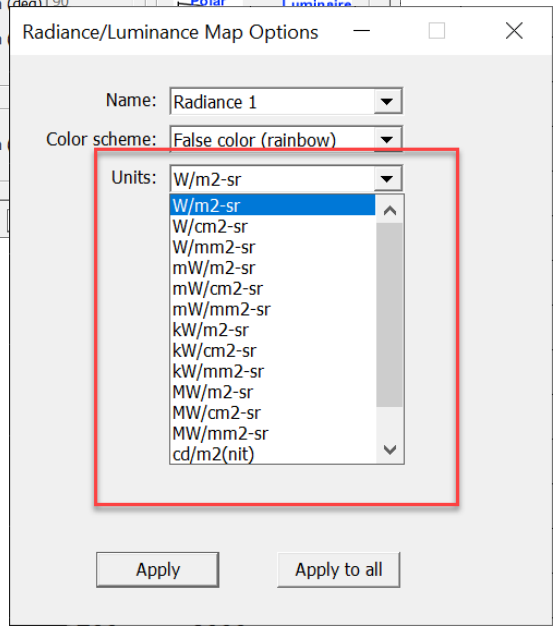
- **TracePro**
  - New analysis tools unit options
  - Set Defaults capability added to Ray Sorting
  - New RepTile geometry – tetrahedron
  - Ray Sorting added to 3D Irradiance/Illuminance Map
  - New capability to import multi-configuration OSLO and Zemax files
  - New ability to select one or more paths and display them in the Candela Plot

TracePro 2022 22.5

TracePro – New unit options have been added to the analysis tools. Also, the units are now set in the appropriate Options dialog boxes.

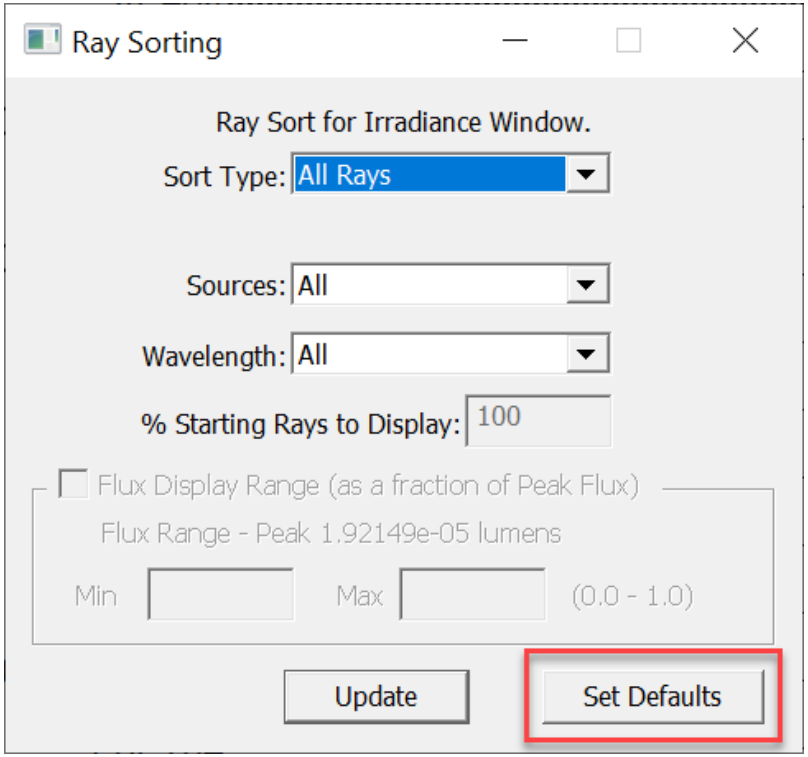






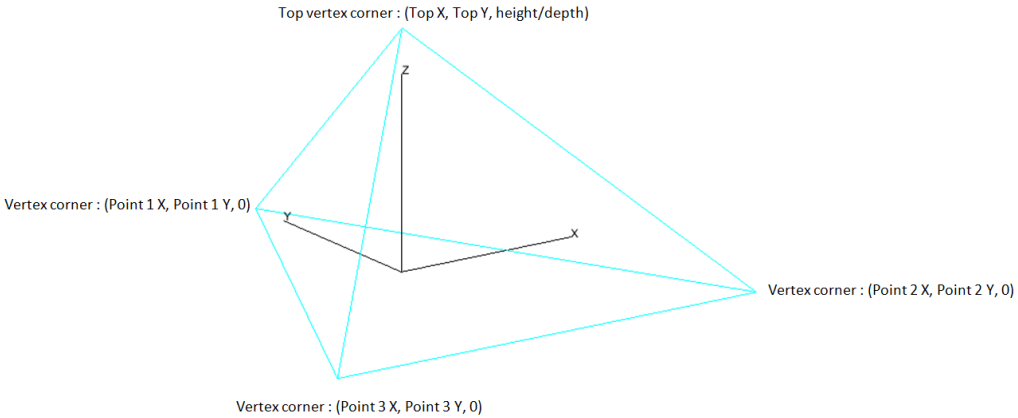
TracePro 2022 22.5

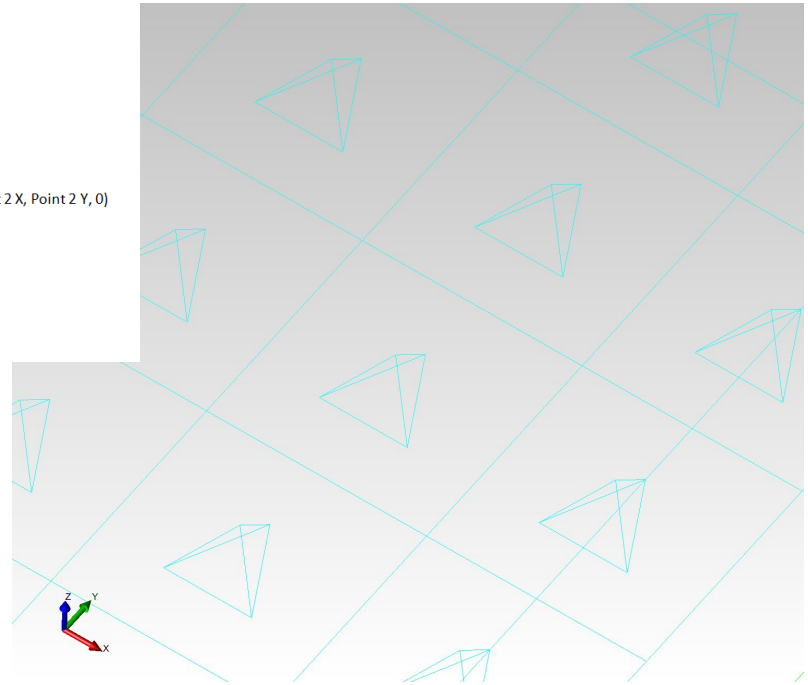
TracePro – Ray Sorting now has a Set Defaults option to allow users to save commonly used settings as the default values



TracePro 2022 22.5

TracePro – A new RepTile geometry type, Tetrahedron, has been added

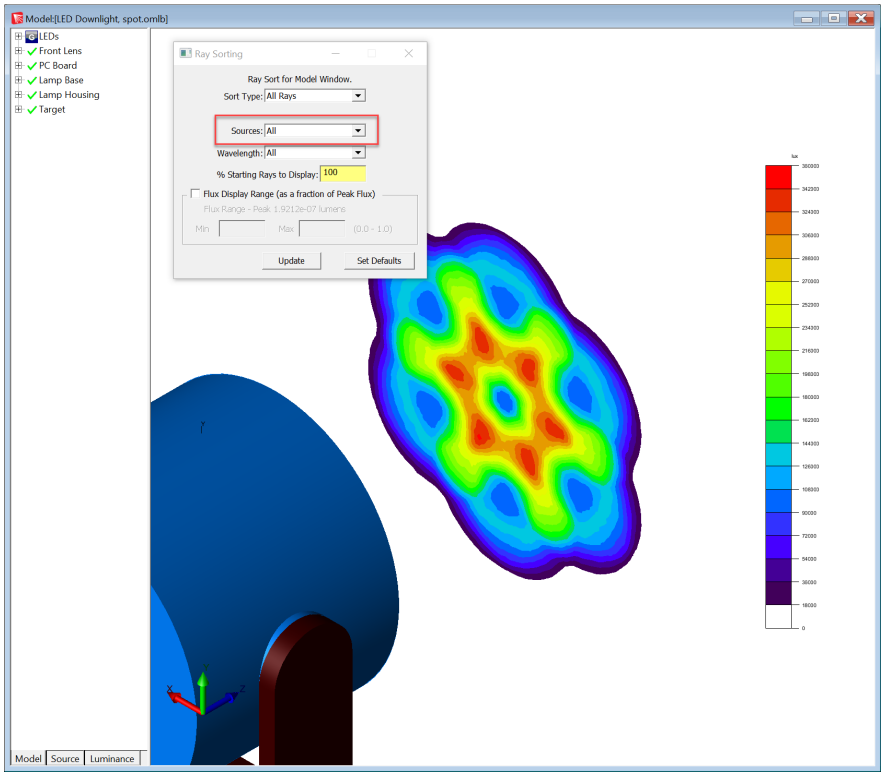


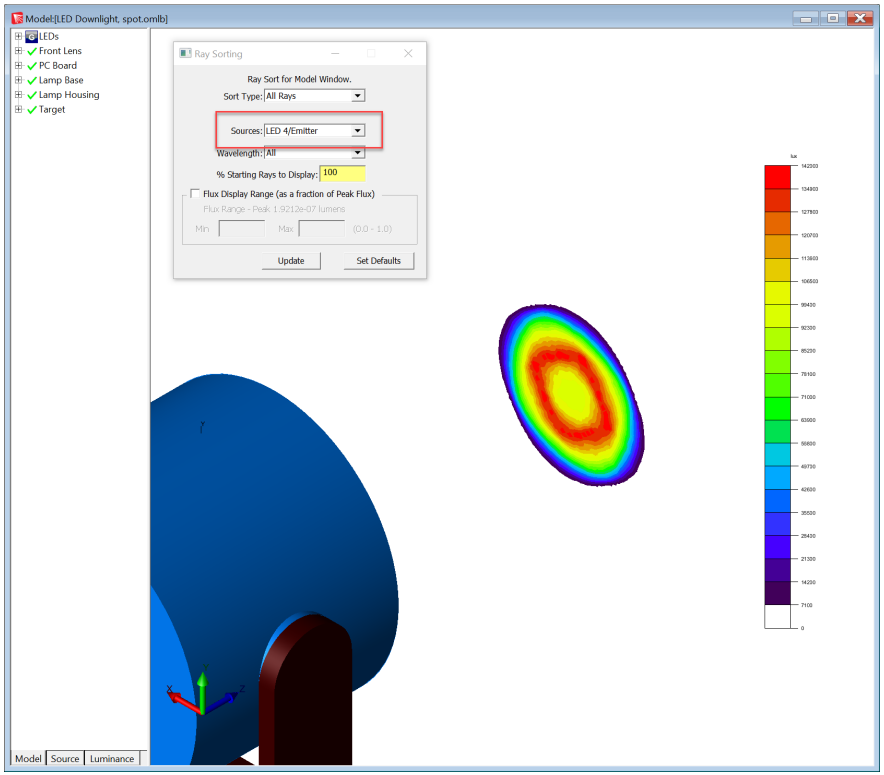


TracePro

TracePro 2022 22.5

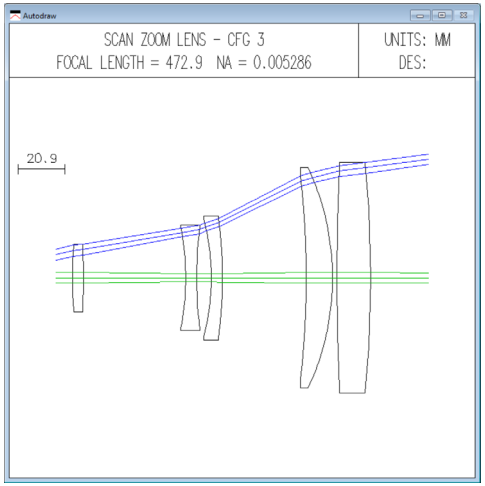
TracePro – Ray Sorting can now be used with the 3D Irradiance/Illuminance Map

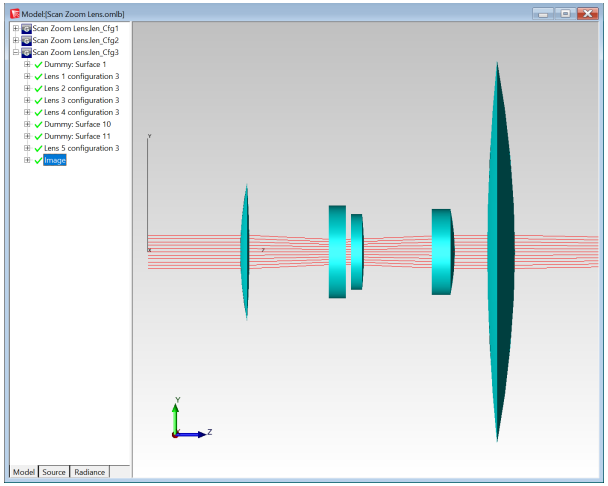


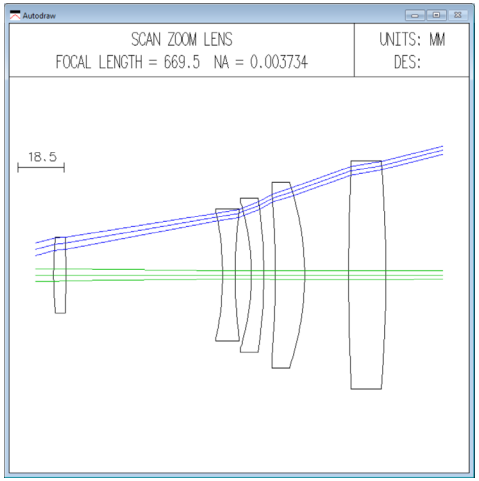


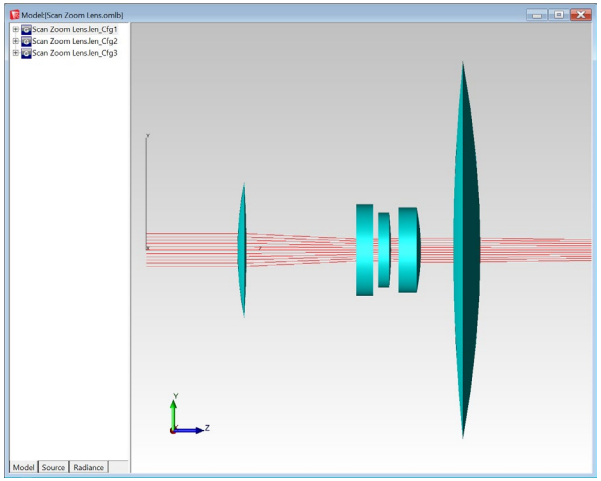
TracePro 2022 22.5

TracePro – TracePro can now import multi-configuration files from OSLO and Zemax



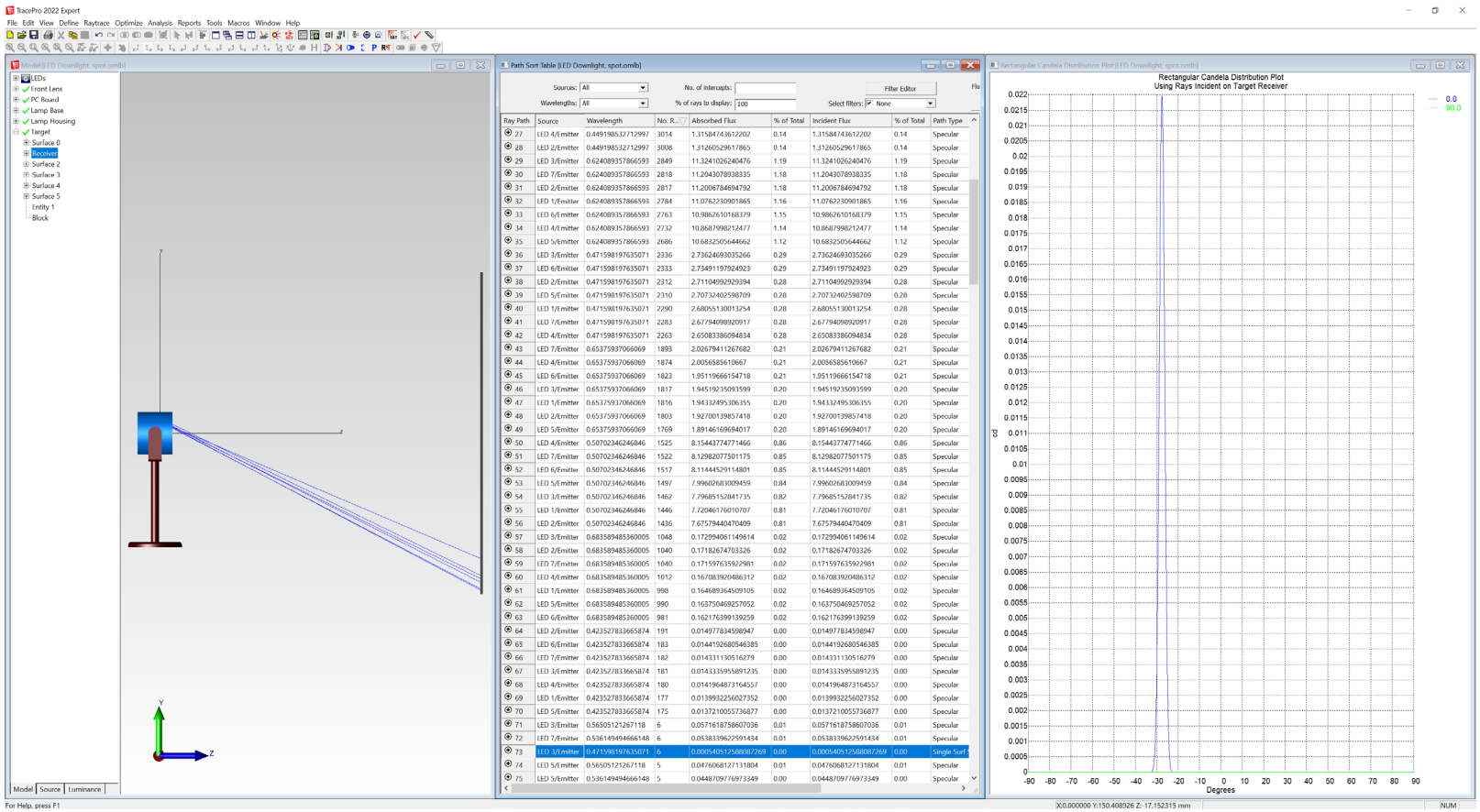




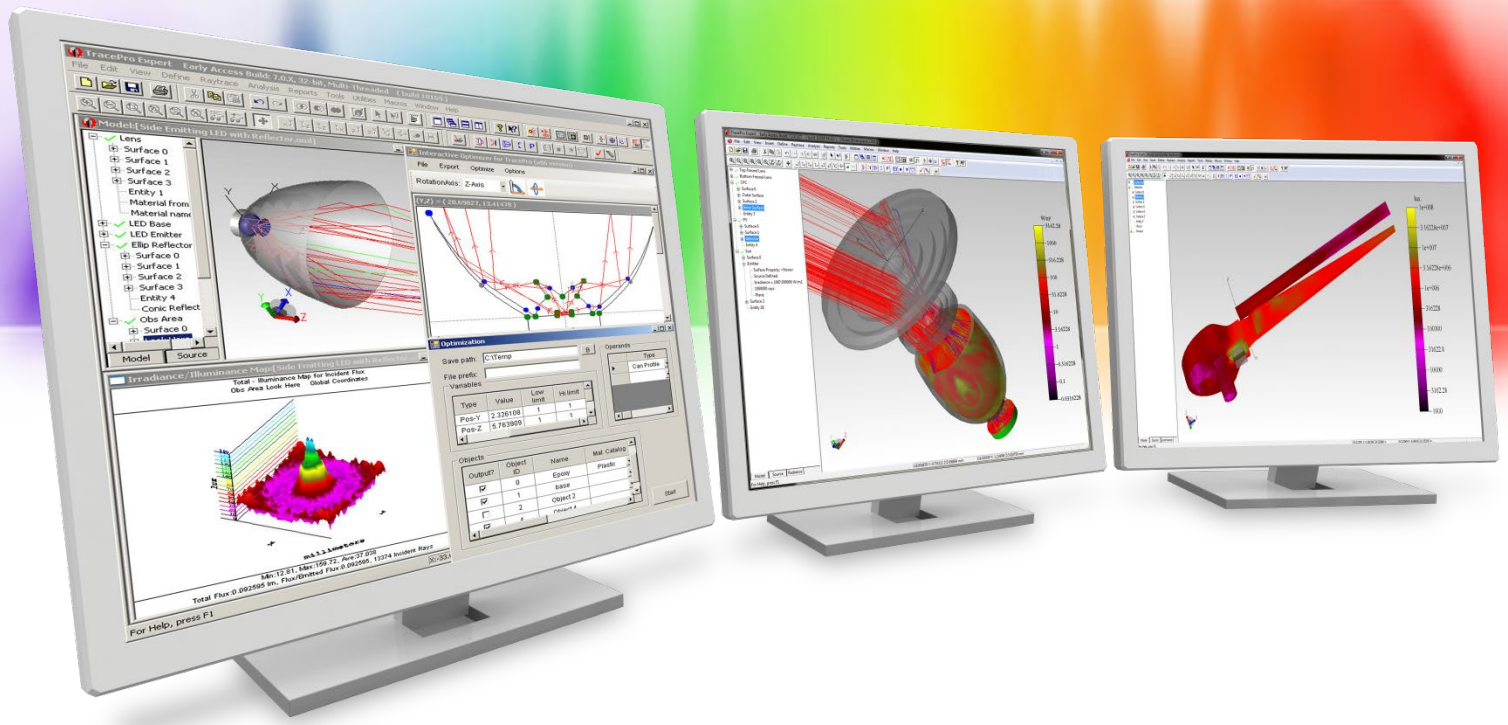


TracePro 2022 22.5

TracePro – Path Sorting can now be used with the Candela Plots in TracePro



TracePro



New Features in TracePro 2022 22.2

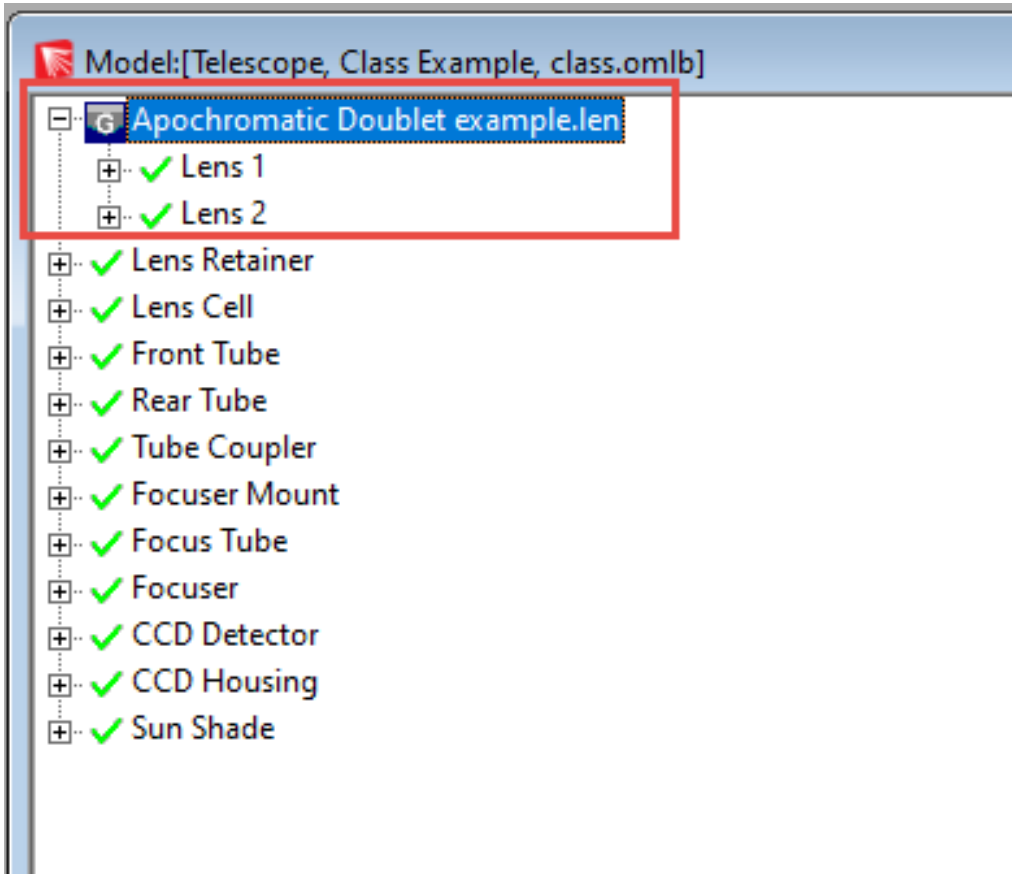
LAMBDA RESEARCH CORPORATION

TracePro 2022 22.2

- **TracePro**
  - Group for imported lenses
- **Light Source Builder**
  - Convert Lucidshape and Zemax rayfiles to TracePro rayfile format

TracePro 2022 22.2

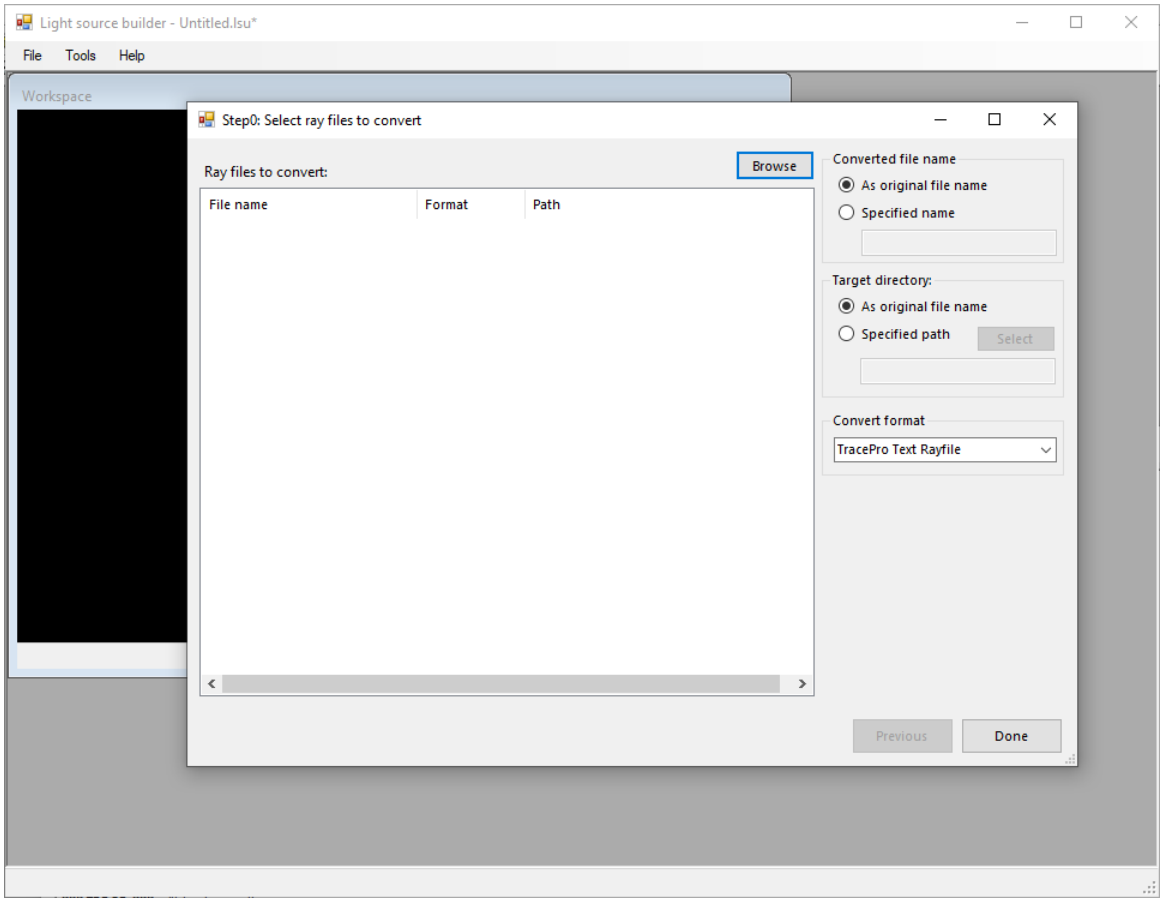
TracePro – Imported lenses are now placed in a new group in TracePro. The name of the lens file will be the name of the group in TracePro.



