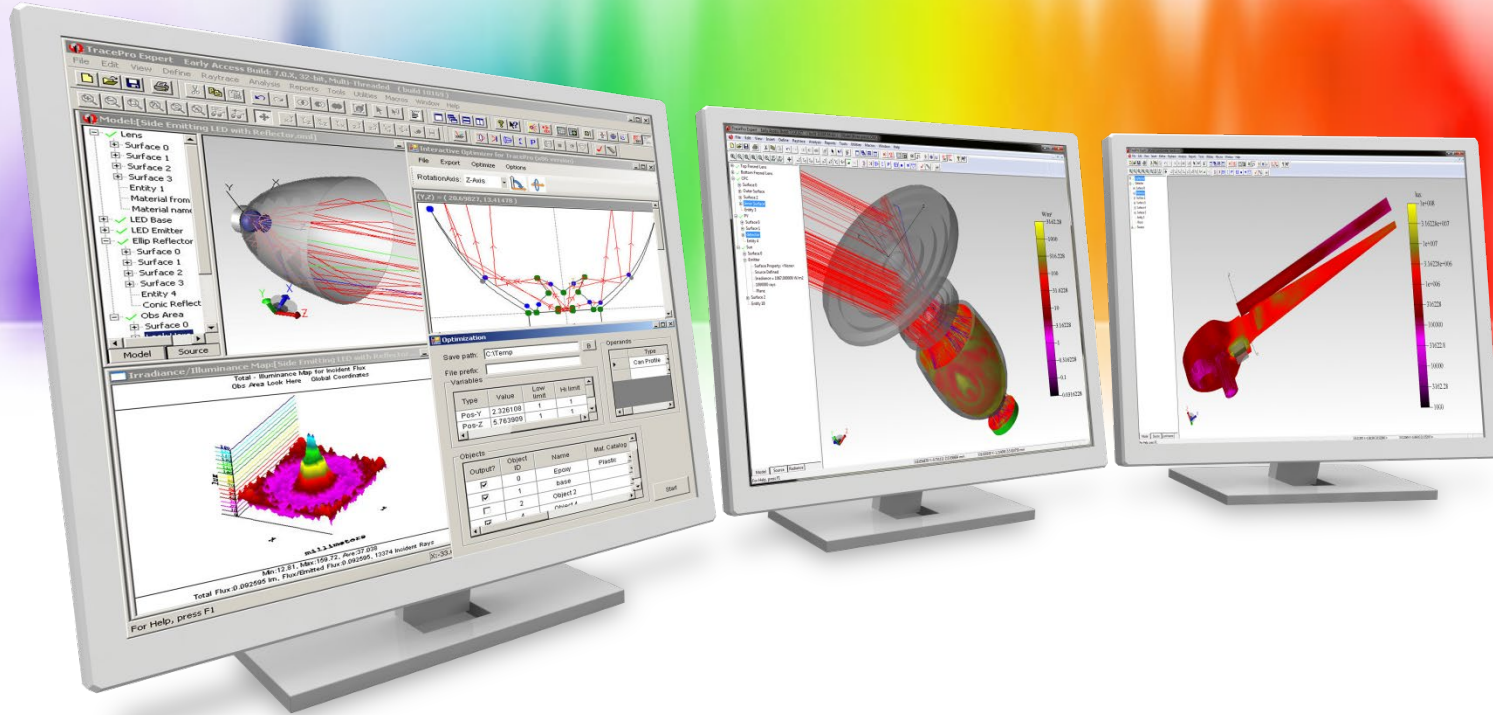


# New Features in TracePro

# 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 10<sup>th</sup> of the month, starting in February.

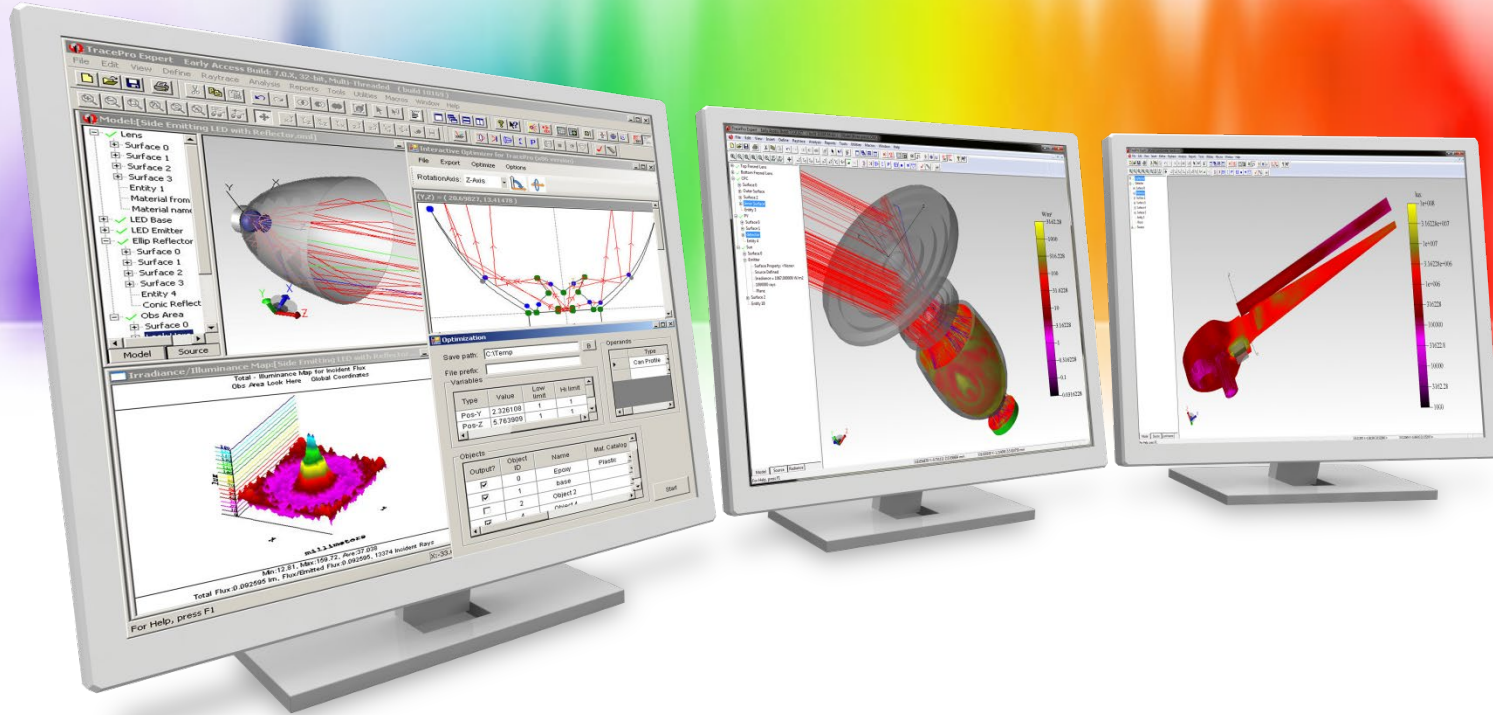