TracePro

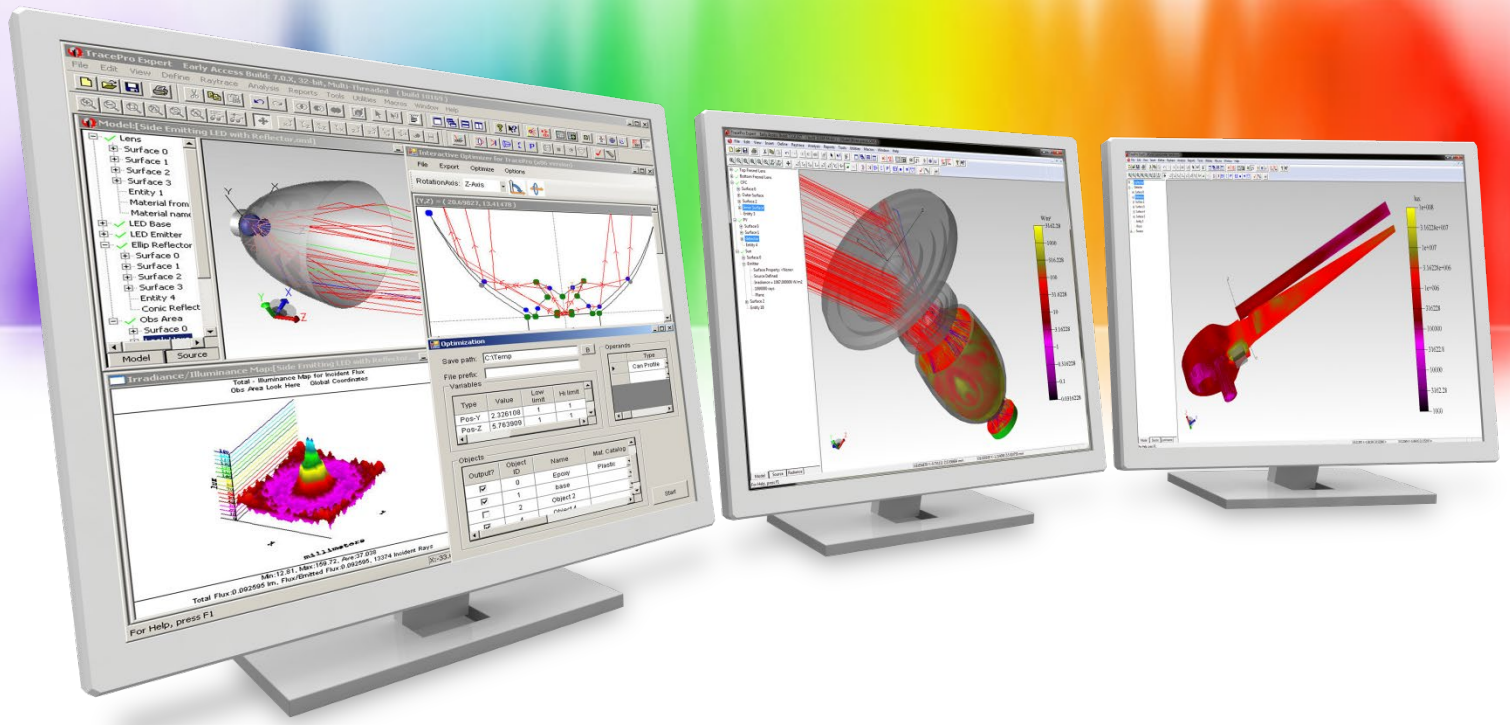
TracePro 2022 22.2

Light Source Builder – New ability to convert LightTools, Lucidshape, and Zemax rayfiles to a TracePro rayfile format



TracePro

TracePro



New Features in TracePro 2022 22.1

LAMBDA RESEARCH CORPORATION

TracePro 2022 22.1

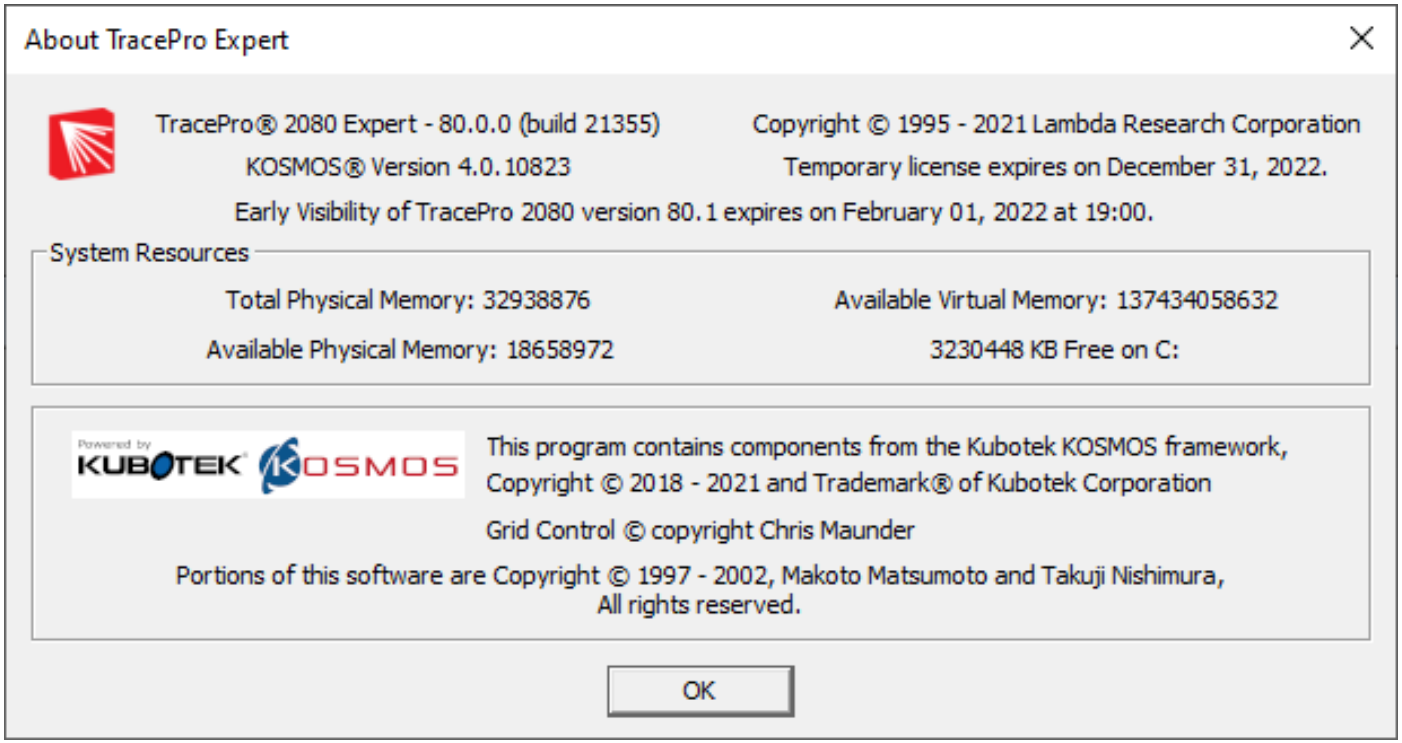
- **TracePro**
  - New geometric modeler
  - New surface types and aperture shapes for the Lens Element
  - New All-mouse mode
  - New dynamic highlighting and tooltips for identifying surfaces
  - New file format *.OMLB
  - STEP and IGES translators now included at no charge
  - New CAD importers included at no charge
  - New Environment options for Material and Bulk Scatter

- **Light Source Builder**
  - New source builder utility for making many different source types

TracePro

TracePro 2022 22.1

TracePro – New Kosmos® KCM® geometric modeler made by Kubotek3D® gives TracePro the capability to model asymmetric and free-form optical surfaces with the accuracy required for optical ray tracing.



TracePro 2022 22.1

TracePro – CAD translators and importers included at no additional cost

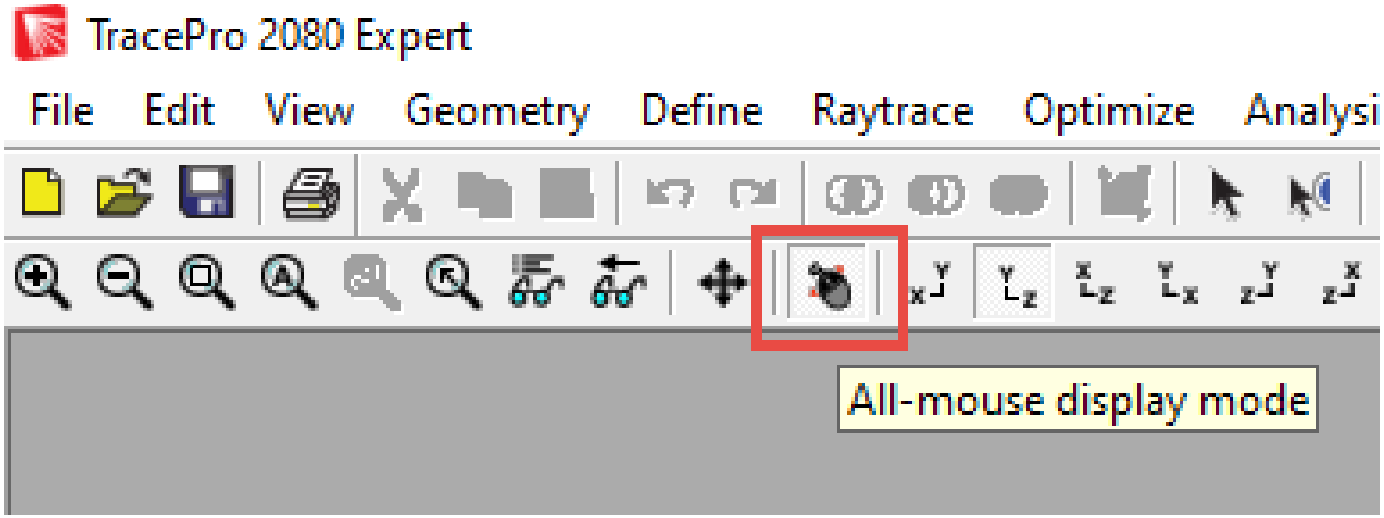
- **CAD Translators**
  - **STEP**
  - **IGES**
  - **SAT**

- **CAD Importers**
  - **SOLIDWORKS**
  - **NX/Unigraphics**
  - **Inventor**
  - **Creo/Pro-E**
  - **SolidEdge**
  - **CATIA v4 and v5**

TracePro

TracePro 2022 22.1

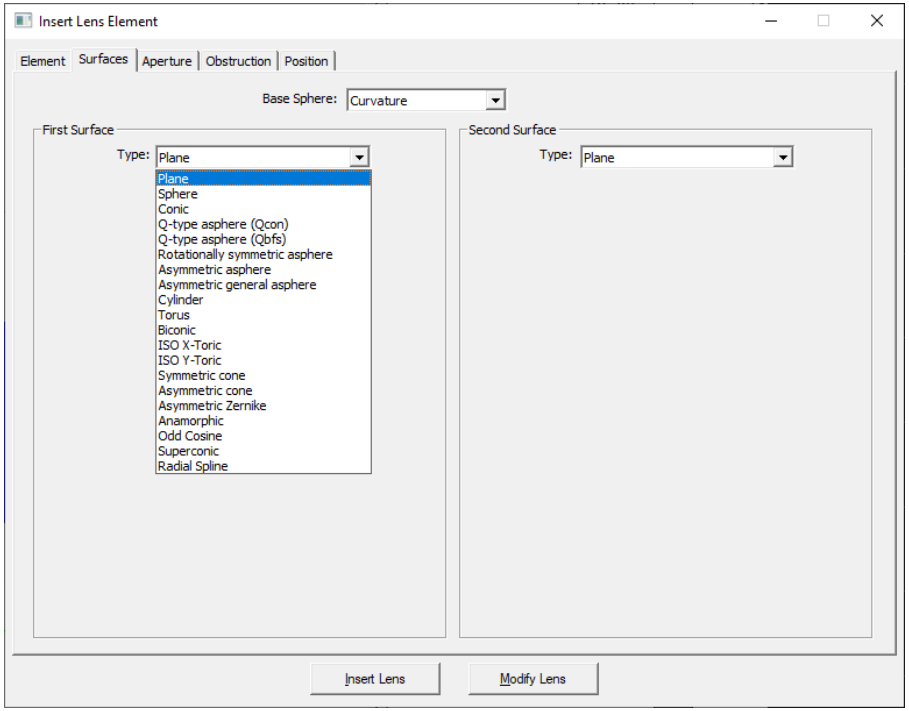
TracePro – New All-mouse mode enables users complete many view manipulations using only the mouse

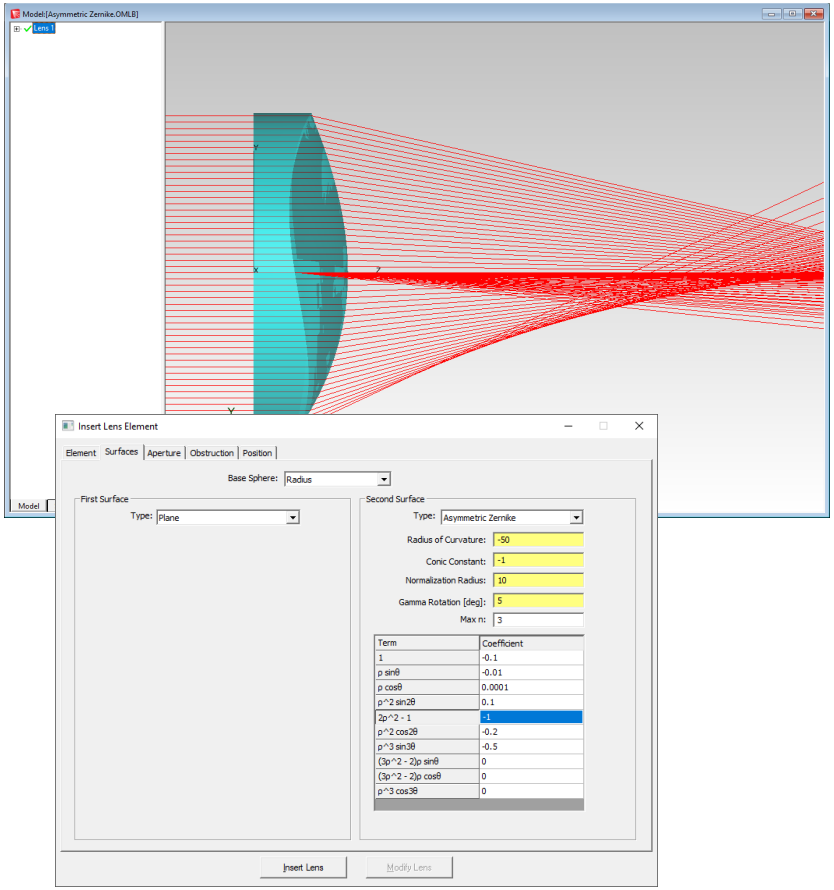


- **Left-button drag – orbit the view**
- **Right-button drag up and down – zoom the view**
- **Both-buttons – pan the view**

TracePro 2022 22.1

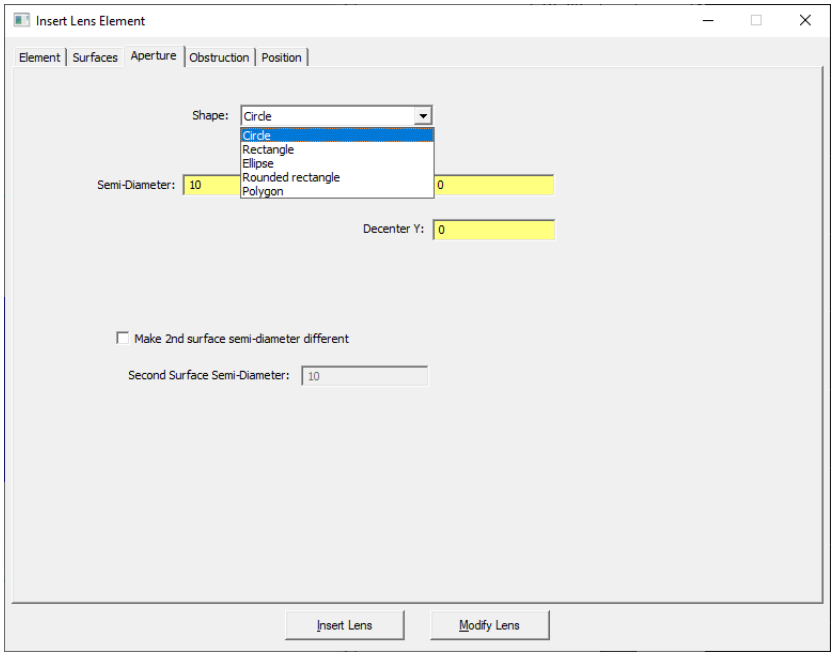
TracePro – Many new surface types have been added to the Lens Element including, Q-type aspheres, Biconics, Asymmetric Zernike, Super Conic, Radial Spline, and many more.

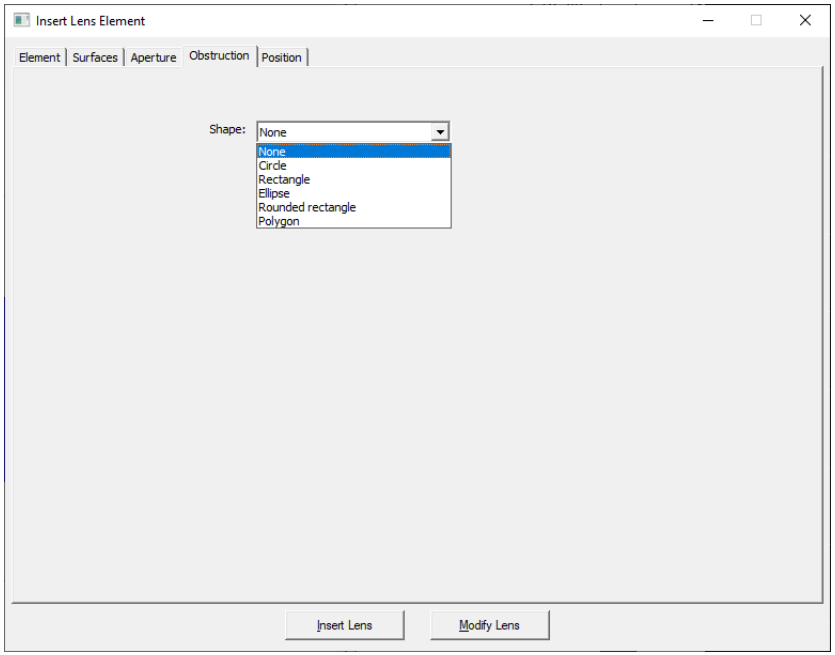




TracePro 2022 22.1

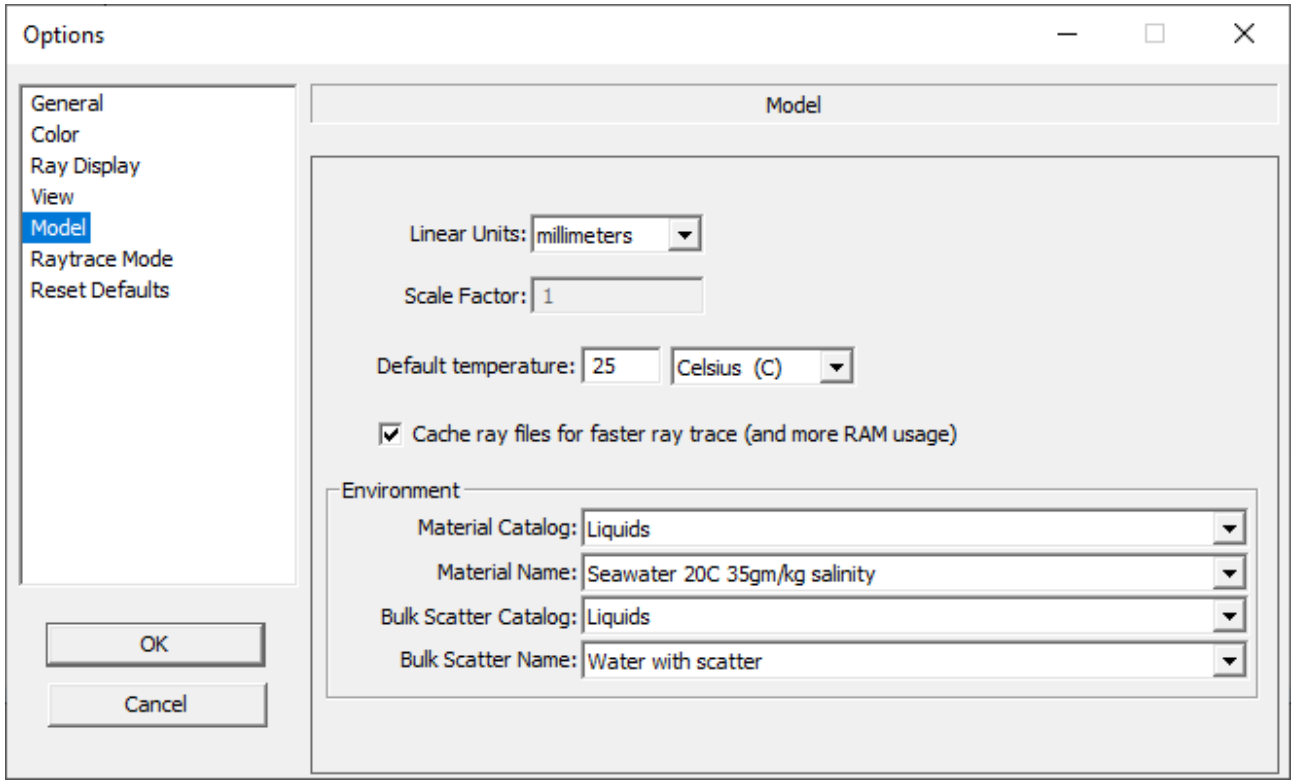
TracePro – Lens Element Aperture and Obstruction options now include Circle, Rectangle, Ellipse, Rounded rectangle, and Polygon





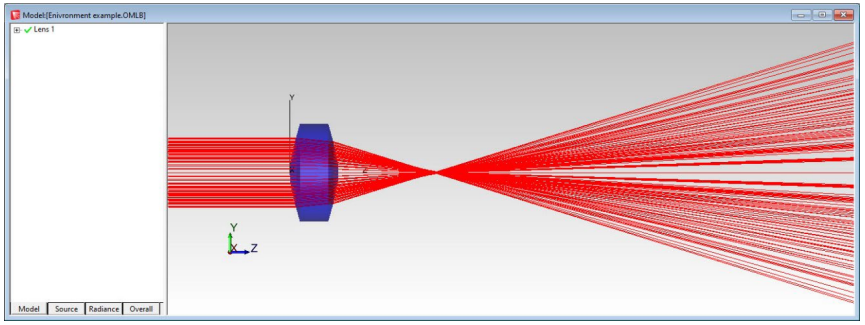
TracePro 2022 22.1

TracePro – Material and Bulk Scatter Properties can now be applied to the environment in TracePro

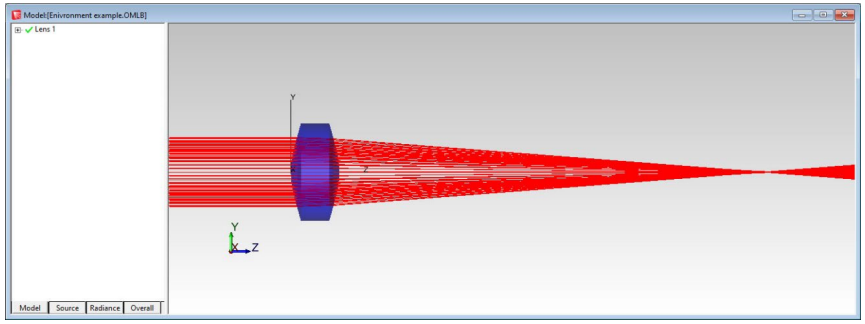


TracePro 2022 22.1

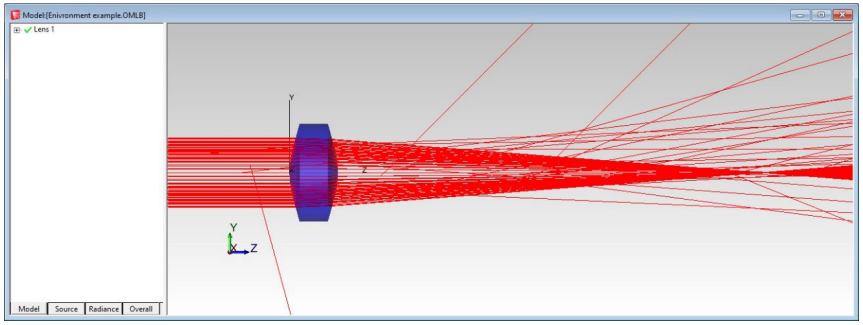
TracePro – Material and Bulk Scatter Properties can now be applied to the environment in TracePro



BK7 lens in air



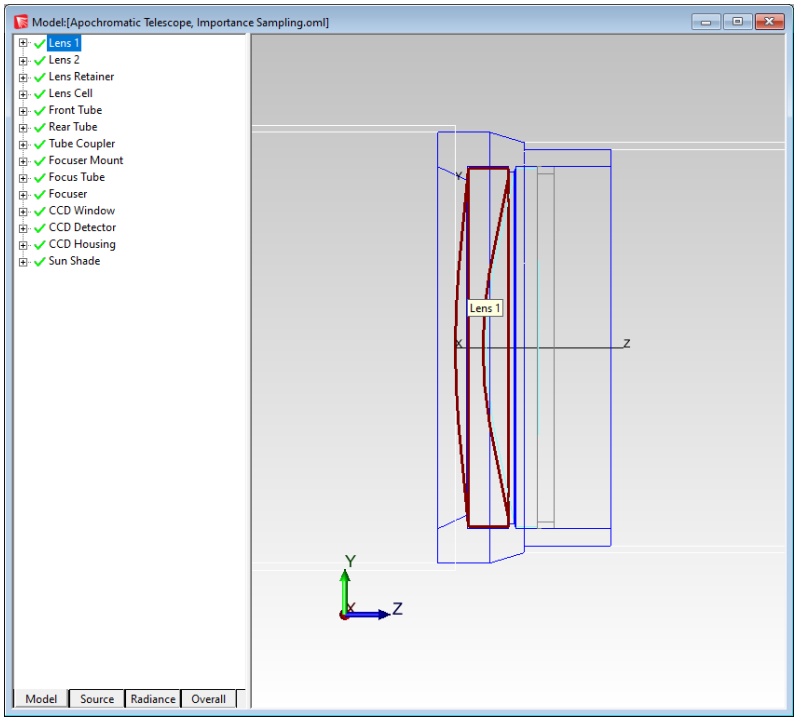
BK7 lens in seawater

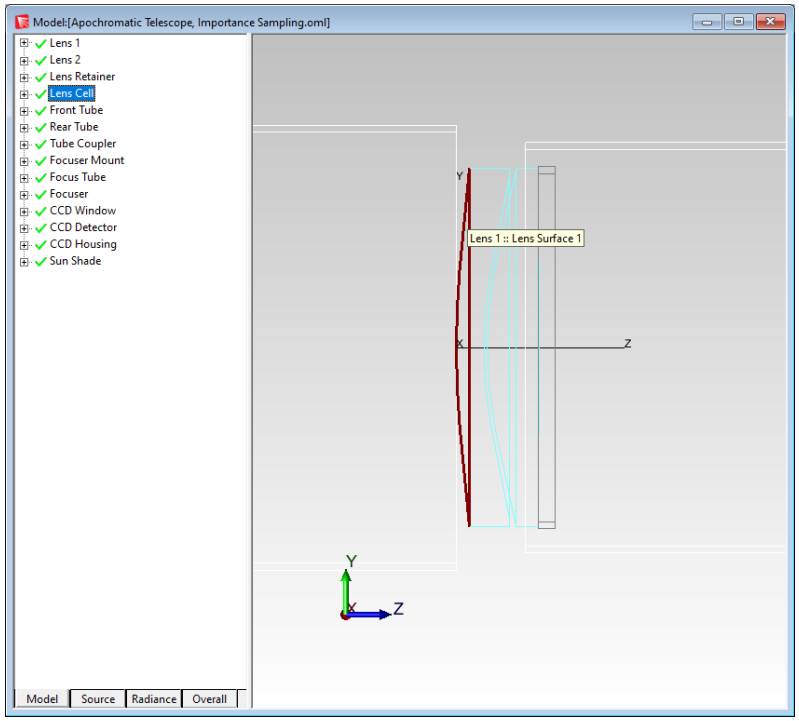


BK7 lens in seawater with scatter

TracePro 2022 22.1

TracePro – New Dynamic Highlighting. Move the cursor over an object or surface to dynamically highlight the object or surface and display its name



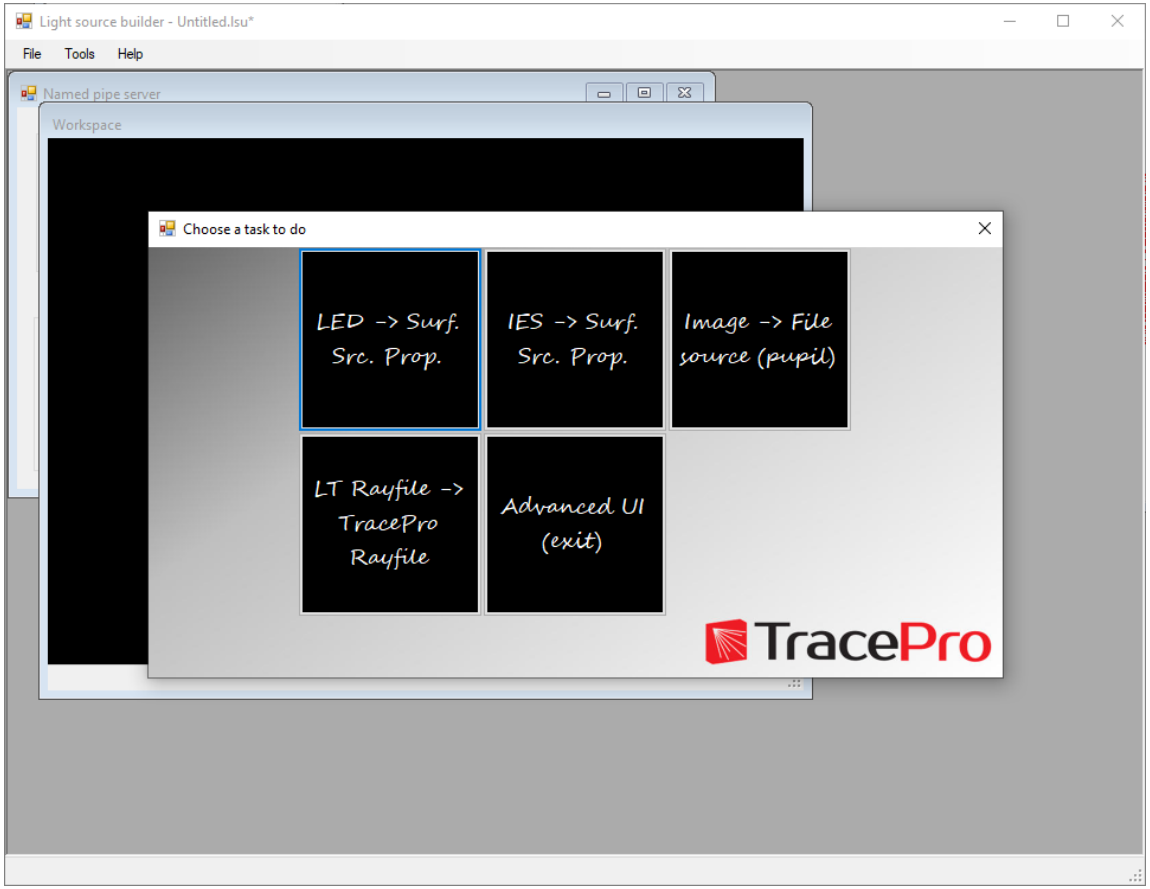


TracePro 2022 22.1

TracePro – New TracePro file extension .OMLB. TracePro 2022 can also open .OML files. Older versions of TracePro will not be able to open .OMLB files.

TracePro 2022 22.1

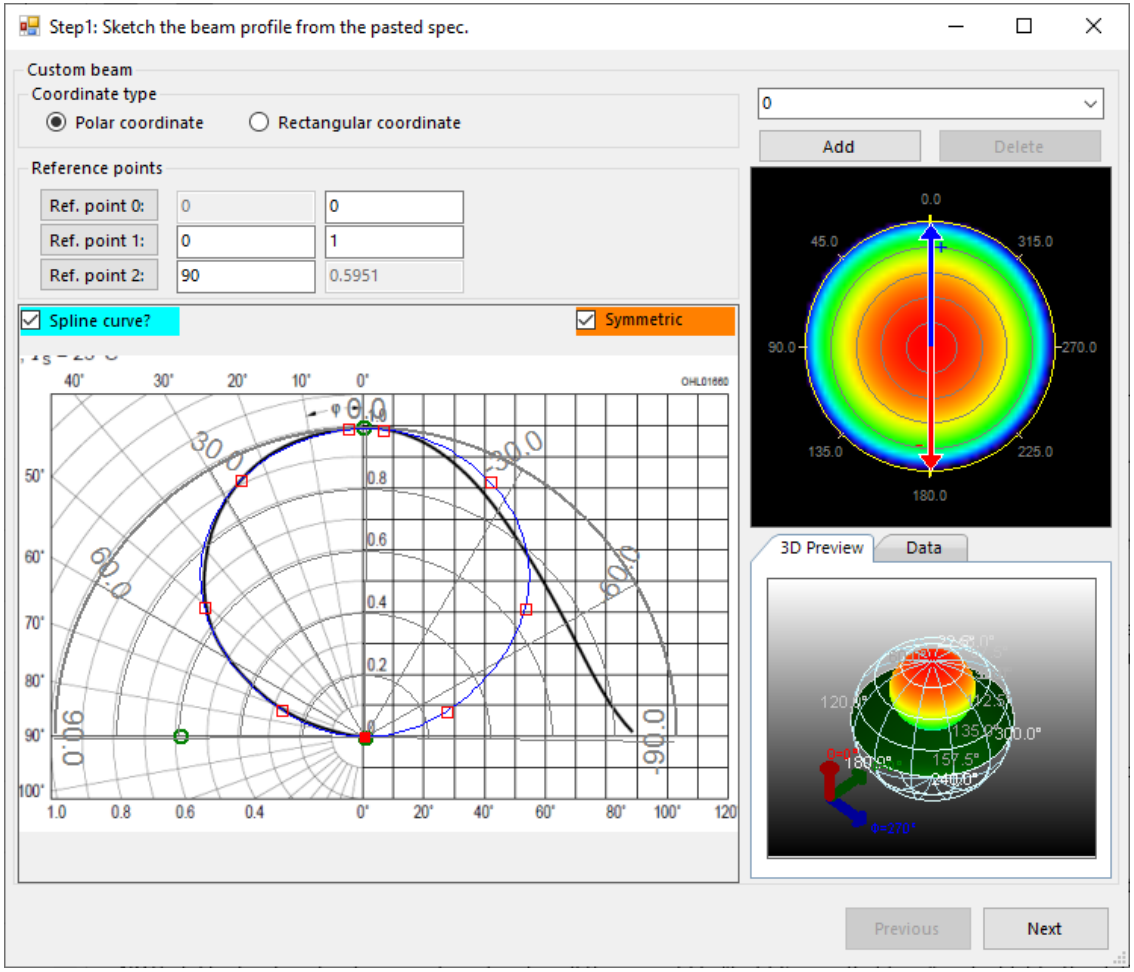
Light Source Builder – The new Light Source Builder gives uses a wizard tool and gives users the ability to make multiple types of light sources.