# New Features in TracePro 2023 23.2

# 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

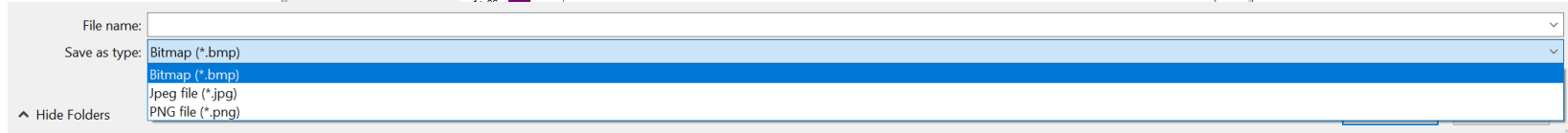
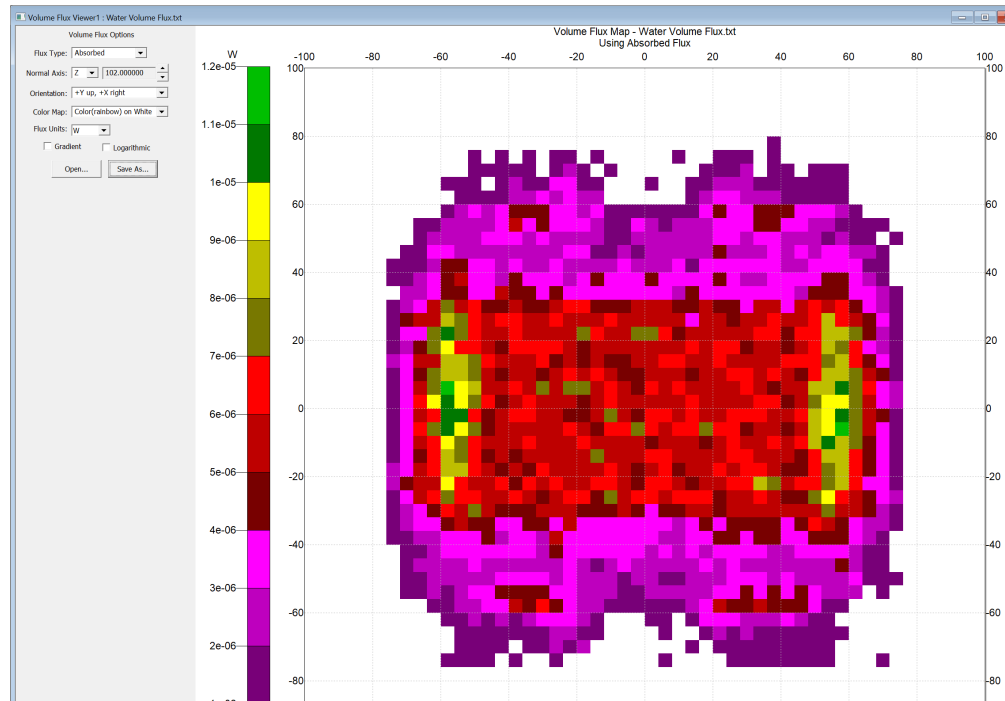


# New Features in TracePro 2023 23.1

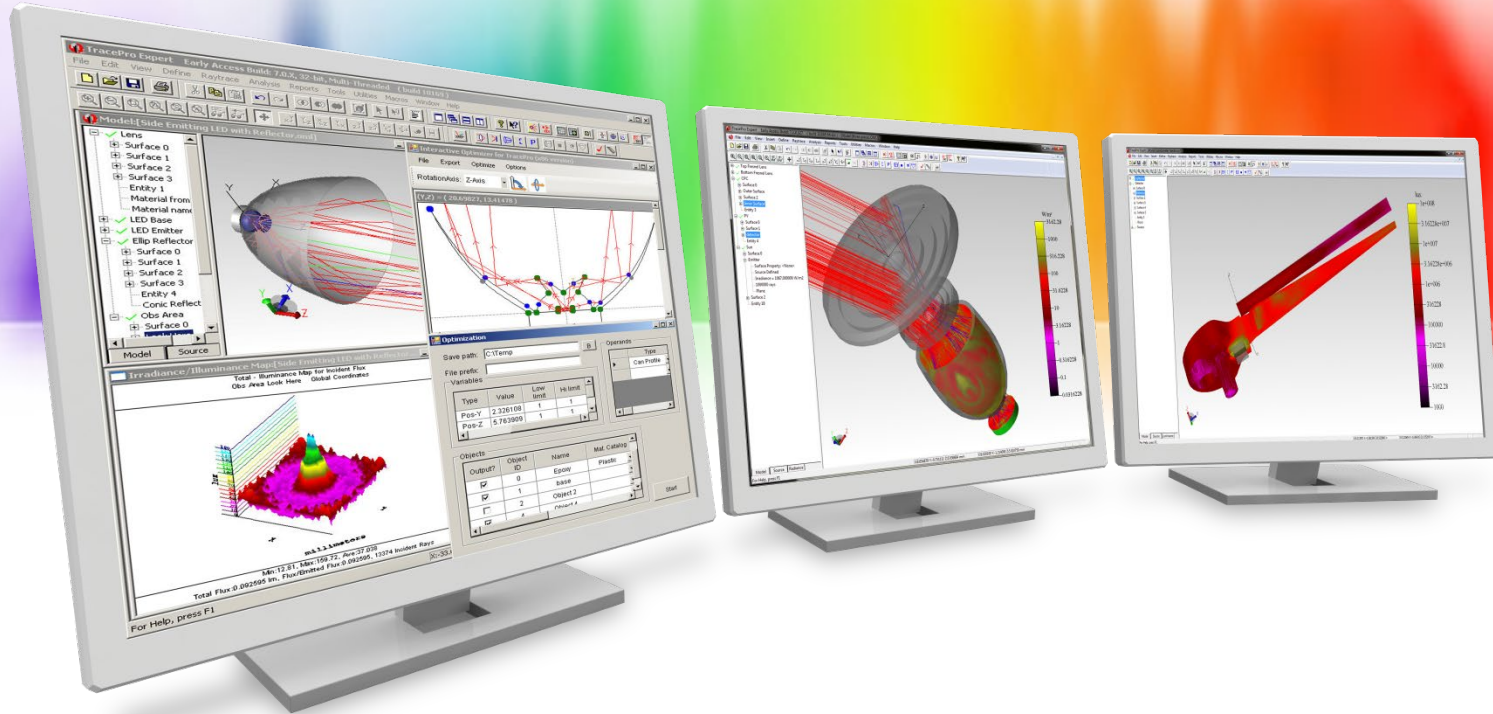
# TracePro 2023 23.1

## ➤ TracePro