TracePro

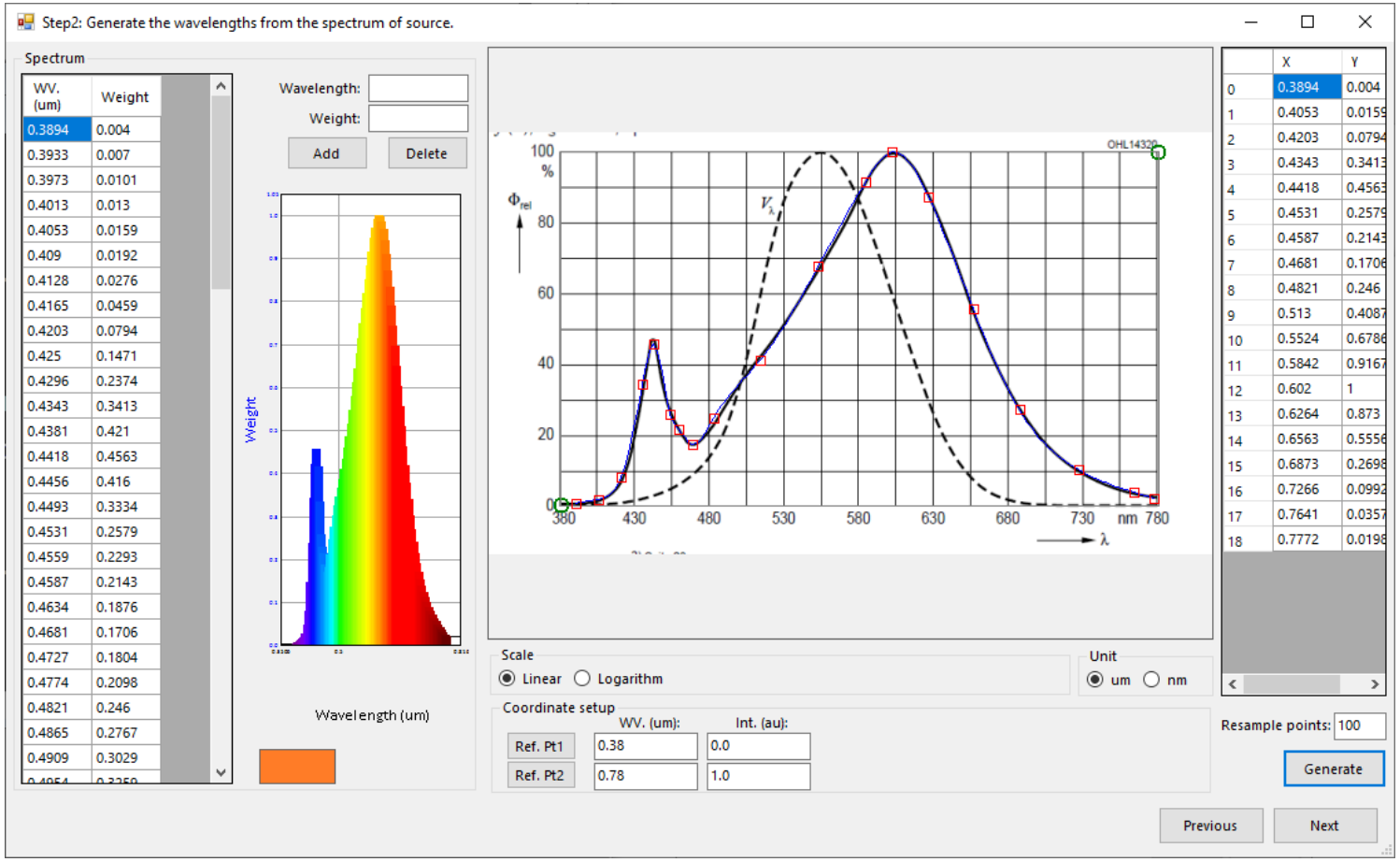
TracePro 2022 22.1

Light Source Builder – Surface Source Property



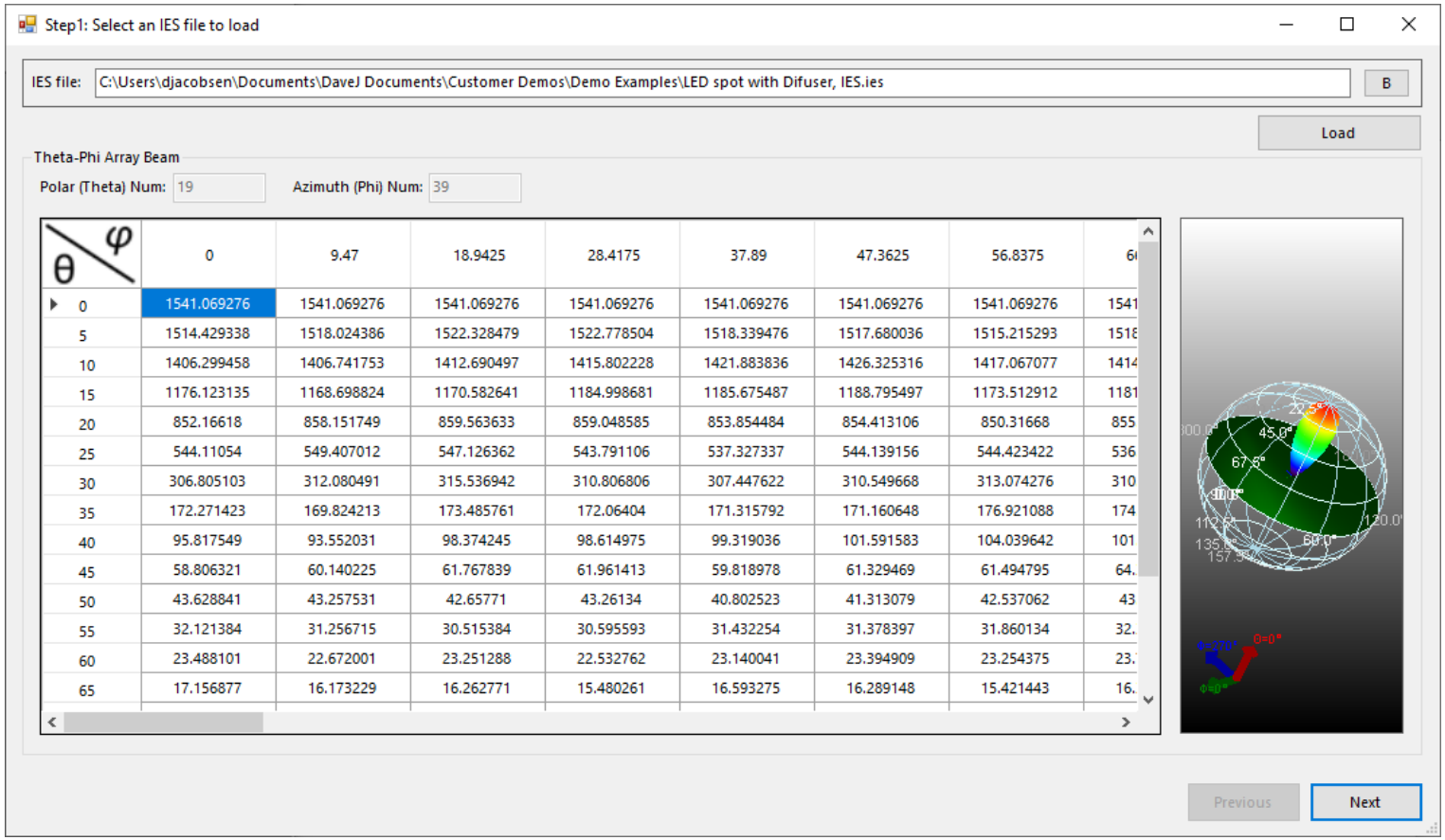
TracePro 2022 22.1

Light Source Builder – Surface Source Property



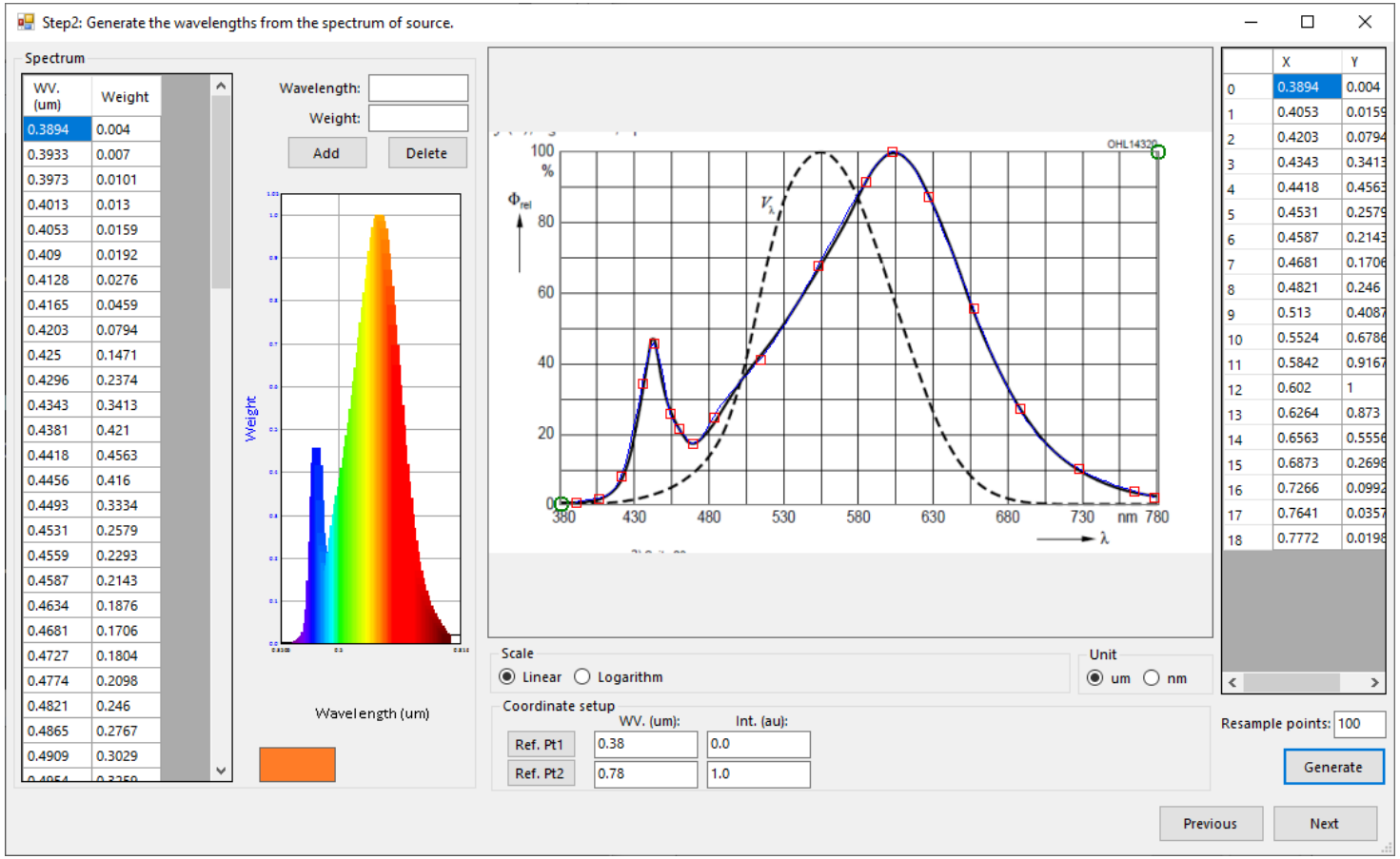
TracePro 2022 22.1

Light Source Builder – Surface Source Property from IES file



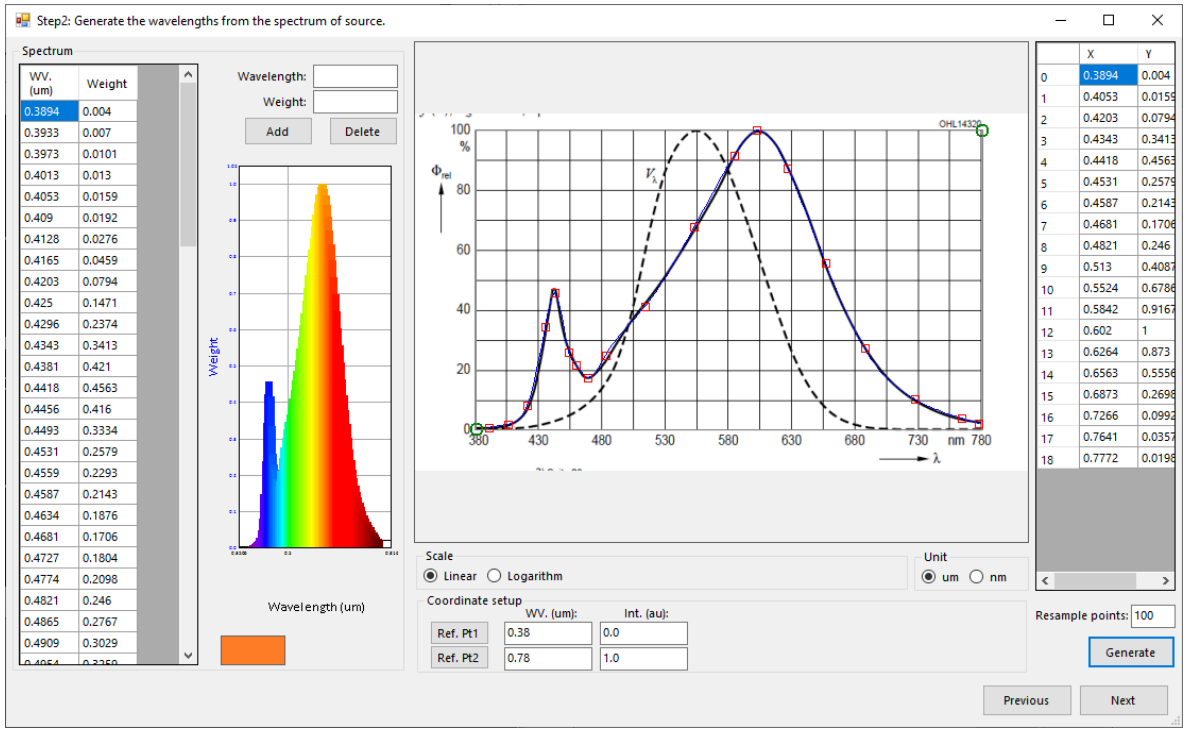
TracePro 2022 22.1

Light Source Builder – Surface Source Property from IES file

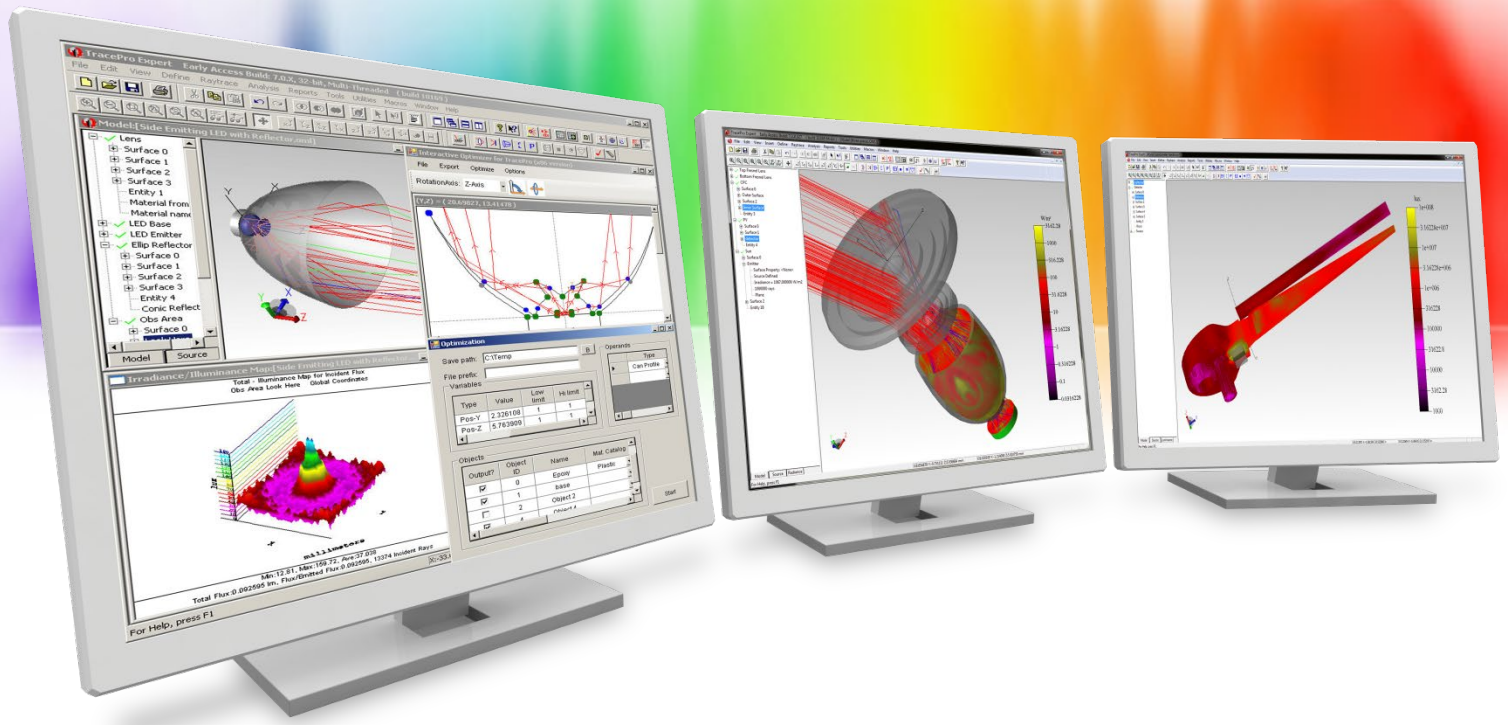


New Light Source Builder

Surface Source Property from IES file



TracePro



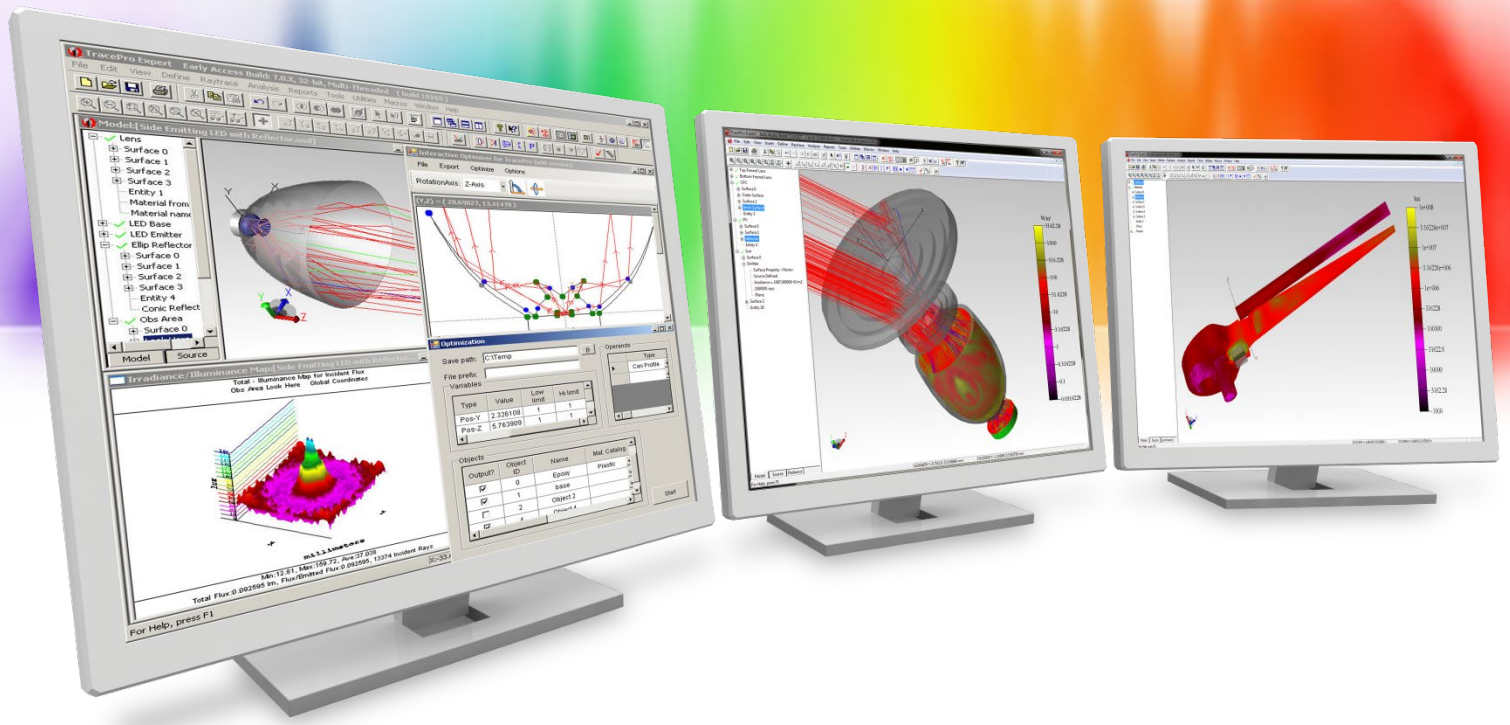
New Features in TracePro 2021 21.5

LAMBDA RESEARCH CORPORATION

TracePro 2021 21.5

- **TracePro**
  - New Stary Light Analyzer utility
- **Interactive Optimizer**
  - New rectangular hole option has been added to the Reflector object type
- **Lighting Toolkit**
  - New regulations have been added
  - Regulations have been updated
- **New Scheme commands**

TracePro



New Features in TracePro 2021 21.4

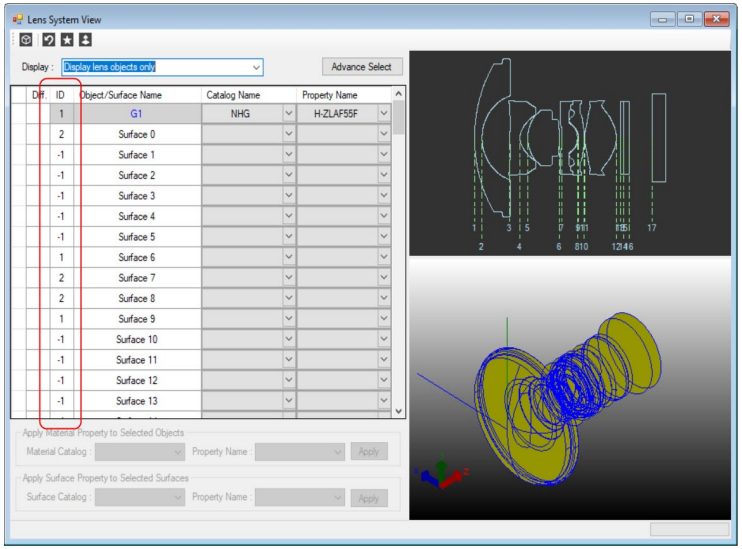
LAMBDA RESEARCH CORPORATION

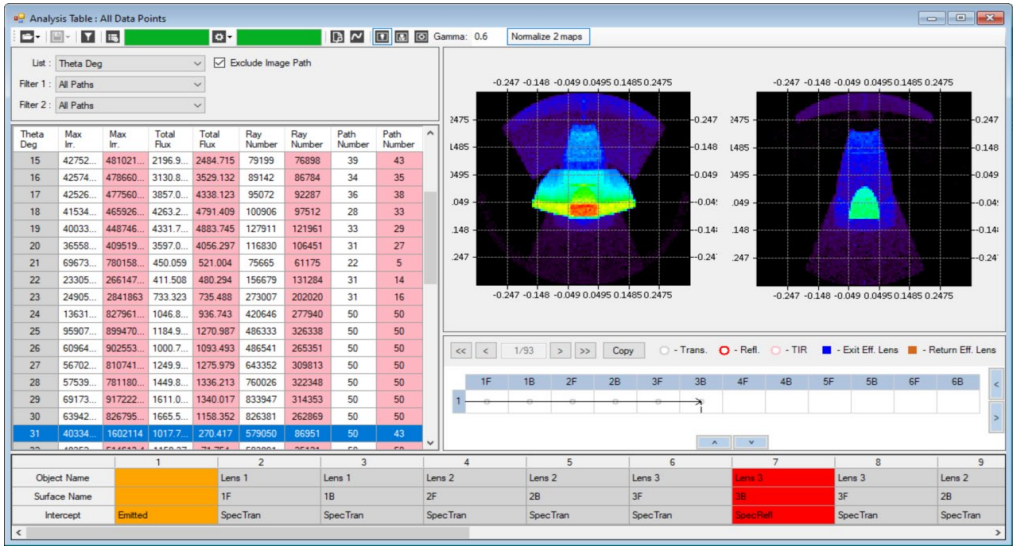
TracePro 2021 21.4

- **TracePro**
  - New Stary Light Analyzer utility
- **Interactive Optimizer**
  - New rectangular hole option has been added to the Reflector object type
- **Lighting Toolkit**
  - New regulations have been added
  - Regulations have been updated
- **New Scheme commands**

TracePro 2021 21.4

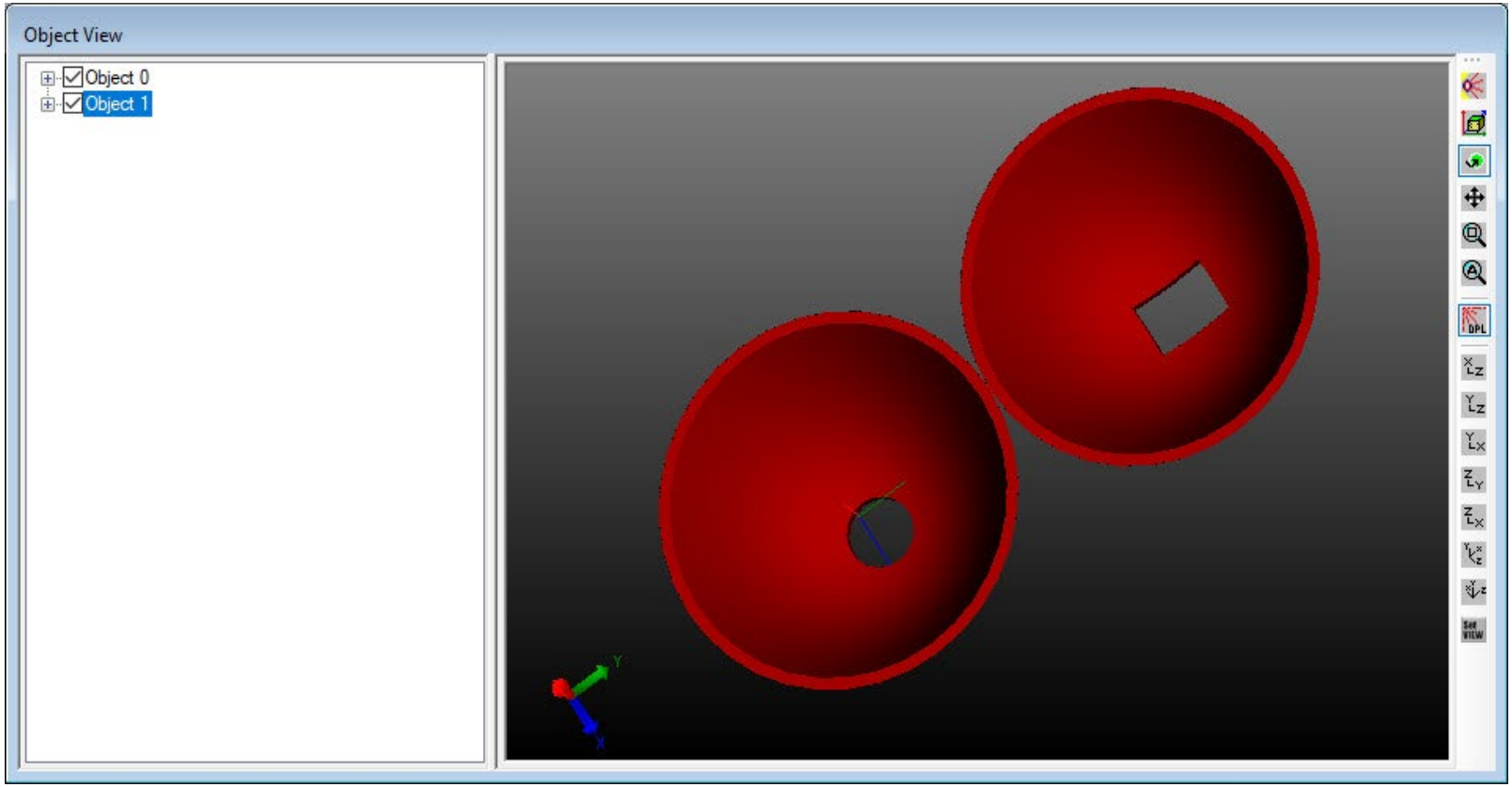
TracePro – A new Stray Light Analyzer utility has been added to TracePro. This utility automates and simplifies many of the steps necessary to do a stray light analysis.





TracePro 2021 21.4

Interactive Optimizer – The Reflector object type in the Interactive Optimizer has been updated so that a rectangular hole can be added to the reflector in addition to the previous circular option.



TracePro 2021 21.4

Lighting Toolkit – Eight new regulation tables have been added

- ECE R7 2019
- ECE R119 (2014)
- ECE R6 2008
- SAE J588
- SAE J222
- SAE J592
- SAE J594
- SAE J845

TracePro 2021 21.4

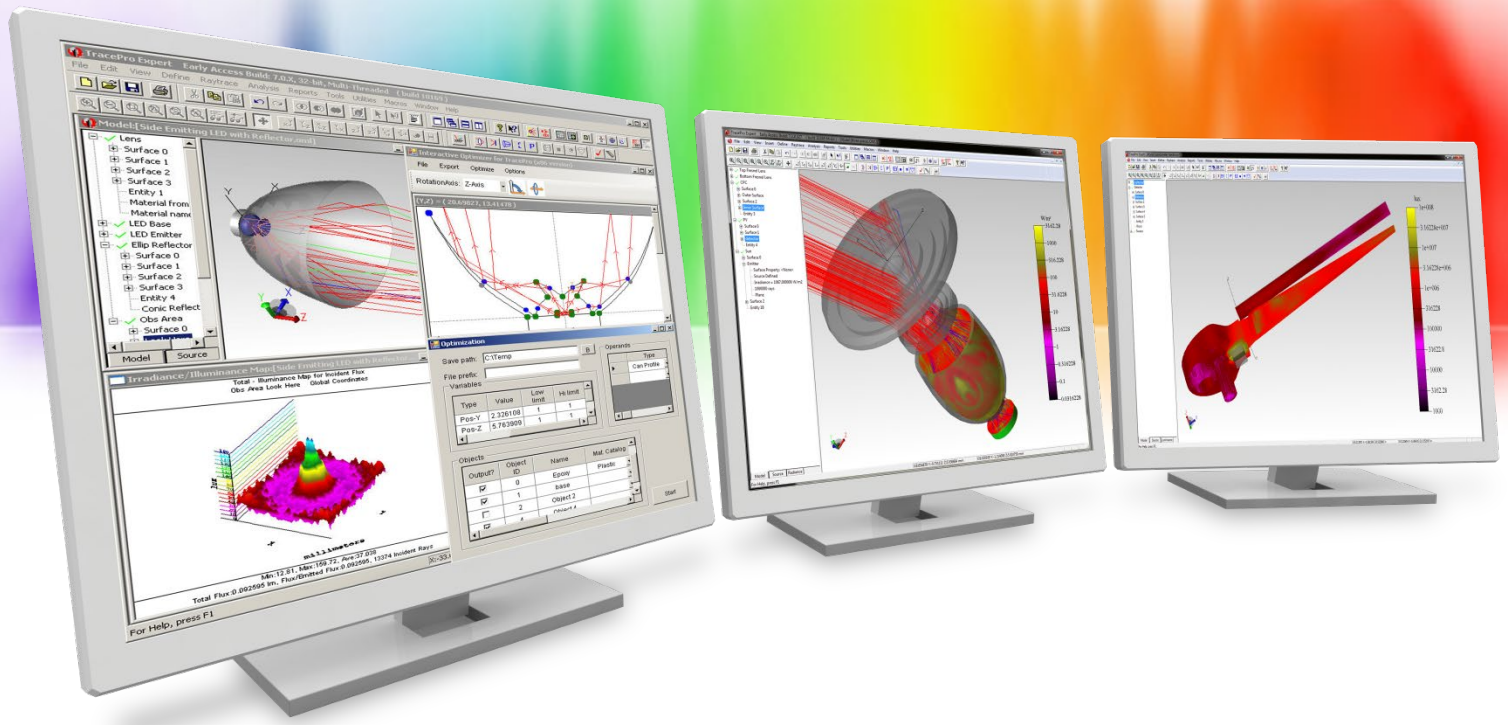
Lighting Toolkit – Six regulation tables have been updated

- ECE R6
- ECE R3
- ECE R91
- ECE R98
- ECE R112 (2010, 2012)
- FMVSS 108 Figures 17, 27, 28

TracePro 2021 20.3

- **New Scheme commands**
  - geometry:get-block-parameters
  - modify:primitive-block

TracePro



New Features in TracePro 2021 21.3

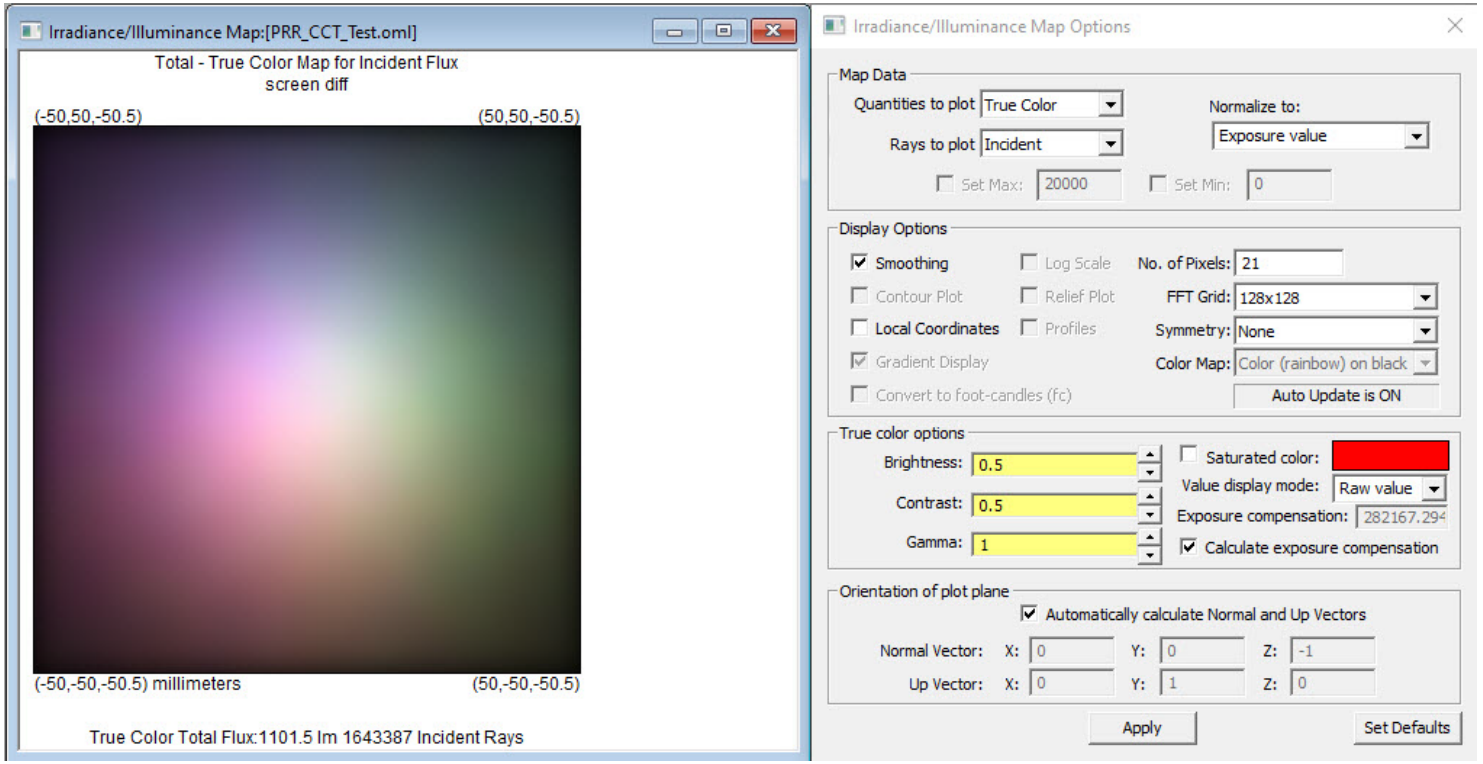
LAMBDA RESEARCH CORPORATION

TracePro 2021 21.3

- **TracePro**
  - Exposure Compensation for Photorealistic Rendering and TrueColor plots
- **Lighting Toolkit**
  - New ECE regulations have been added to the Lighting Toolkit
- **Analysis Toolkit**
  - A polygon analysis shape for luminance analysis has been added
- **New Scheme commands**

TracePro 2021 21.3

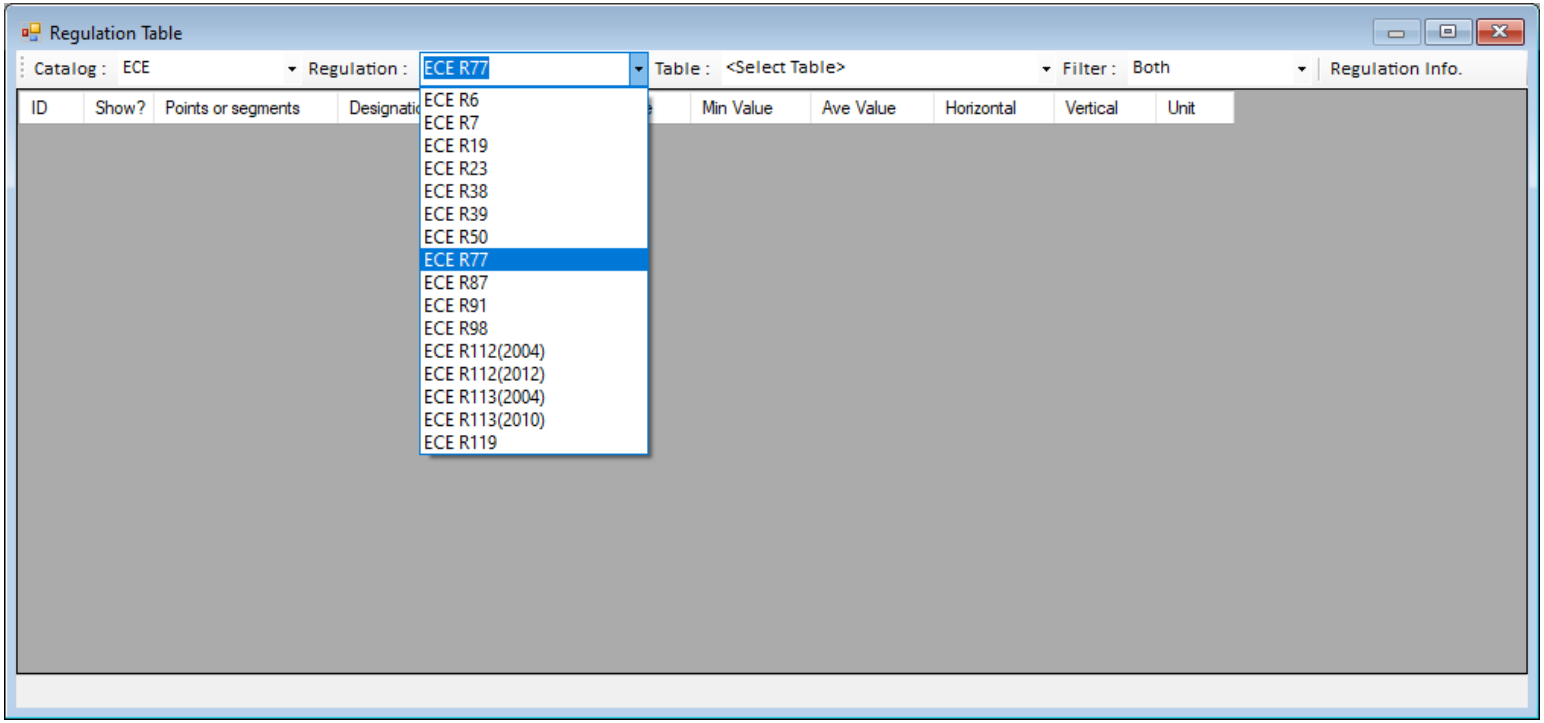
TracePro – A new Exposure Compensation option has been added to the Photorealistic Rendering and TrueColor Plots. This allows normalizing the color to a saturated white or monochromatic color. There is also a new option to normalize to the highest color in the plot.