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



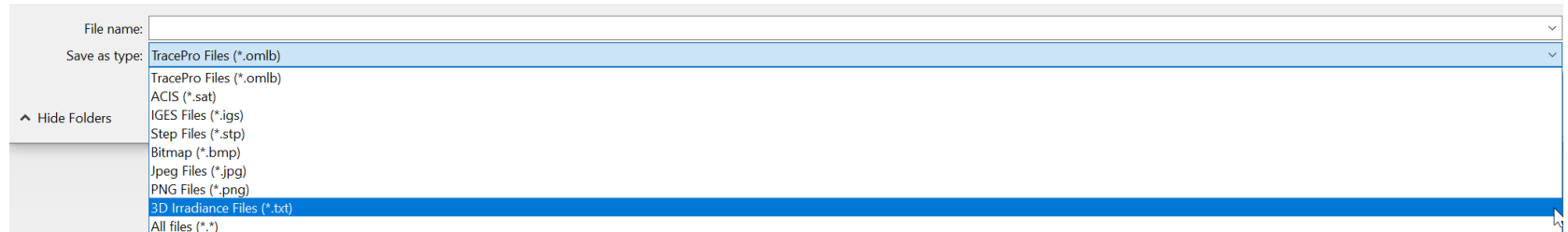
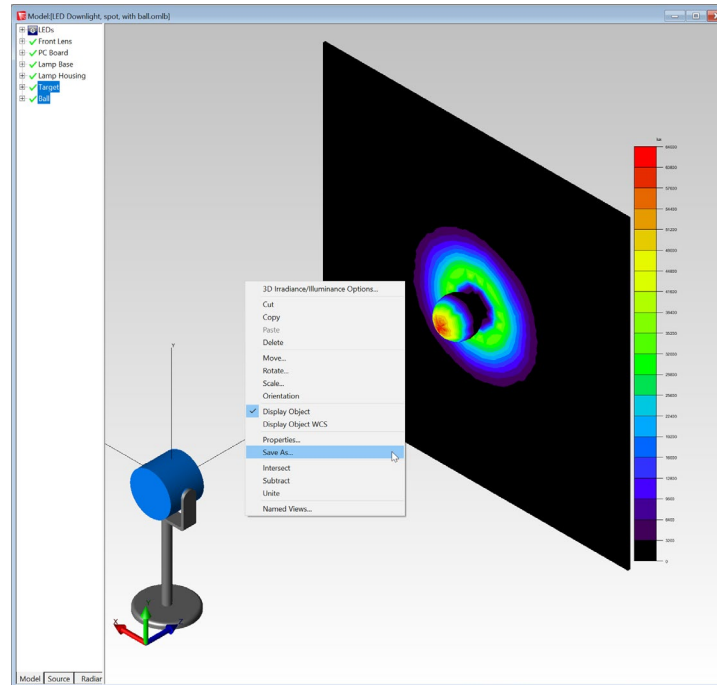




# New Features in TracePro 2022 22.6

# TracePro 2022 22.6

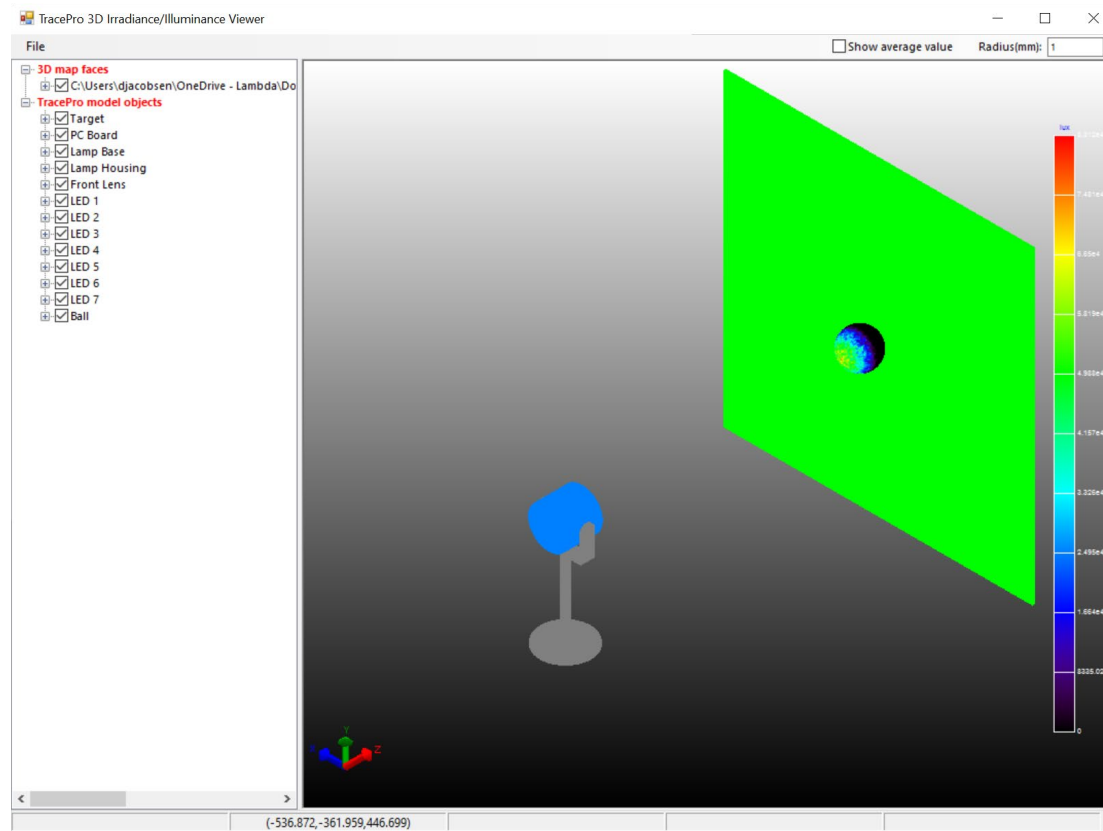
## ➤ New capability to save 3D Irradiance/Illuminance Map





# TracePro 2022 22.6

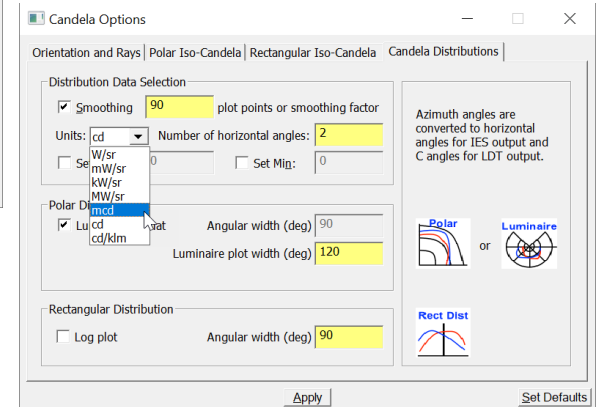
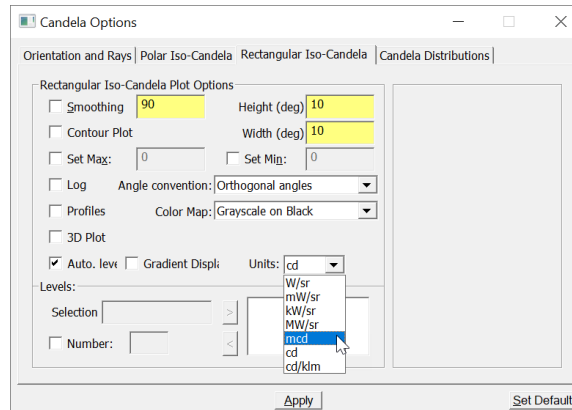
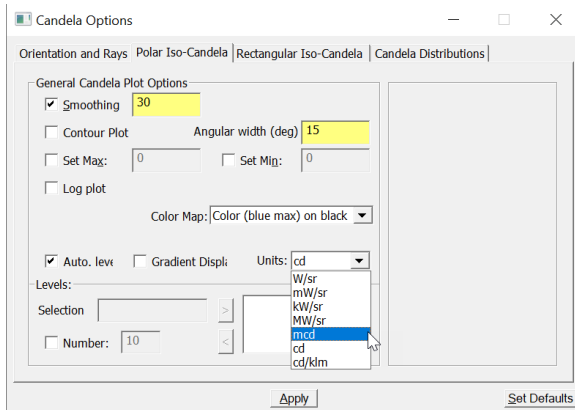
## ➤ New 3D Irradiance/Illuminance Viewer in Tools menu