TracePro 2021 21.3

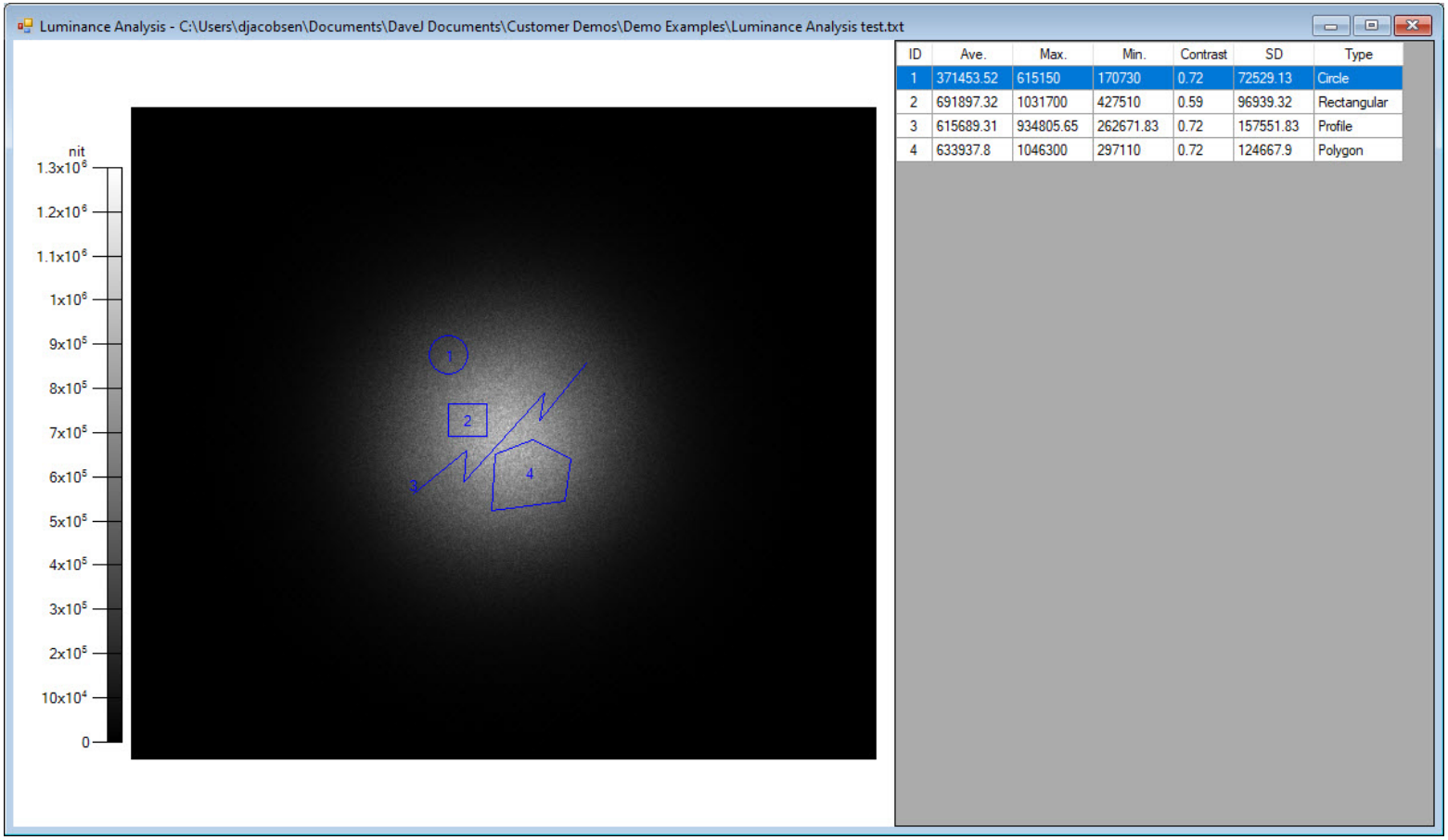
Lighting Toolkit – Three new ECE regulation tables

- ECE R91 side marker lamps
- ECE R119 cornering lamps
- ECE R77 parking lamps



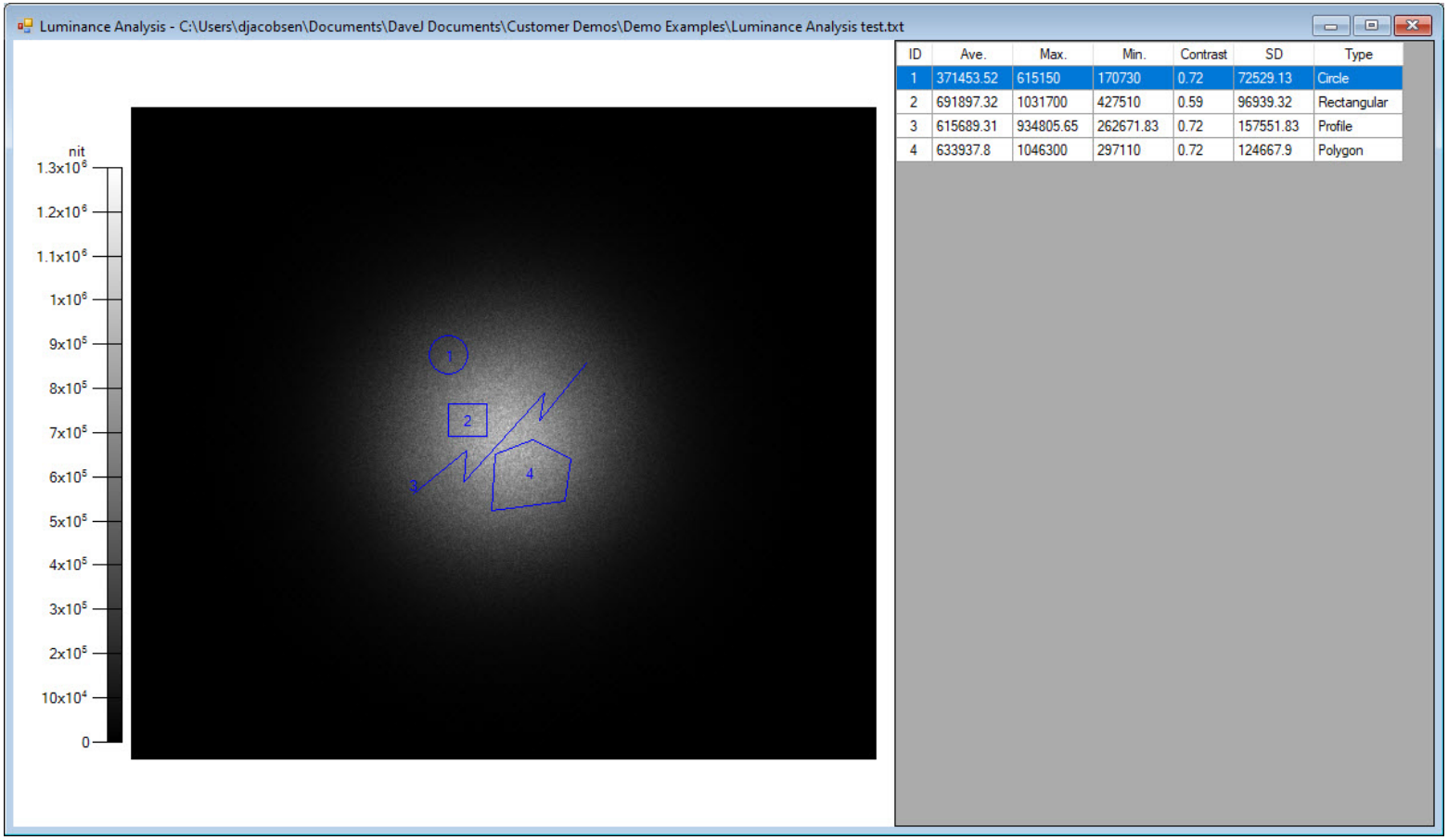
TracePro 2021 21.3

Analysis Toolkit – A new analysis shape, polygon, has been added to the Luminance Analysis tool in the Analysis Toolkit



TracePro 2021 21.3

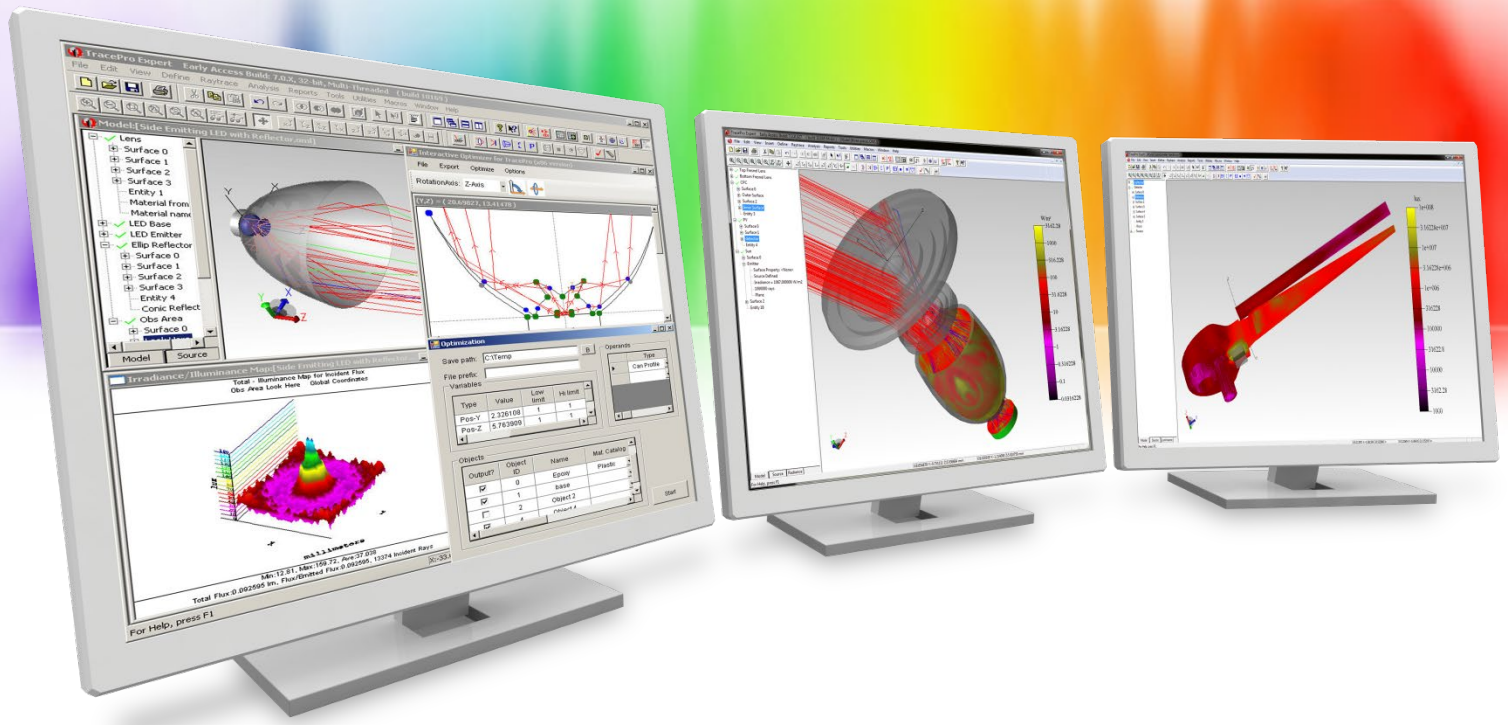
Analysis Toolkit – A new analysis shape, polygon, has been added to the Luminance Analysis tool in the Analysis Toolkit



TracePro 2021 20.3

- **New Scheme commands**
  - New Scheme commands have been added
    - geometry:make-circular-edge-3pt
    - geometry:make-circular-edge

TracePro



New Features in TracePro 2021 21.2

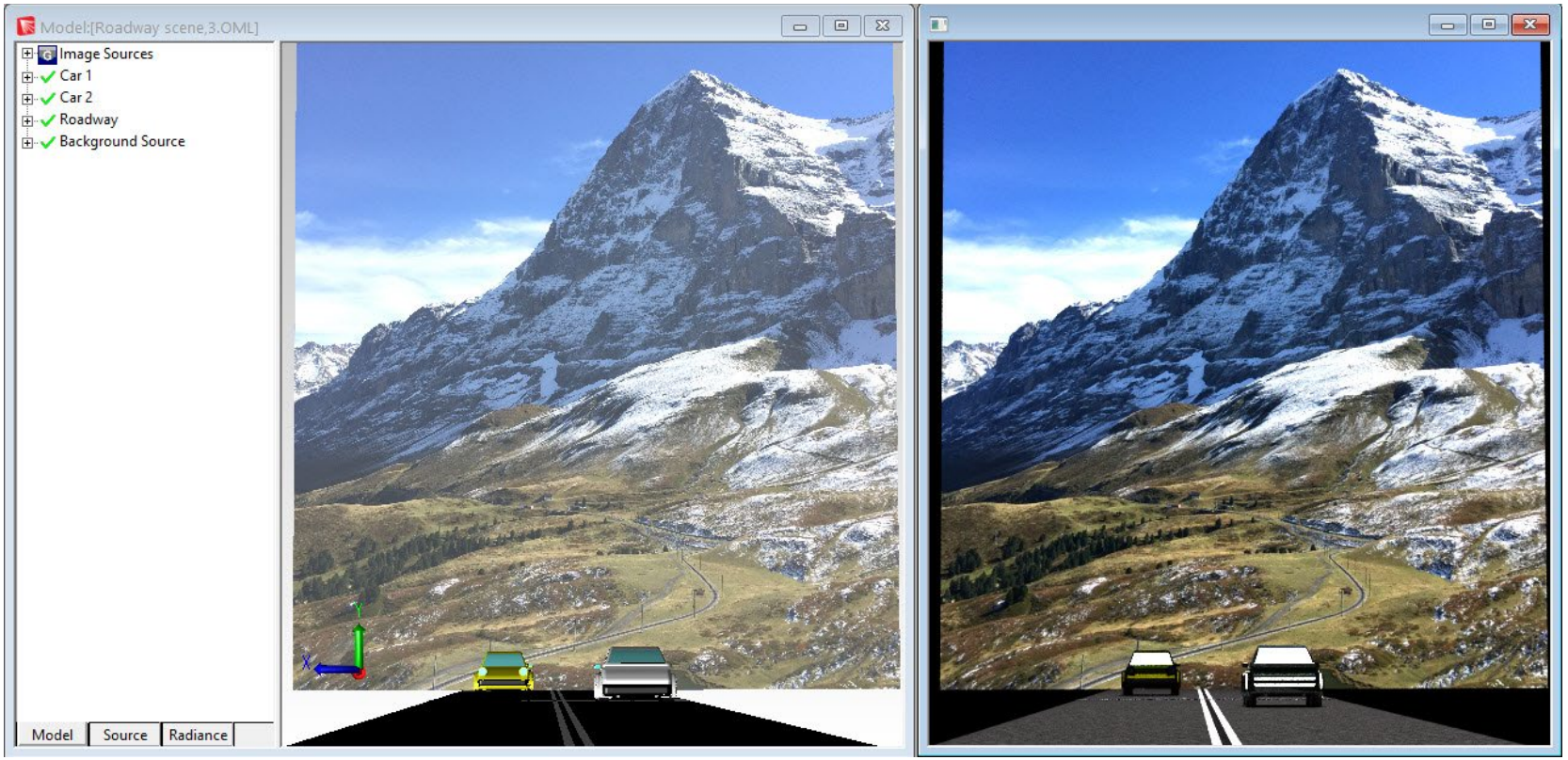
LAMBDA RESEARCH CORPORATION

TracePro 2021 21.2

- **TracePro**
  - New source type - Image Source
  - Updated CGDM glass catalogs

TracePro 2021 21.2

TracePro – A new source type, the Image Source has been added. An image file such as a JPEG or Bitmap file can now be used as a source in TracePro.



TracePro 2021 21.2

TracePro – A new source type, the Image Source has been added. An image file such as a JPEG or Bitmap file can now be used as a source in TracePro.

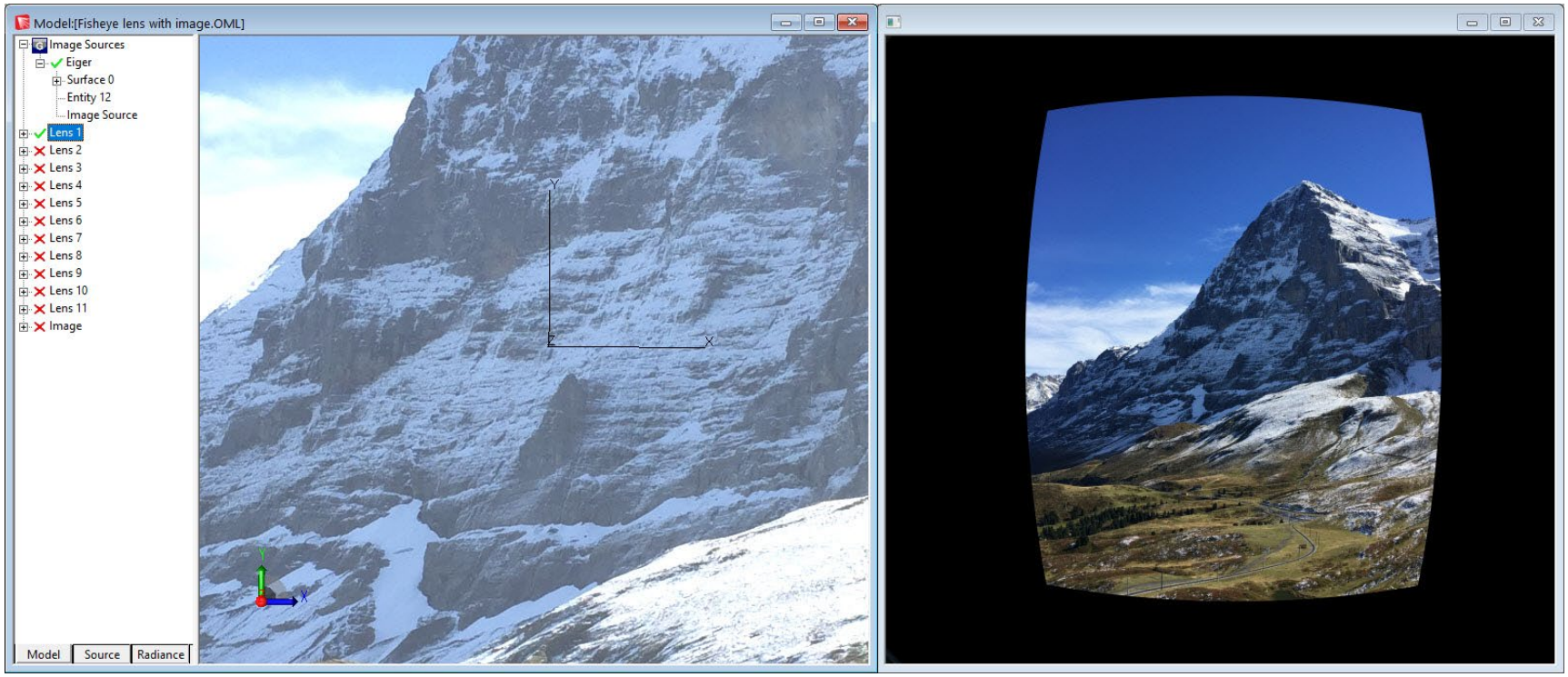
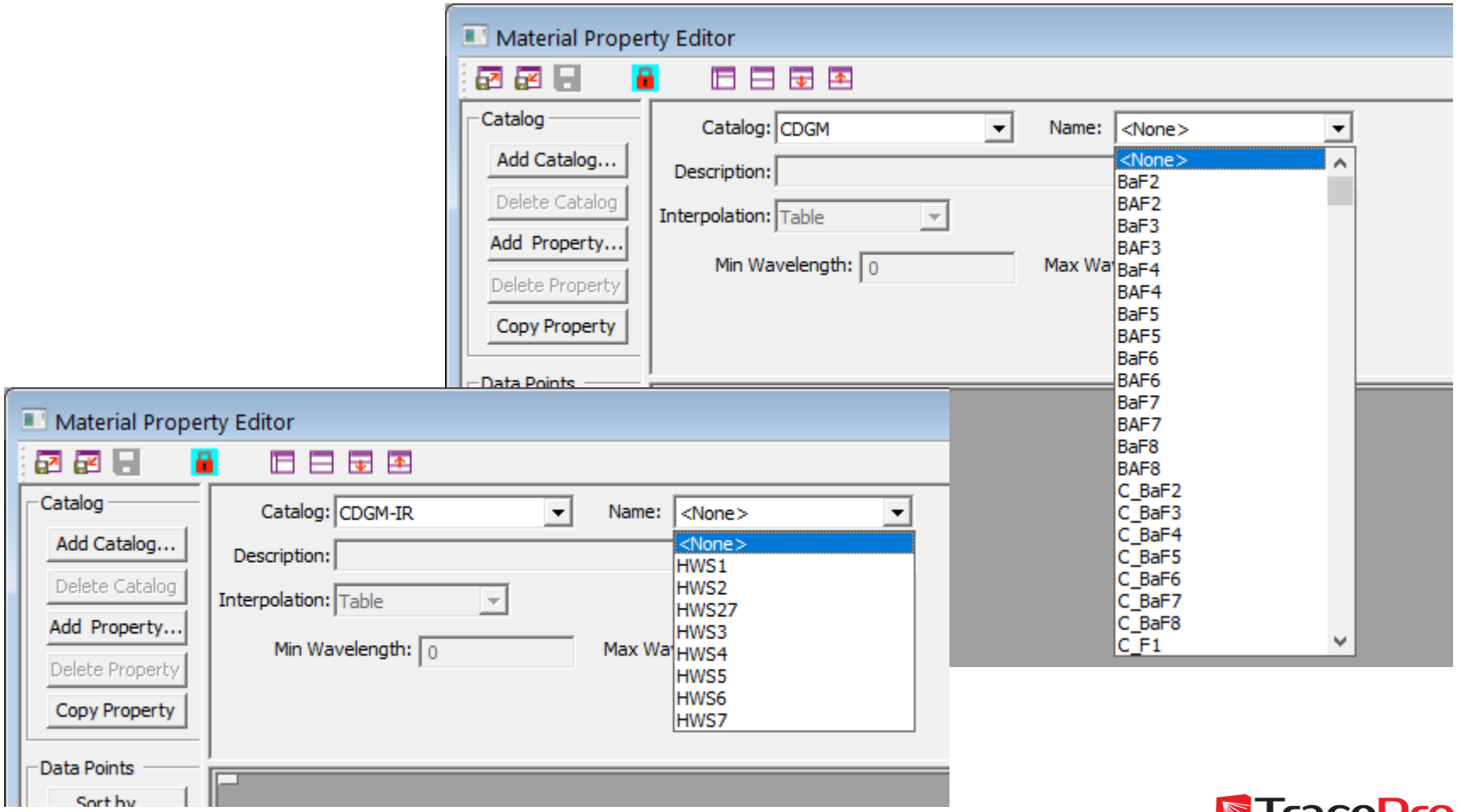


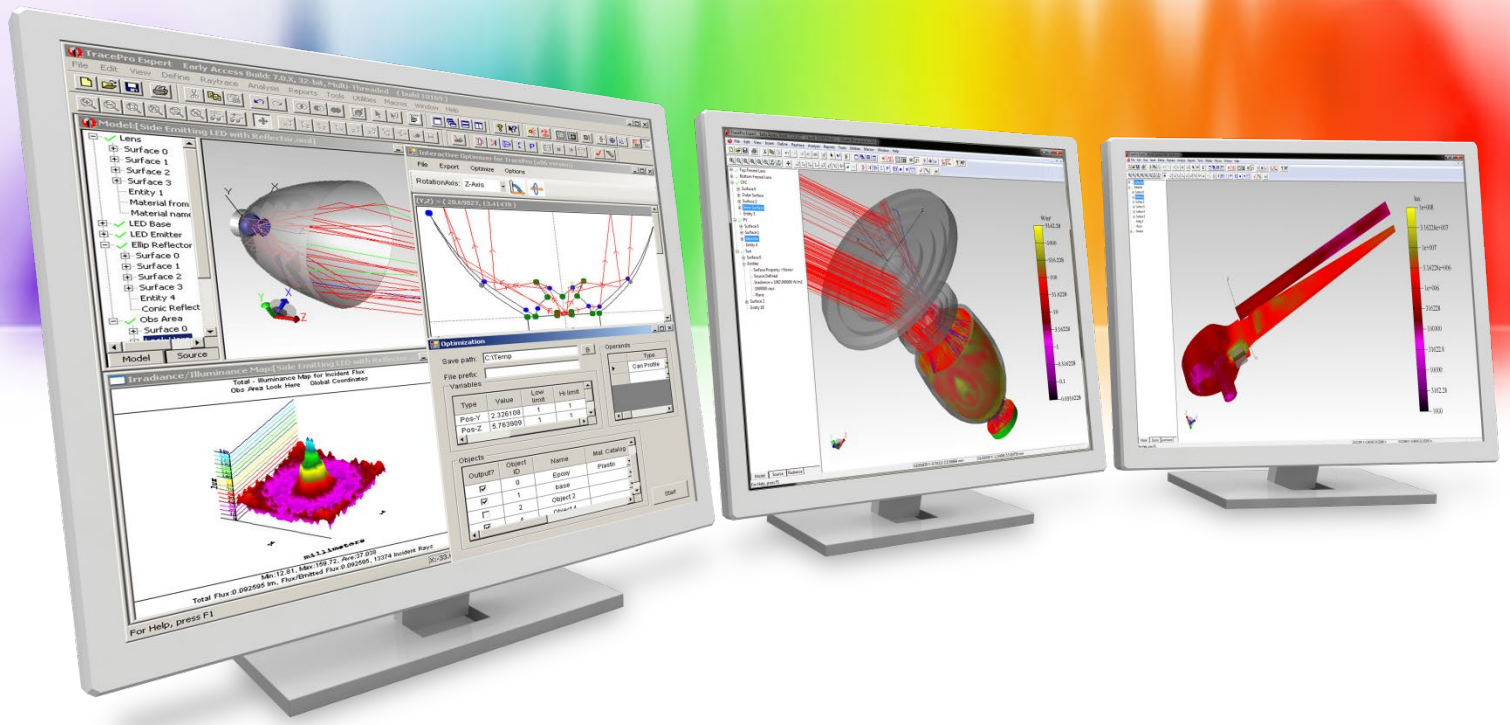
Image as viewed through a wide angle lens

TracePro 2021 21.2

TracePro – The CDGM glass catalog as been updated to reflected the latest data. A new CDGM-IR catalog of IR glass has been added.