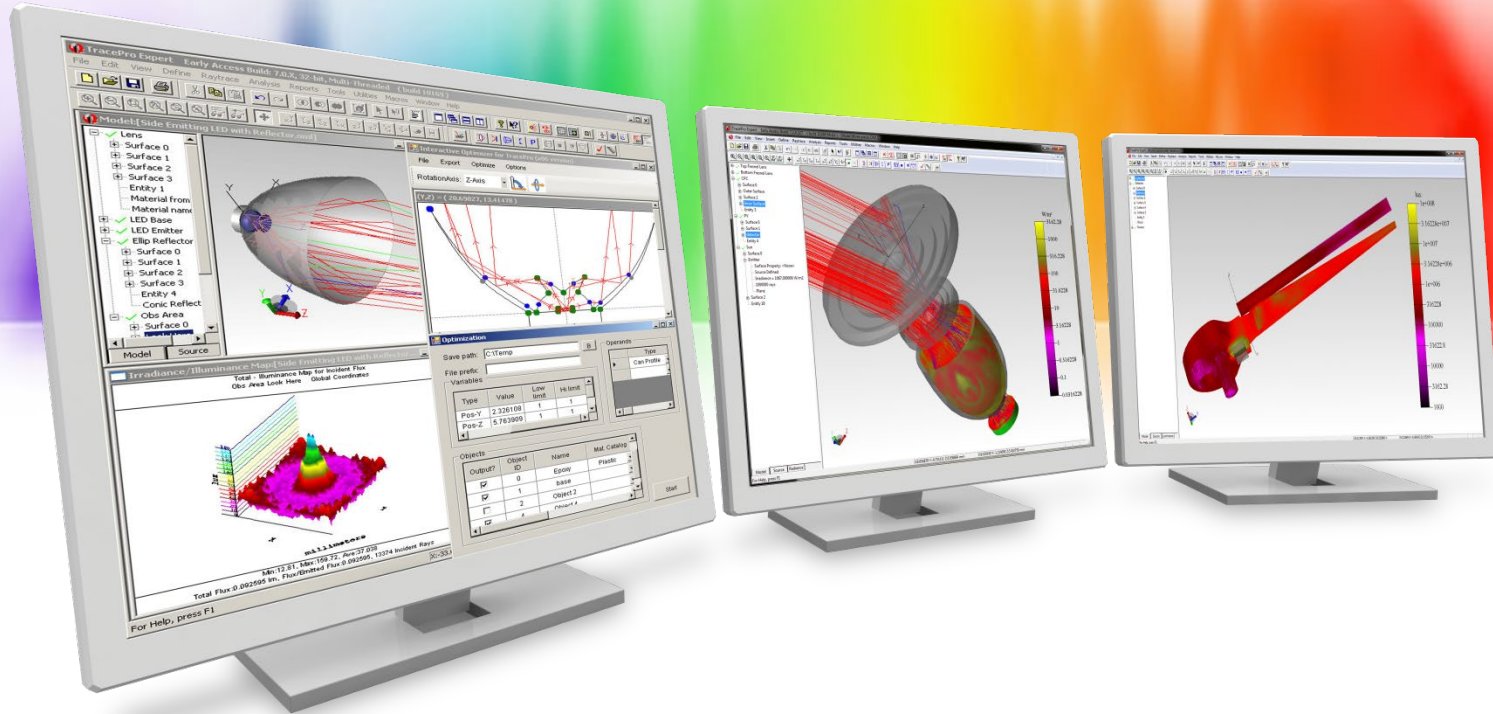


# TracePro 2022 22.6

## ➤ TracePro

### ➤ Added mcd (millicandela) unit option to Candela Plots





# New Features in TracePro 2022 22.5

# 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.**

**Irradiance/Illuminance Map Options**

Map Data  
Quantities to plot: Irradiance  
Rays to plot: Incident  
Normalize to: <None>  
Units: lux  
Set Max: 0  
Set Min: 0

Display Options  
☐ Smoothing  
☐ Log Scale  
☐ Contour Plot  
☐ Relief Plot  
☐ Local Coordinates  
☒ Profiles  
☐ Gradient Display  
No. of Pixels: 100  
FF Grid: 100  
Symmetry: 100  
Color Map: Black  
ON

Contour Levels  
☒ Auto. levels  
Selection: 20  
Use percent of Max. (1.0 = 100%)

Orientation of plot plane  
☐ Automatically calculate Normal and Up Vectors  
Normal Vector: X: 0 Y: 0 Z: 1  
Up Vector: X: 0 Y: 1 Z: 0  
Apply Set Defaults

**Candela Options**

Orientation and Rays | Polar Iso-Candela | Rectangular Iso-Candela | Candela Distributions

Distribution Data Selection  
☒ Smoothing 90 plot points or smoothing factor  
Units: cd  
Number of horizontal angles: 2  
Set Min: 0  
Polar D: 90  
☒ Lu/cd/klm  
Angular width (deg): 90  
Luminaire plot width

Rectangular Distribution  
☐ Log plot  
Angular width

**Radiance/Luminance Map Options**

Name: Radiance 1  
Color scheme: False color (rainbow)  
Units: W/m2-sr  
W/cm2-sr  
W/mm2-sr  
mW/m2-sr  
mW/cm2-sr  
mW/mm2-sr  
kW/m2-sr  
kW/cm2-sr  
kW/mm2-sr  
MW/m2-sr  
MW/cm2-sr  
MW/mm2-sr  
cd/m2(nit)  
Apply Apply to all

# 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**

Ray Sorting

Ray Sort for Irradiance Window.

Sort Type: All Rays

Sources: All

Wavelength: All

% Starting Rays to Display: 100

☐ Flux Display Range (as a fraction of Peak Flux)

Flux Range - Peak 1.92149e-05 lumens

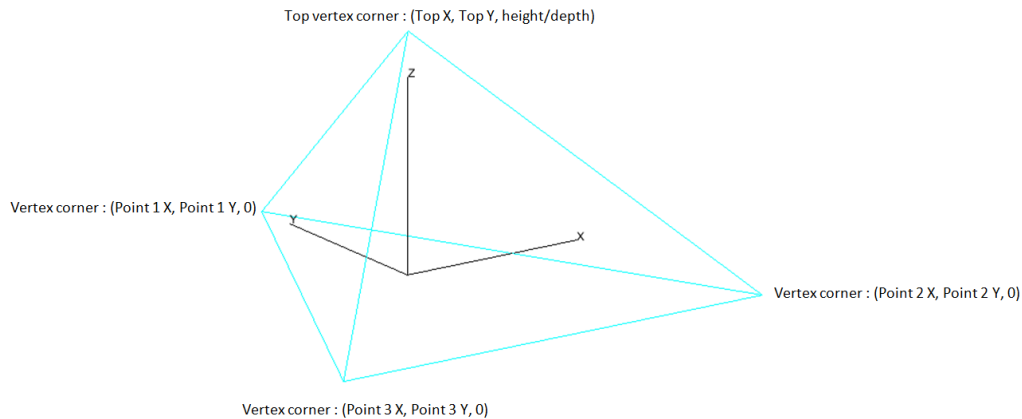
Min Max (0.0 - 1.0)