TracePro



New Features in TracePro 2021 21.1

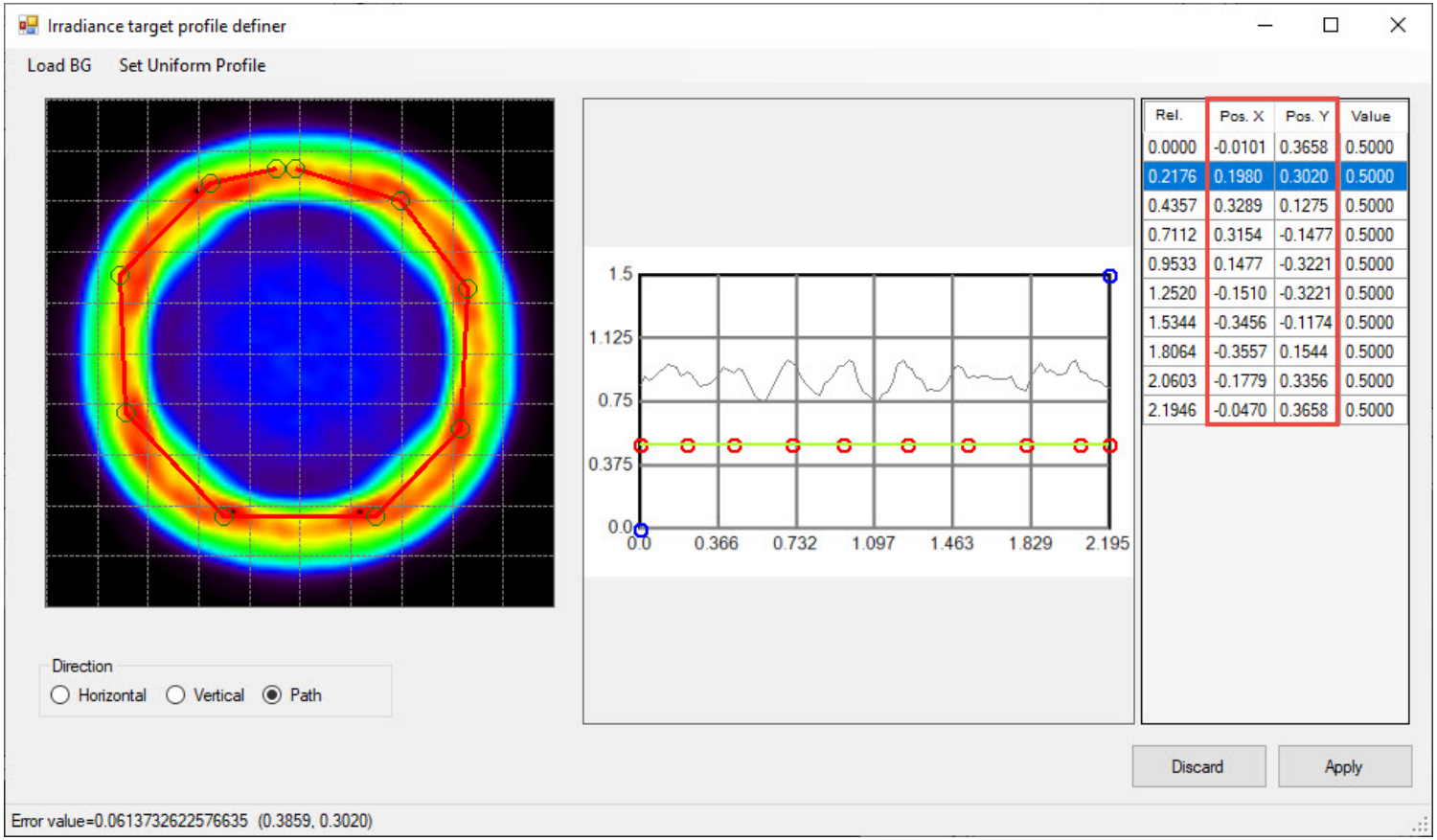
LAMBDA RESEARCH CORPORATION

TracePro 2021 21.1

- **Interactive Optimizer**
  - New capability for editing values of points in the Irradiance Profile operand
- **Lighting Toolkit**
  - New FMVSS 108 regulations have been added
- **New Scheme command**

TracePro 2021 20.1

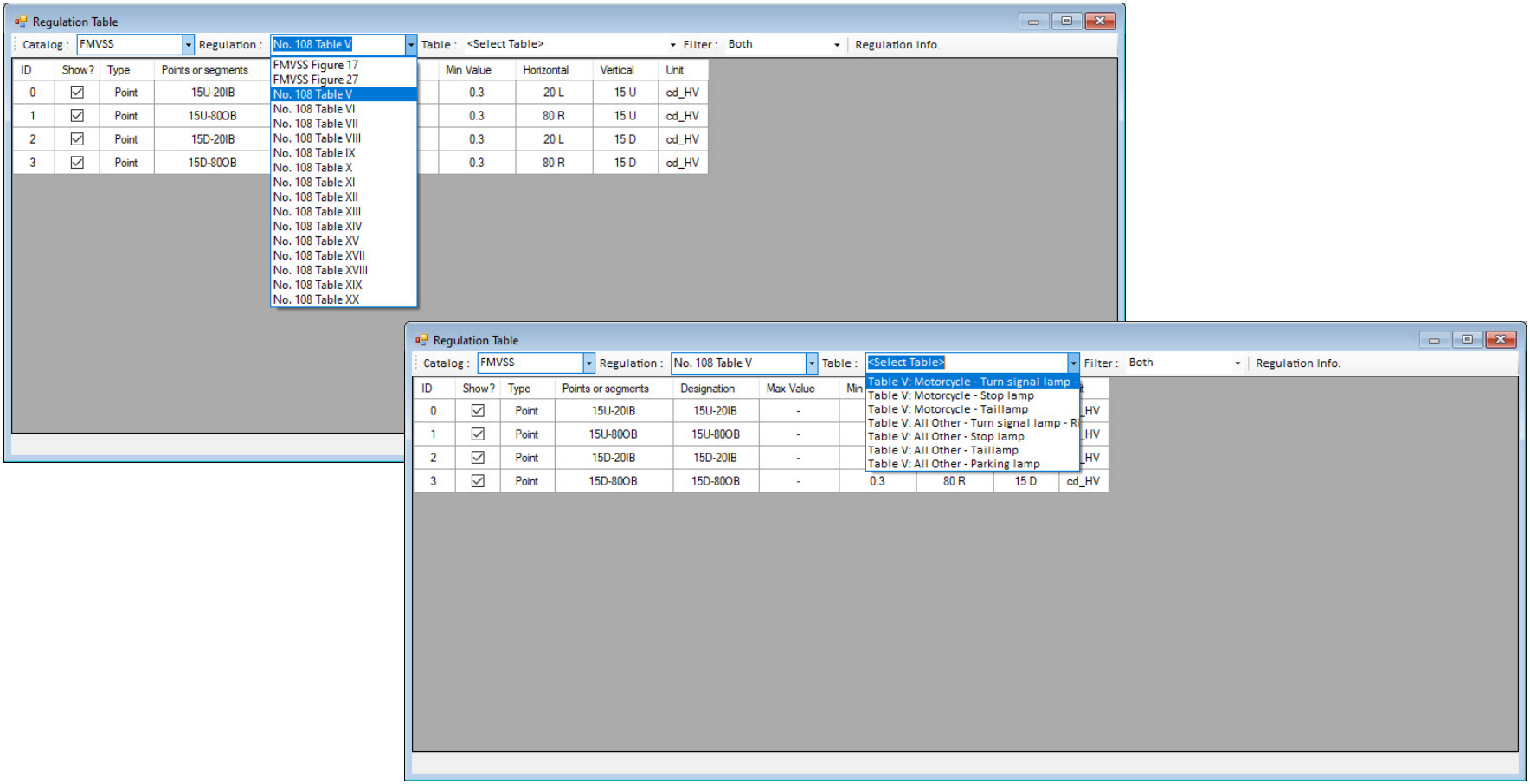
Interactive Optimizer – The capability to edit the values of points when defining the Irradiance Profile operand has been added



TracePro 2021 20.1

➢ Lighting Toolkit

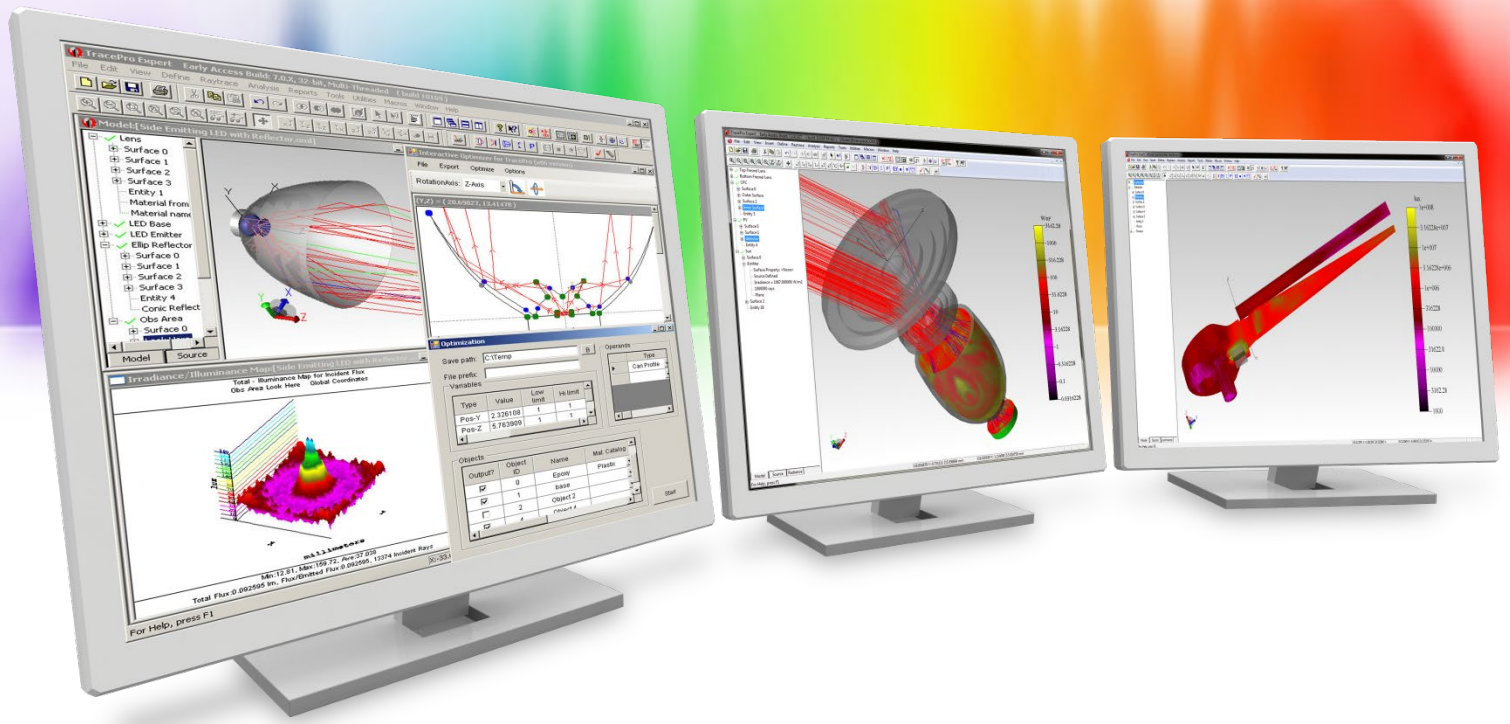
- ➢ 62 FMVSS 108 regulations have been added



TracePro 2021 20.1

- **New Scheme command**
  - New Scheme command has been added
    - edit:rotate-objects

TracePro



New Features in TracePro 2020 20.6

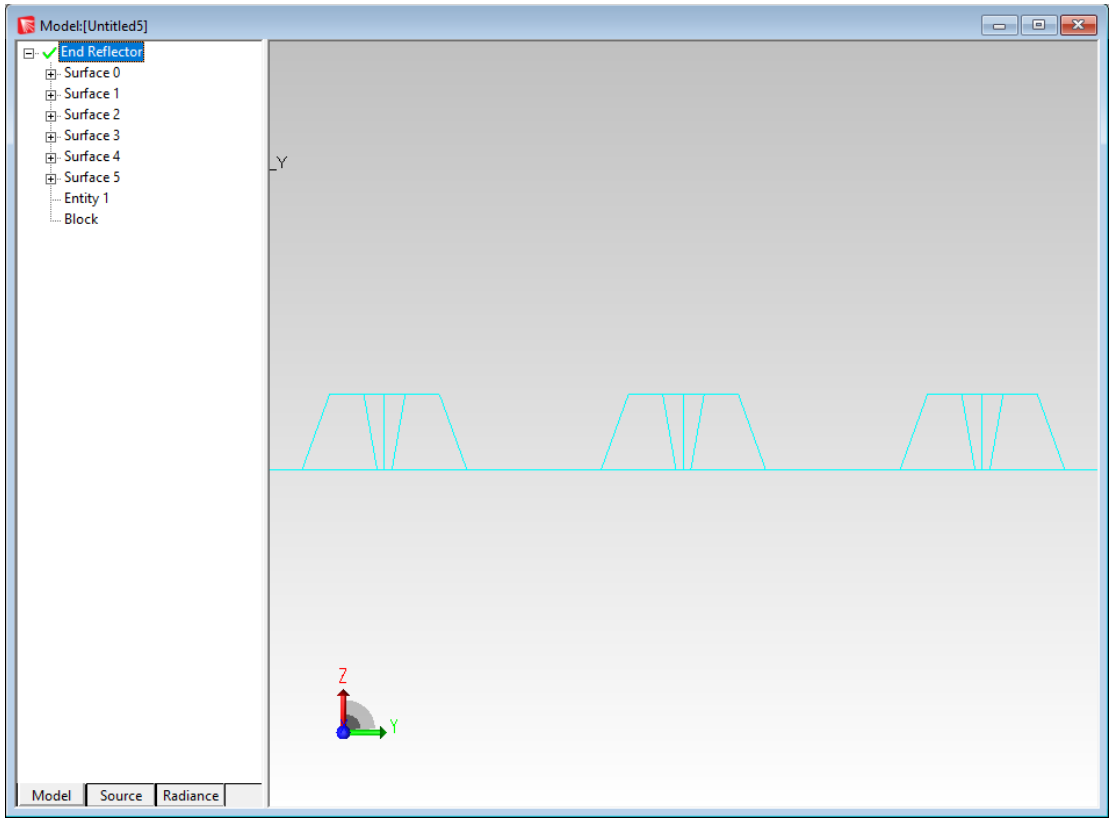
LAMBDA RESEARCH CORPORATION

TracePro 2020 20.6

- **TracePro**
  - New RepTile geometry shape – Circular Hip Roof
- **Lighting Toolkit**
  - New SAE J595 regulations have been added
- **Surface Property Generator**
  - New Import Data options have been added
- **New Scheme commands**

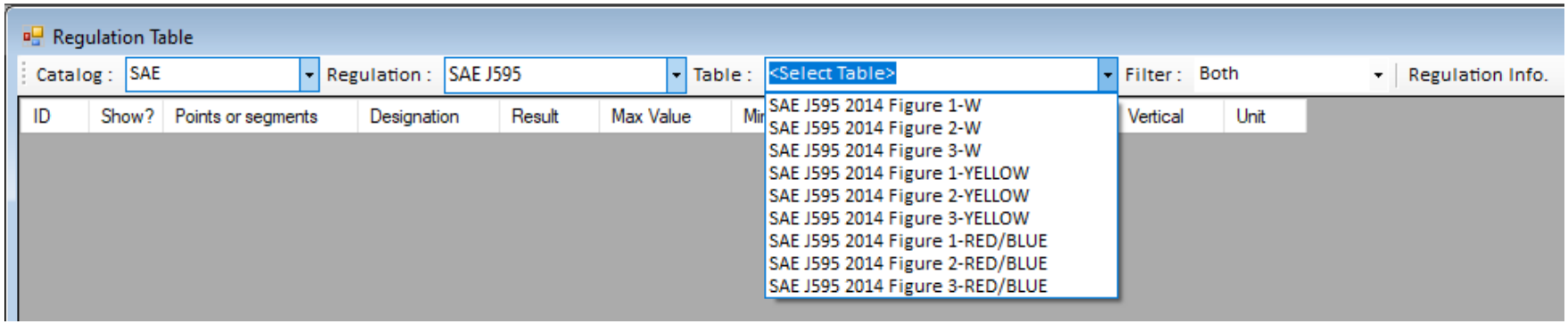
TracePro 2020 20.6

- **TracePro**
  - New RepTile shape – Circular Hip Roof



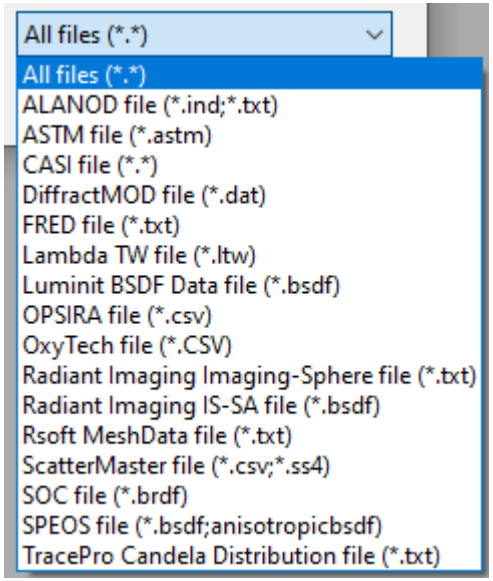
TracePro 2020 20.6

- **Lighting Toolkit**
  - 9 SAE J595 regulations have been added



TracePro 2020 20.6

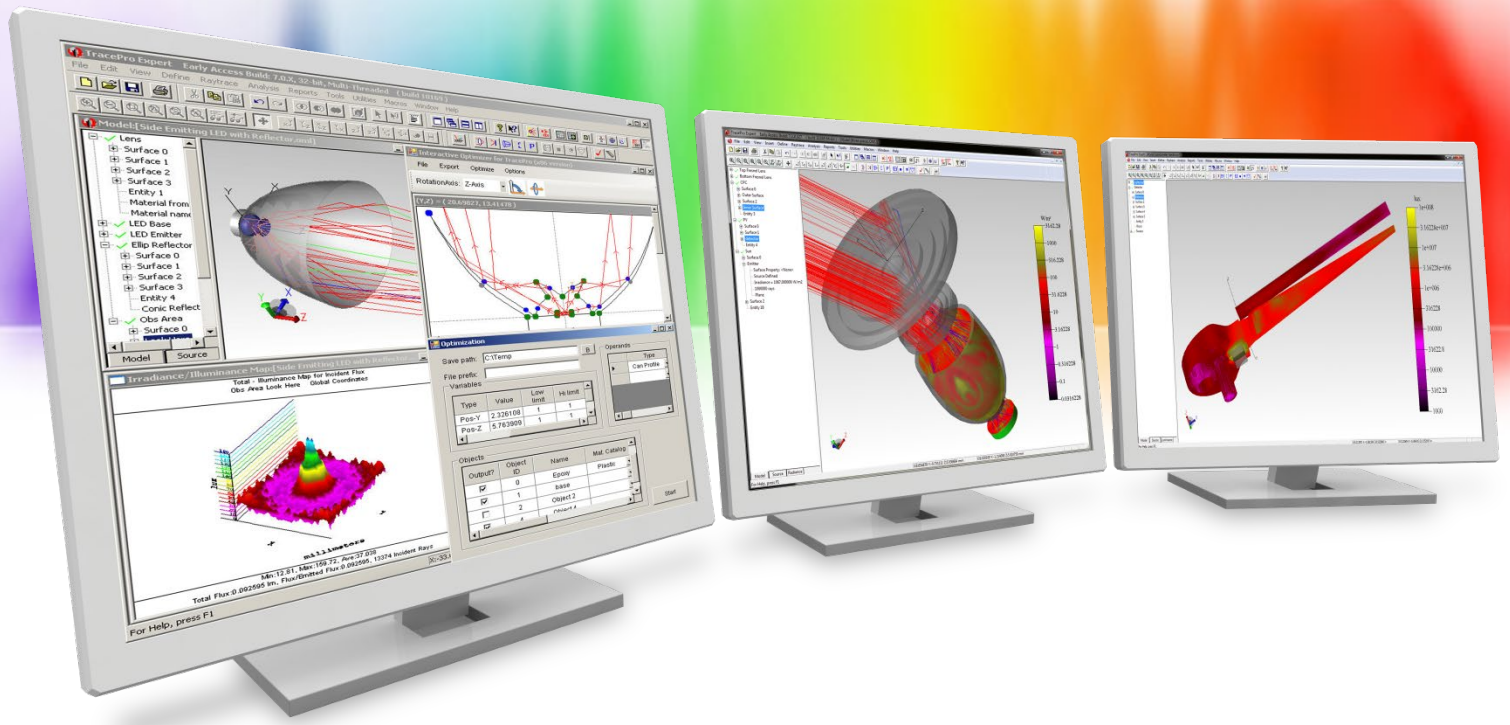
- **Surface Property Generator**
  - Import of 3 new data types is now supported
    - ASTM file format
    - Rsoft NeshData format
    - OPTIS – brdf surface file v3.0



TracePro 2020 20.6

- **Scheme commands**
  - New Scheme commands have been added
    - edit:copy-sources
    - edit:paste-sources
    - geometry:primitive-block
    - geometry:primitive-sphere
  - New arguments for edit:cut, edit:copy, and edit:move Scheme commands have been added

TracePro



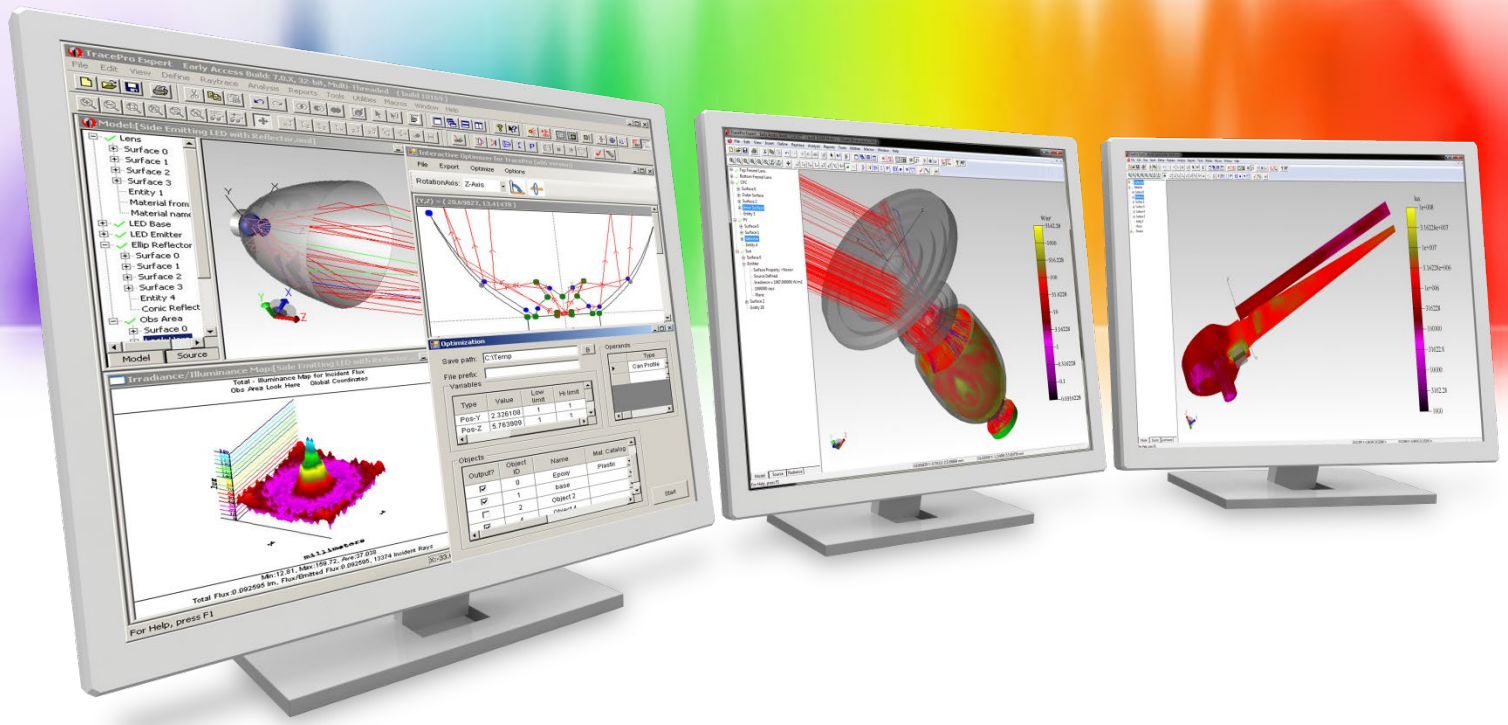
New Features in TracePro 2020 20.5

LAMBDA RESEARCH CORPORATION

TracePro 2020 20.5

- **TracePro**
  - New Scheme commands for setting and getting the current setting for Collect Path Sort Data
    - (raytrace:set-collect-path-sort-data-on)
    - (raytrace:set-collect-path-sort-data-off)
    - (raytrace:get-collect-path-sort-data?)

TracePro



New Features in TracePro 2020 20.4

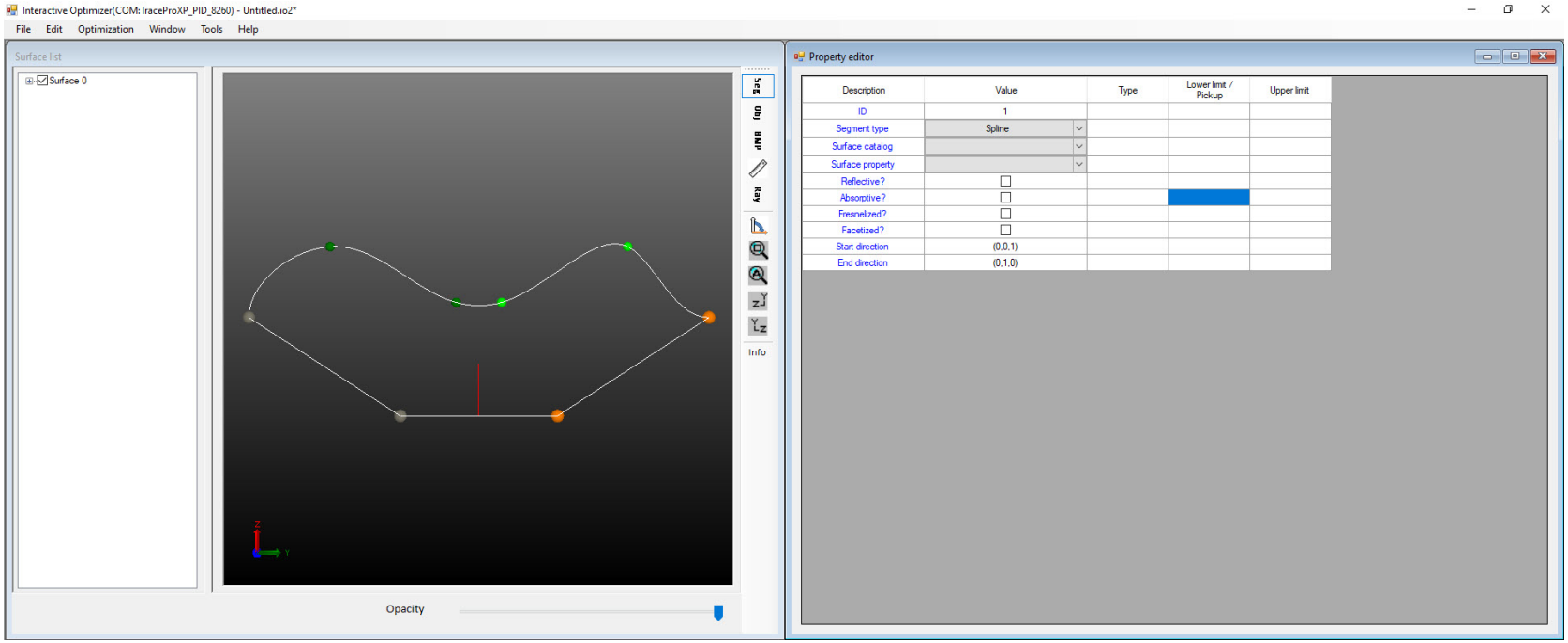
LAMBDA RESEARCH CORPORATION

TracePro 2020 20.4

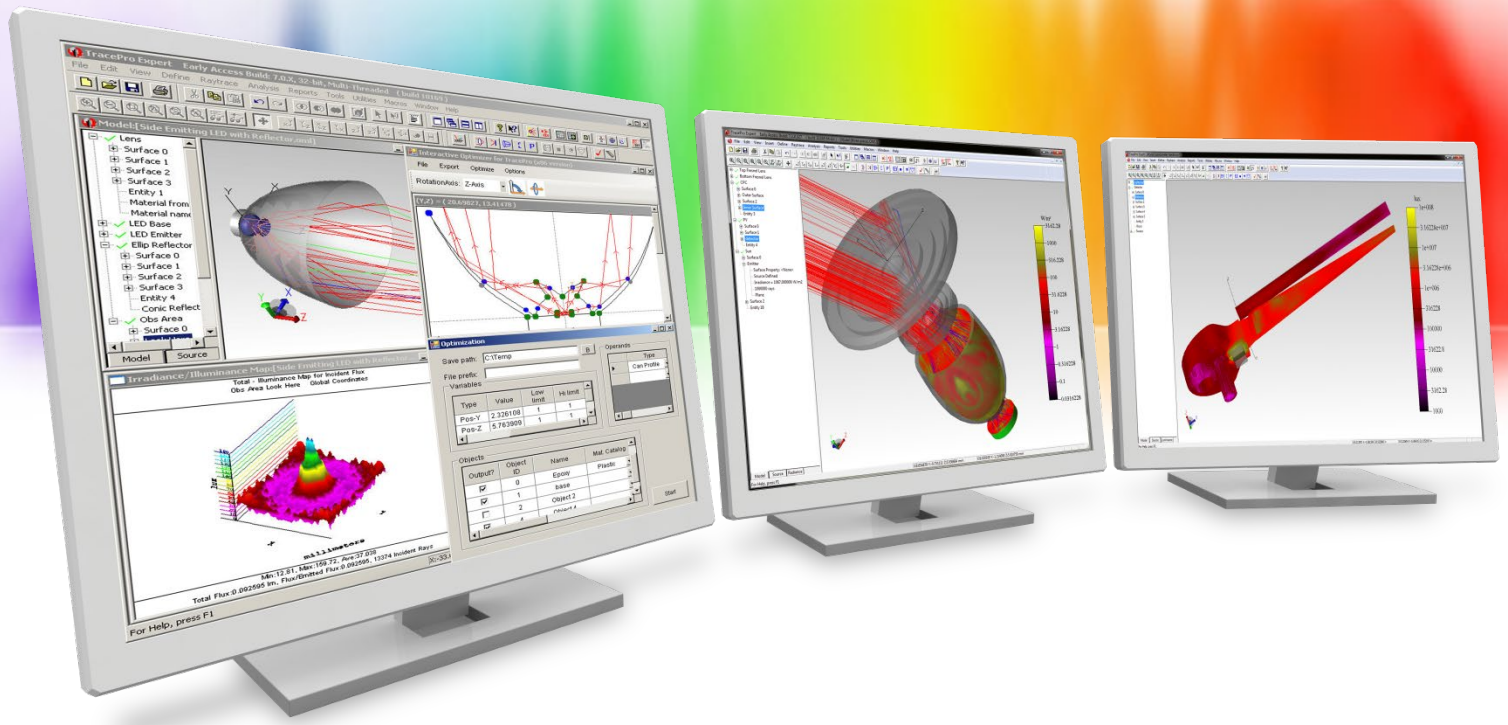
- **Interactive Optimizer**
  - Two new properties for the Spline segment: Start direction and End direction

TracePro 2020 20.4

Interactive Optimizer – New Start and End directions can be used to control the terminal slope of a generated spline curve



TracePro



New Features in TracePro 2020 20.3

LAMBDA RESEARCH CORPORATION

TracePro 2020 20.3

- **TracePro**
  - New arguments for geometry:baffle-vane Scheme command
  - New Scheme command modify:baffle-vane

TracePro 2020 20.3

- **TracePro**
  - New arguments for the geometry:baffle-vane Scheme command have been added. The user can now enter values for the angles in degrees and apply a name to the baffle.

geometry:baffle-vane

Action:	Creates a TracePro baffle vane.
Syntax:	(**geometry:baffle-vane** app-radius tube-radius [conical-angle=45] [grnd-angle=30] [thickness=0.1] [knife-radius=0.01] [center=(0,0,0)] [rot-x=0] [rot-y=0] [rot-z=0] [degrees=#f] [name=""])
Arg Types:	app_radius real tube_radius real conical_angle real grnd_angle real thickness real knife_radius real center position rot_x real rot_y real rot_z real degrees boolean name string
Returns:	entity
Errors:	None
Description:	The baffle vane is created based on the definitions in TracePro. The app_radius (Aperture Radius) and tube_radius (Tube Radius) are required. The conical-angle default to 45 degrees and the relative Ground Angle (grnd-angle) defaults to 30 degrees. The thickness default in .1 mm and the knife-radius has a default of .01 mm. The baffle vane will be placed at the global origin without any rotation. Note that all the angles must be entered in Radians unless degrees is set to true.
Limitations:	Not applicable
Example:	

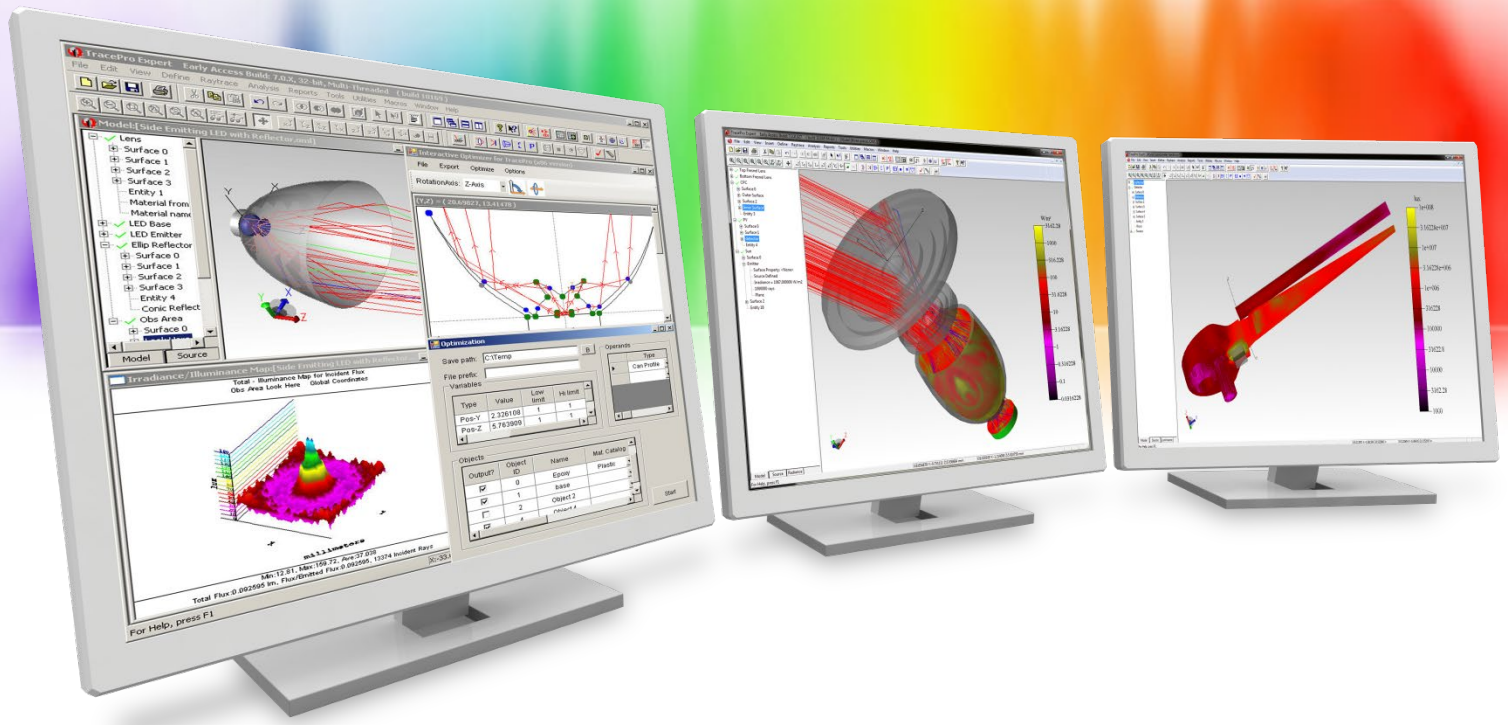
TracePro 2020 20.3

- **TracePro**
  - A new Scheme command modify:baffle-vane has been added

modify:baffle-vane

Action:	Modifies a TracePro baffle vane.
Syntax:	(**modify:baffle-vane** body app-radius [tube-radius] [conical-angle] [grnd-angle] [thickness] [knife-radius] [center] [rot-x] [rot-y] [rot-z] [degrees=#f] [name])
Arg Types:	body entity app_radius real tube_radius real conical_angle real grnd_angle real thickness real knife_radius real center position rot_x real rot_y real rot_z real degrees boolean name string
Returns:	entity
Errors:	None
Description:	The arguments are based on the baffle vane parameters in TracePro. The parameters default to the current values for the body. Only the app_radius (Aperture Radius) is required. All properties will be preserved provided that the modified body has the same number of faces as the original. Note that all the angles must be entered in Radians unless degrees is set to true.
Limitations:	Not applicable
Example:	

TracePro



New Features in TracePro 2020 20.2

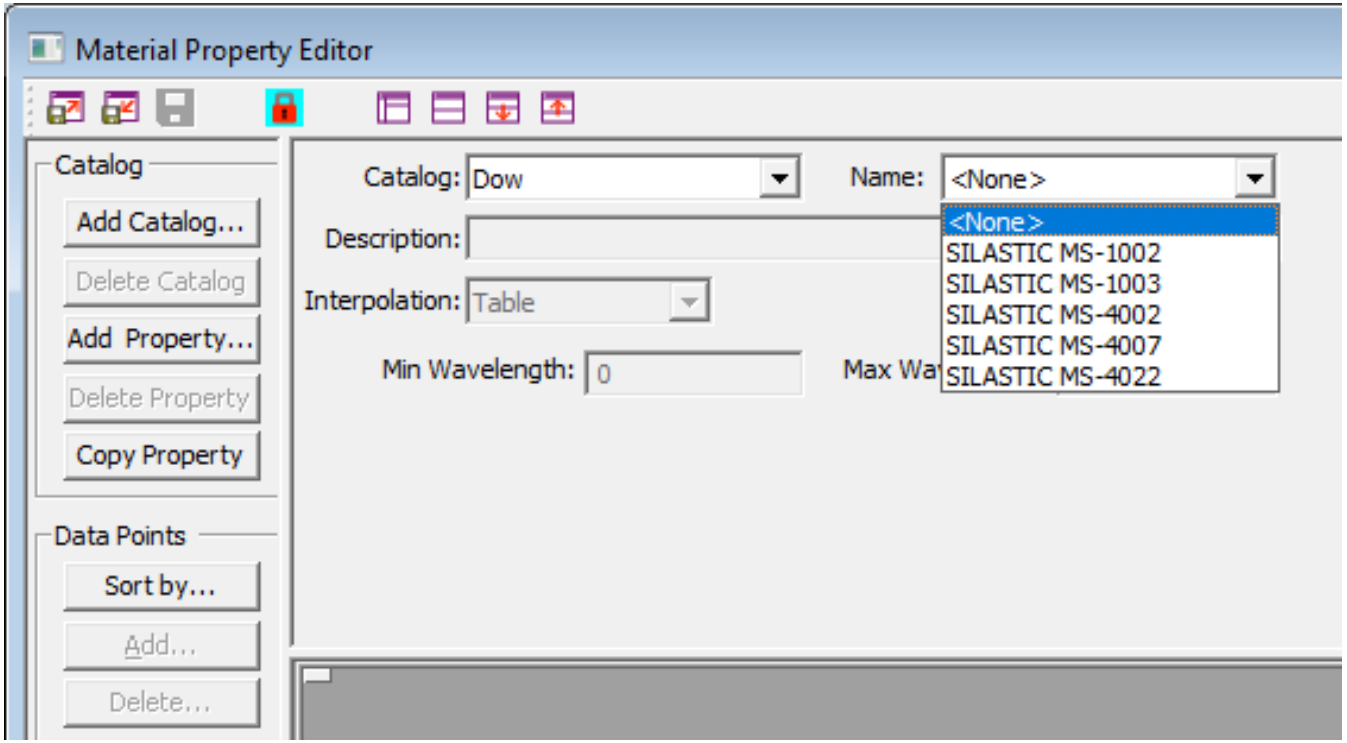
LAMBDA RESEARCH CORPORATION

TracePro 2020 20.2

- **TracePro**
  - New Material Property catalog for Dow Silastic moldable silicone materials
- **Texture Optimizer II**
  - New capability for a random dot distribution
  - New capability for smoothing the dot distribution
  - New tool to measure Dot spacing
- **Interactive Optimizer**
  - Added ability for viewing the TracePro model in the Interactive Optimizer
  - New capability to locate the position, normal, and uv coordinates of an existing model
  - New simplified capability the marked trajectory information above in an After-scheme macro

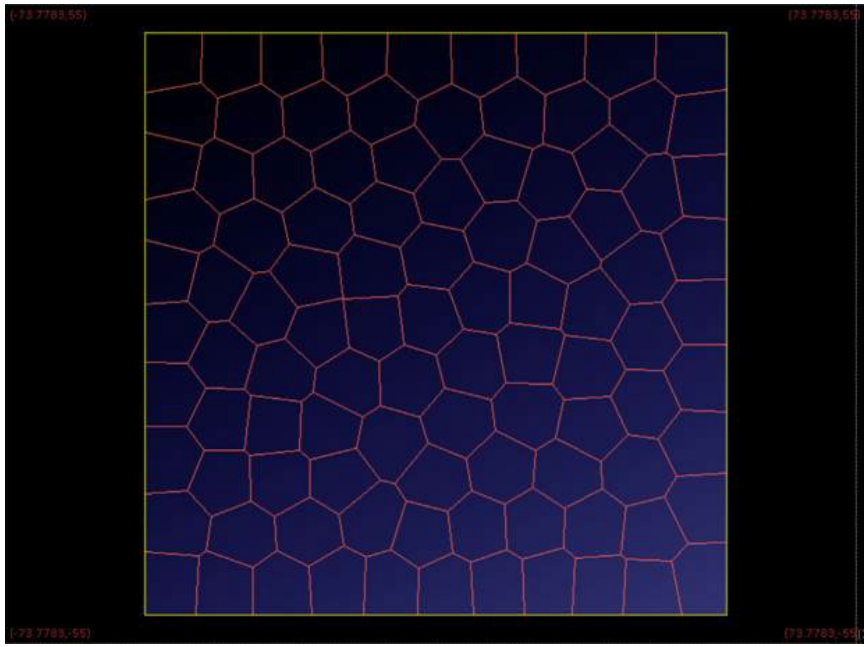
TracePro 2020 20.2

TracePro – A new catalog of Dow Silastic moldable silicone has been added. User's can updated their catalogs in TracePro by going to: Help->Update Property Data

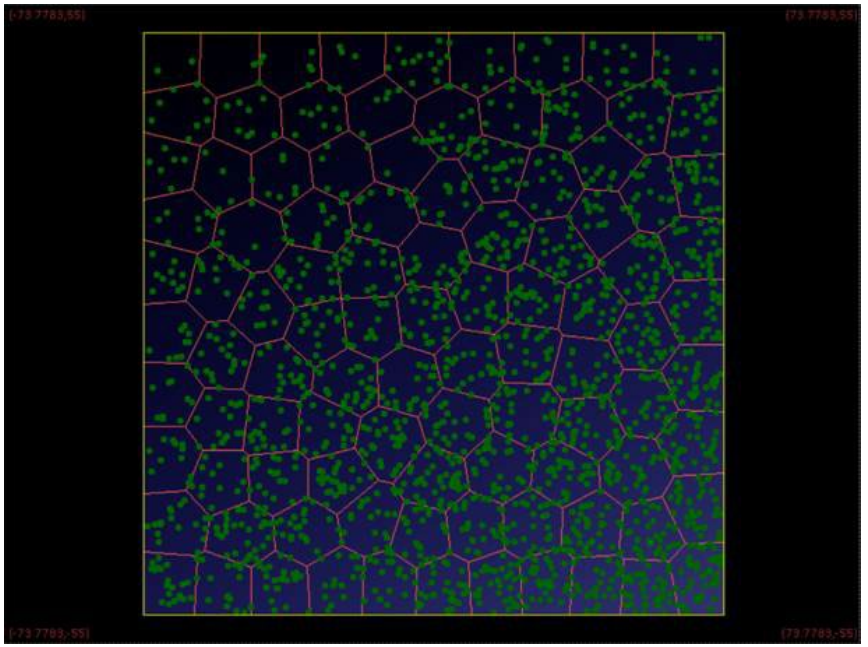


TracePro 2020 20.2

Texture Optimizer II – Two methods of adding a random dot pattern have been added: using cell densities and using a density map



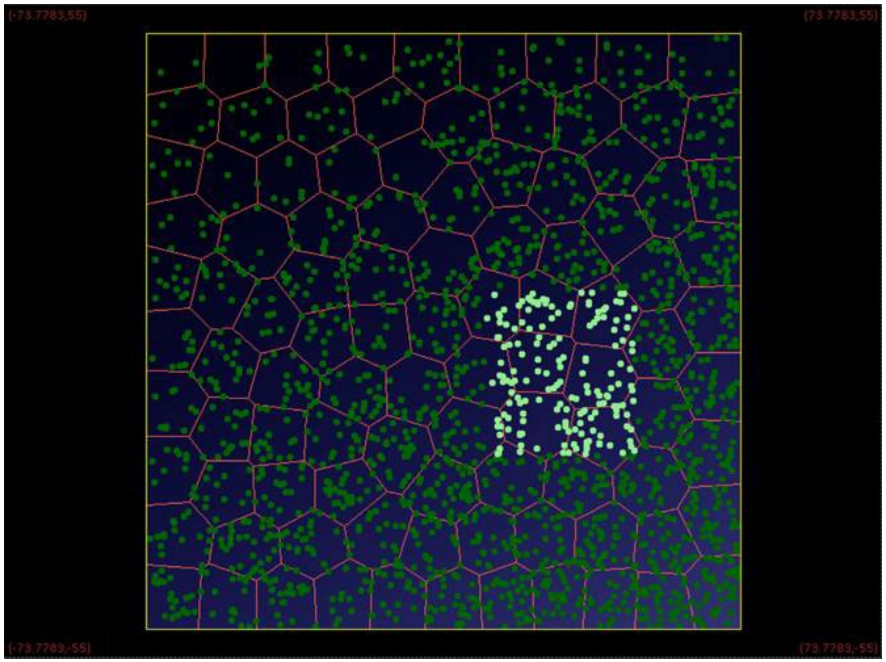
Varying density map



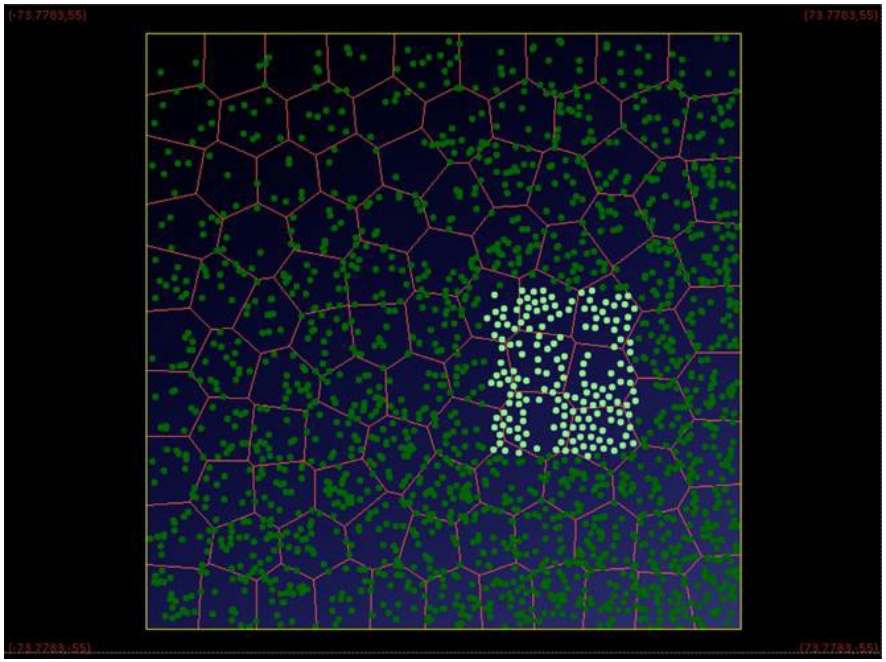
Random dots using density map

TracePro 2020 20.2

Texture Optimizer II – The distribution of the dots can be smoothed using the Molecular Dynamics Simulation approach



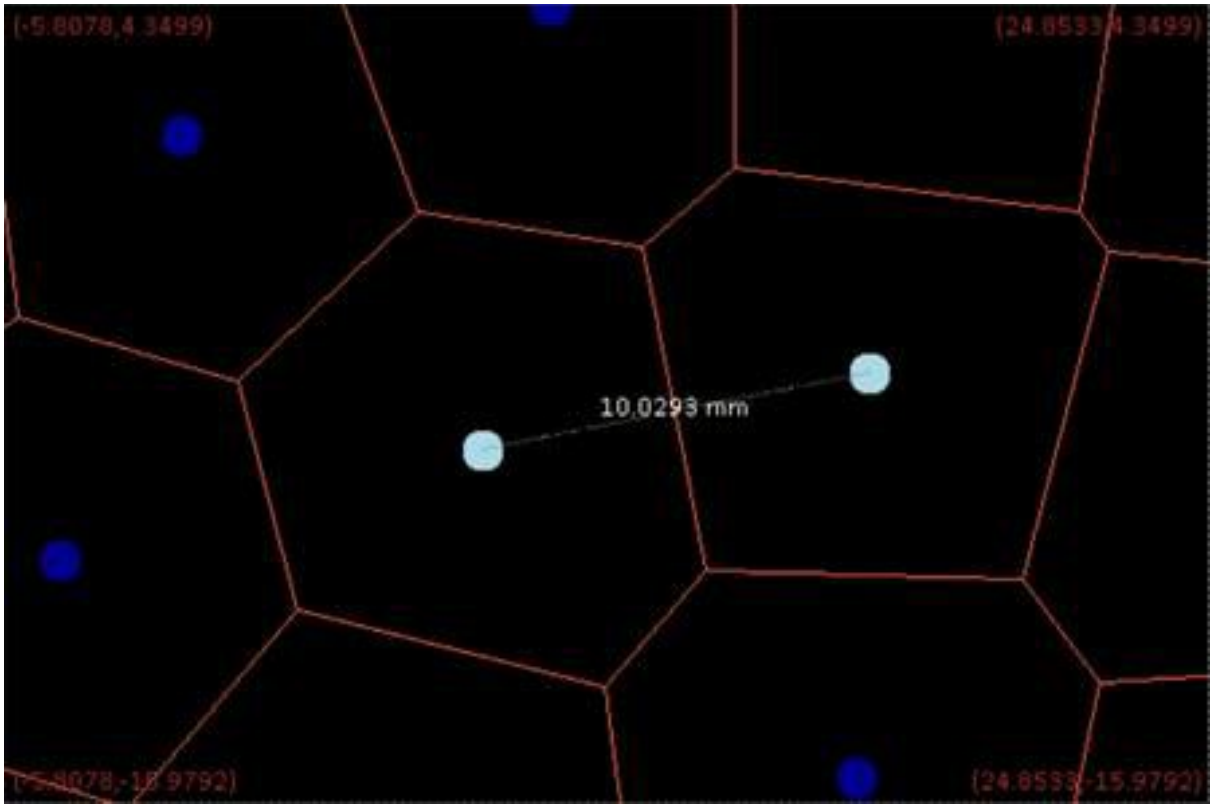
A group of dots selected for smoothing, some dots are overlapping



The smoothing function adjusts the dot positions so they are no longer overlapping

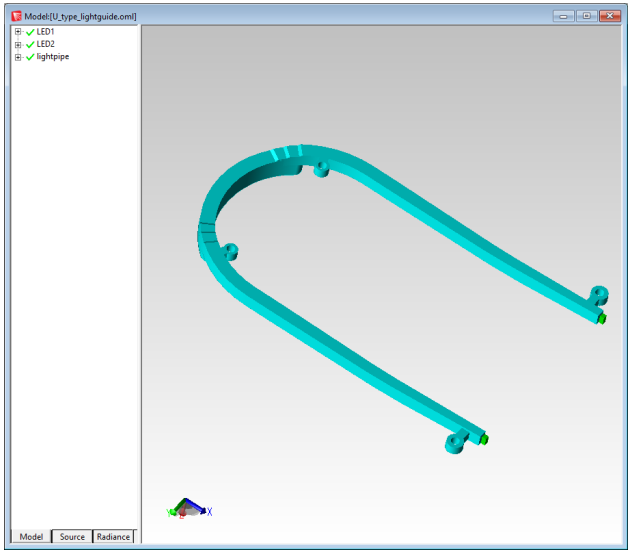
TracePro 2020 20.2

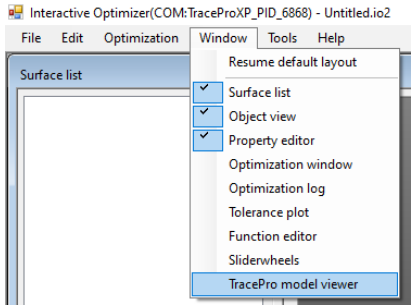
Texture Optimizer II – The distance between two dots selected for smoothing can be displayed

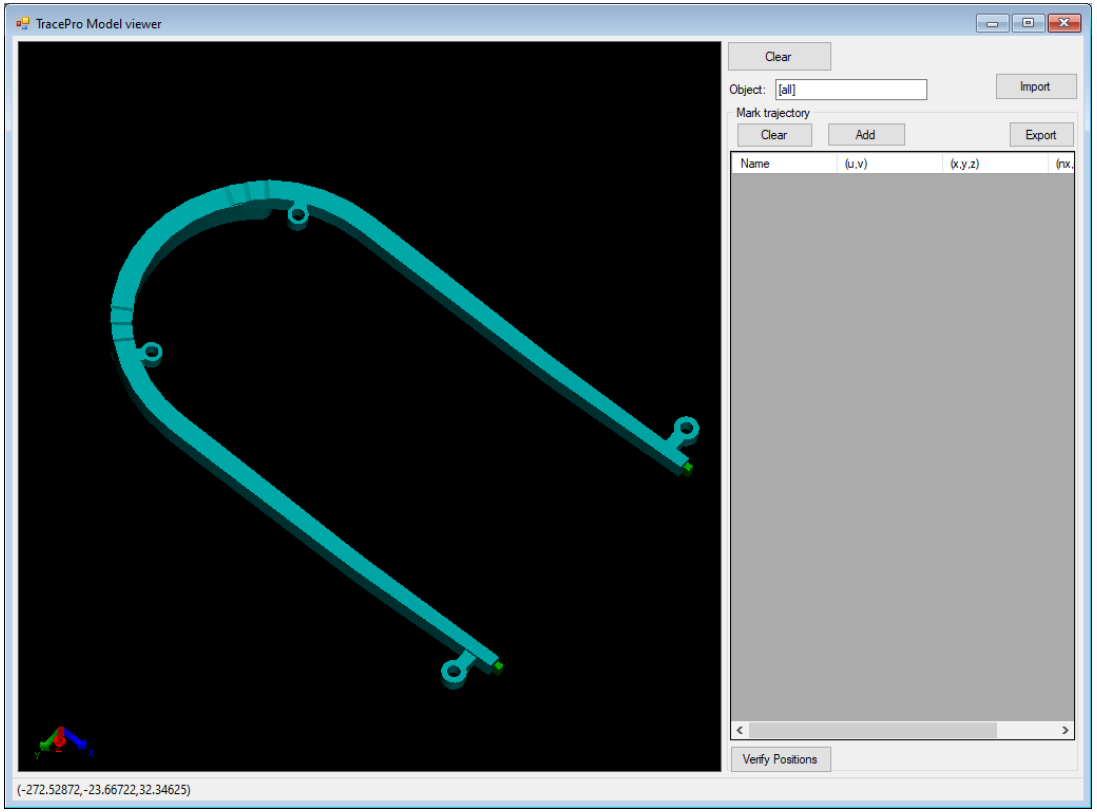


TracePro 2020 20.2

Interactive Optimizer – The current TracePro model can now be viewed in the optimizer. Either all objects or selected objects can be viewed.

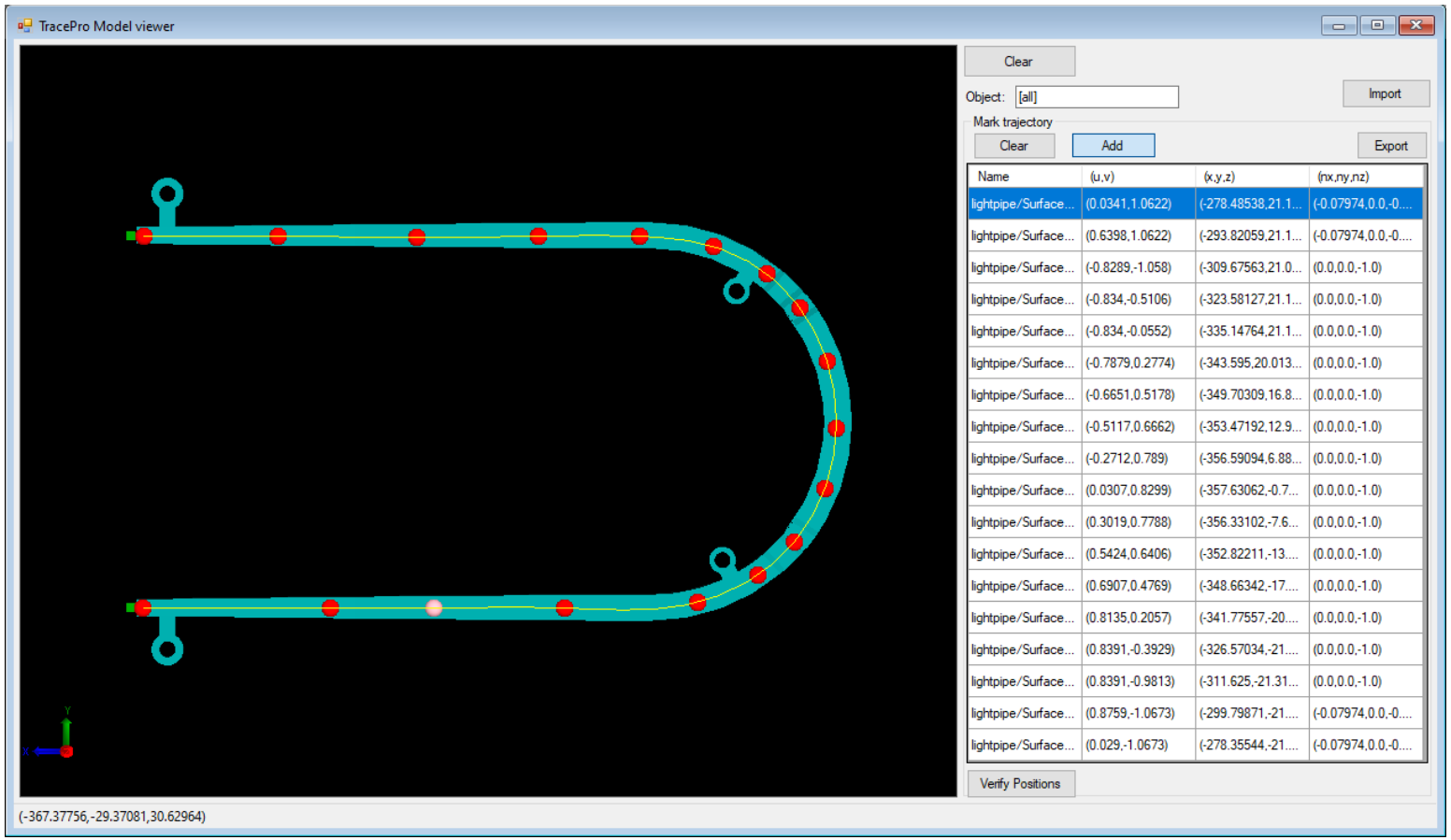






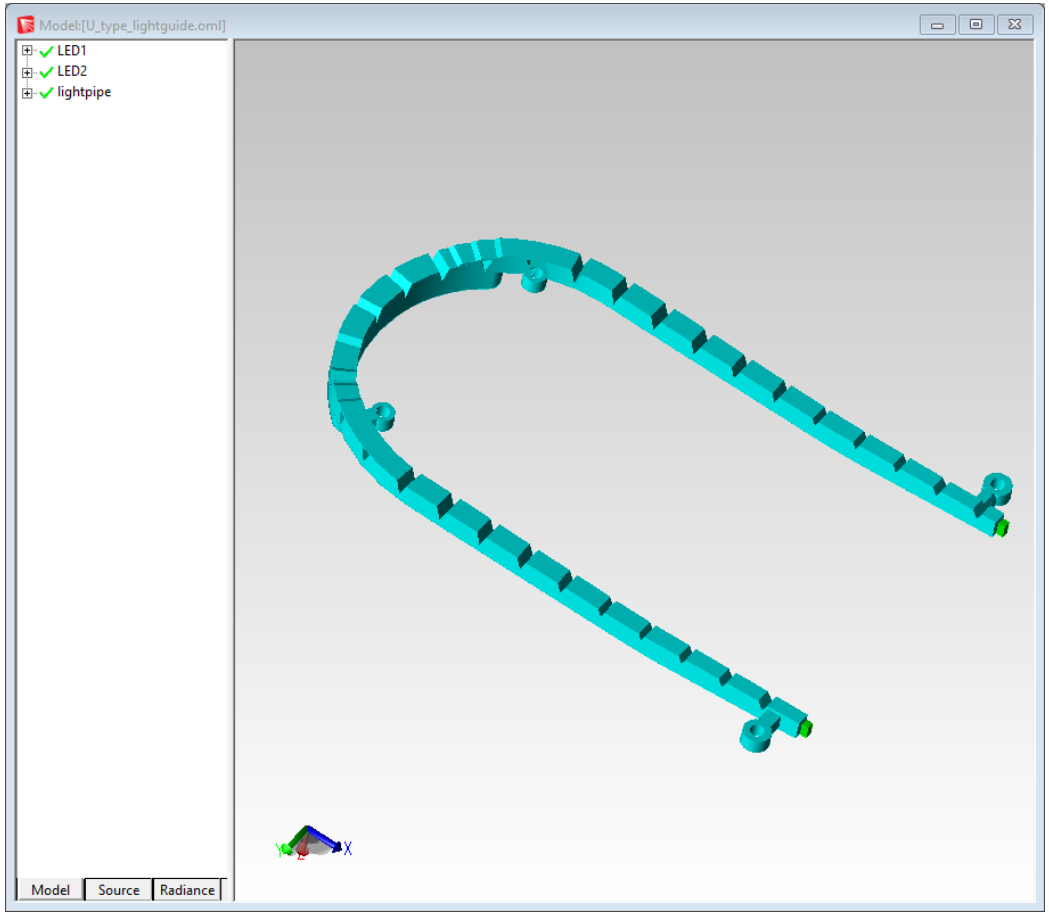
TracePro 2020 20.2

Interactive Optimizer – The trajectory of a path along a surface of the model from TracePro can be easily plotted

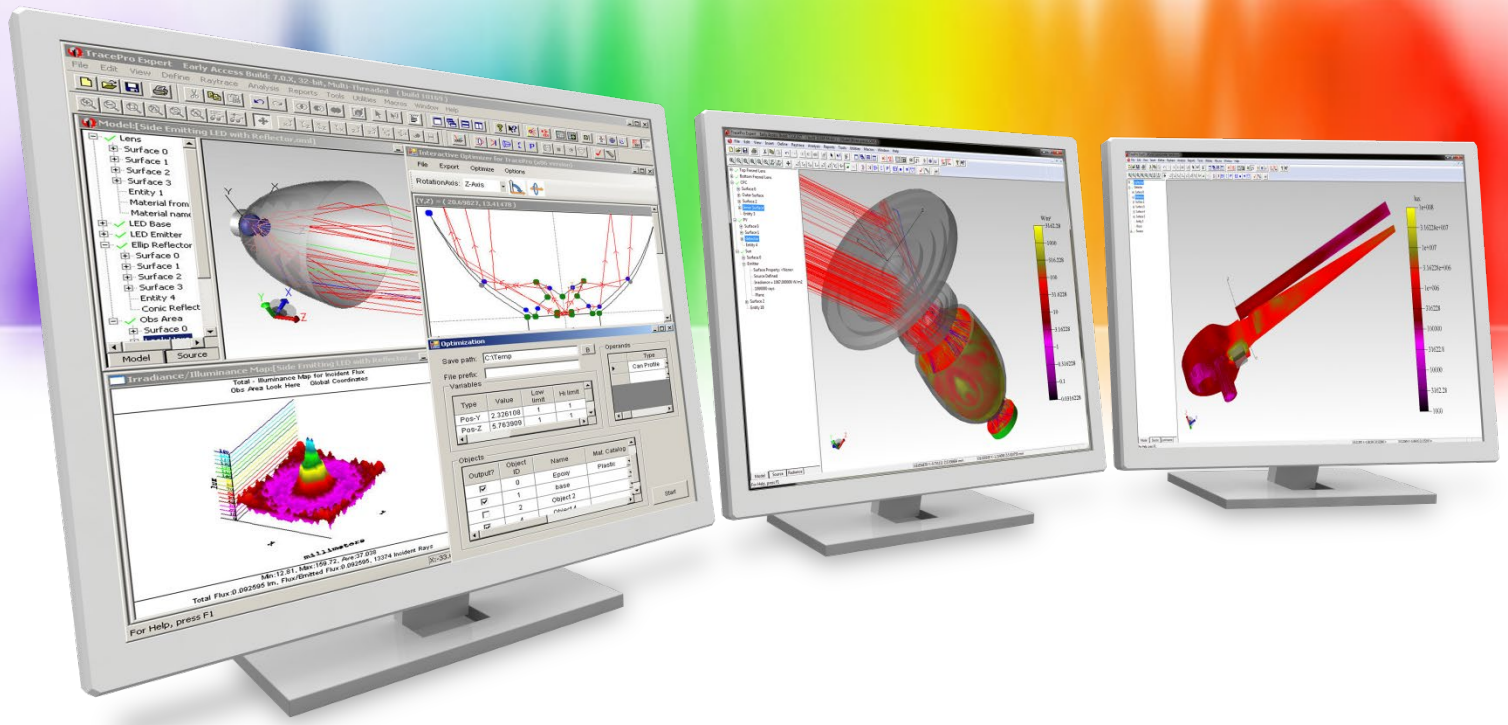


TracePro 2020 20.2

Interactive Optimizer – The trajectory of a path can be exported and used in an After-scheme macro to add periodic structures to a light guide surface



TracePro



New Features in TracePro 2020 20.1

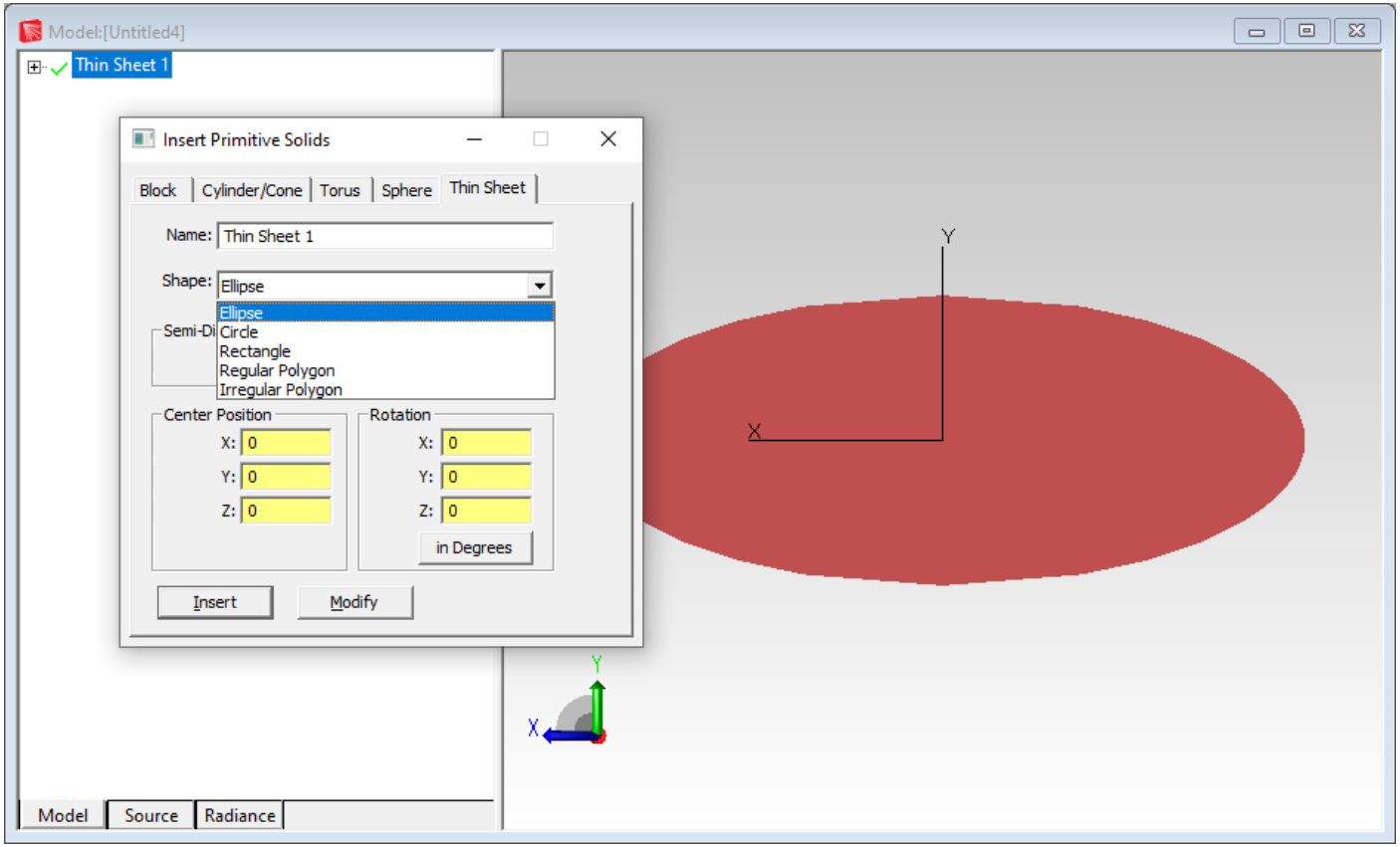
LAMBDA RESEARCH CORPORATION

TracePro 2020 20.1

- **TracePro**
  - Enhanced Thin Sheet capabilities including new shape options and the ability to modify existing Thin Sheet primitives
- **Surface Property Generator**
  - Added capability to import scatter data files from Surface Optics Corp.
- **New Scheme Commands**

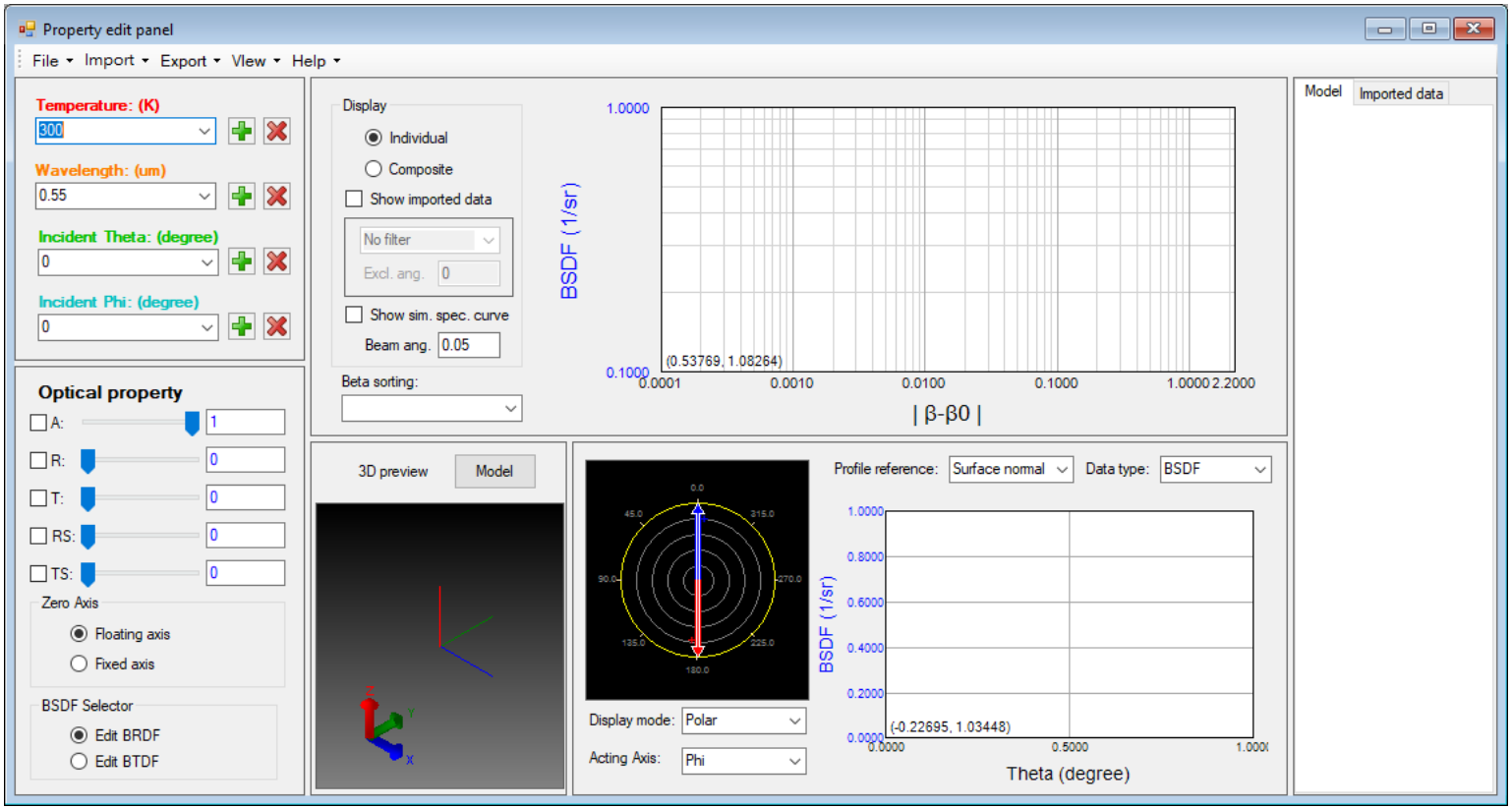
TracePro 2020 20.1

TracePro – The Thin Sheet Primitive Solid now has new options for shapes including: ellipse, circle, rectangle, regular polygon, and irregular polygon. Existing Thin Sheet primitives can now be modified after they are created.



TracePro 2020 20.1

Surface Property Generator – BRDF files from Surface Optics Corporation can now be loaded in the Surface Property Generator to make new Surface Properties for use in TracePro



TracePro 2020 20.1

Scheme – New Scheme commands have been added

Ten new Scheme commands are now available:

- (geometry:thin-sheet)
- (geometry:thin-sheet-circle)
- (geometry:thin-sheet-ellipse)
- (geometry:thin-sheet-rectangle)
- (geometry:thin-sheet-regular-polygon)
- (modify:thin-sheet)
- (modify:thin-sheet-circle)
- (modify:thin-sheet-ellipse)
- (modify:thin-sheet-rectangle)
- (modify:thin-sheet-regular-polygon)

TracePro