Update Set Defaults



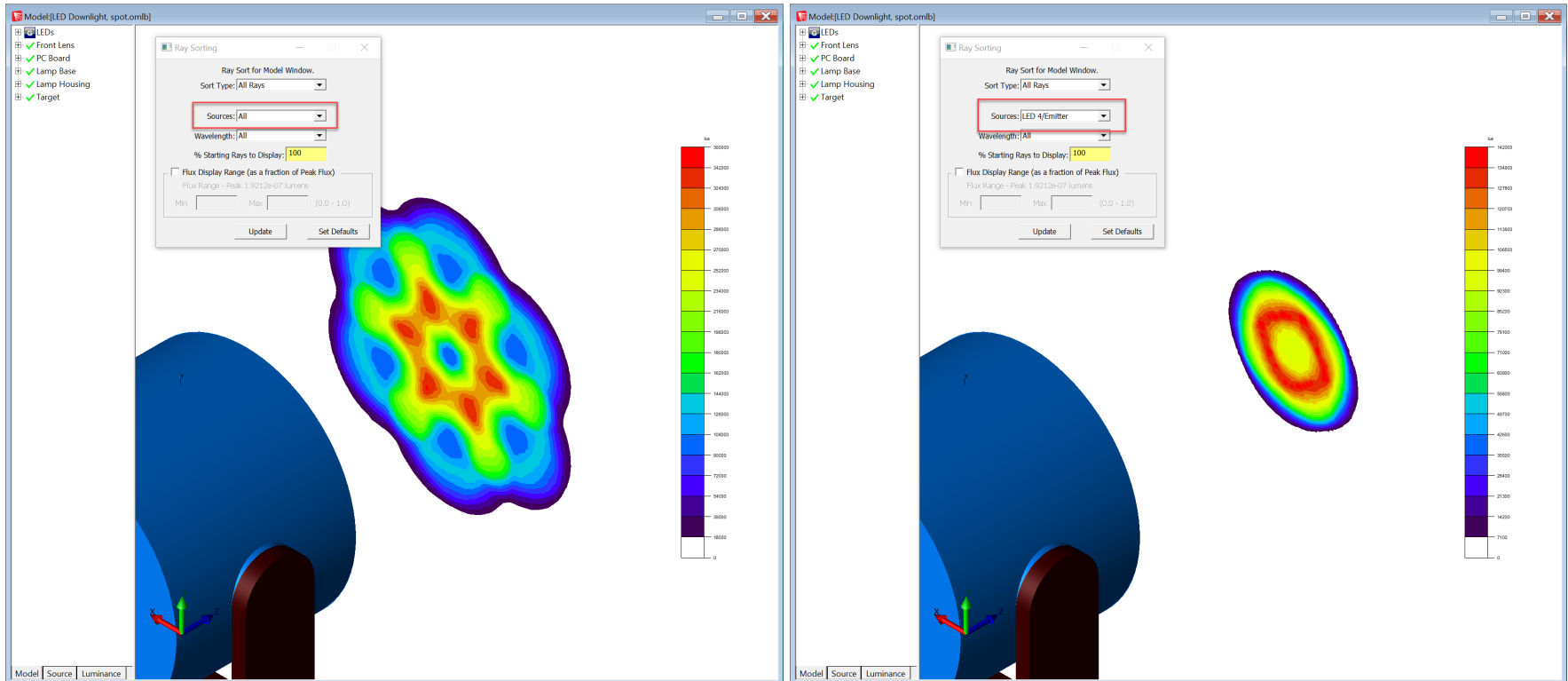
# TracePro 2022 22.5

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



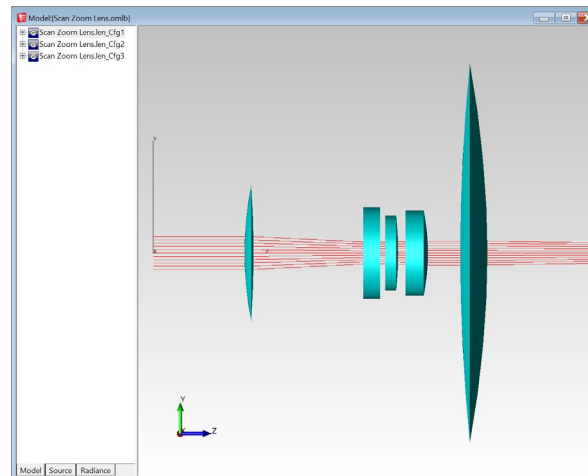
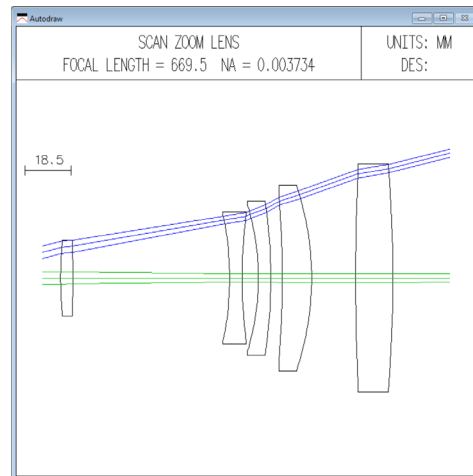
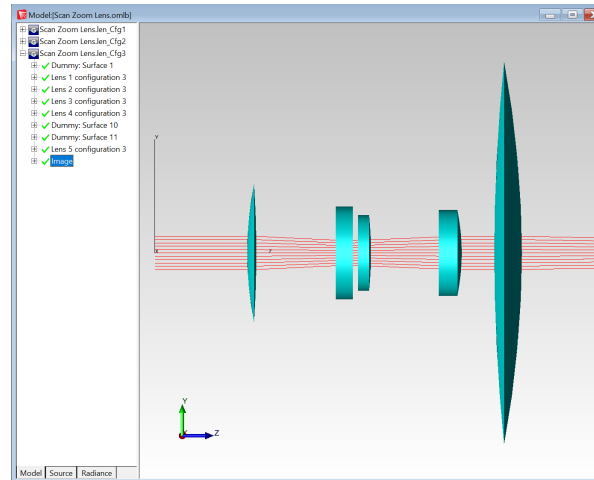
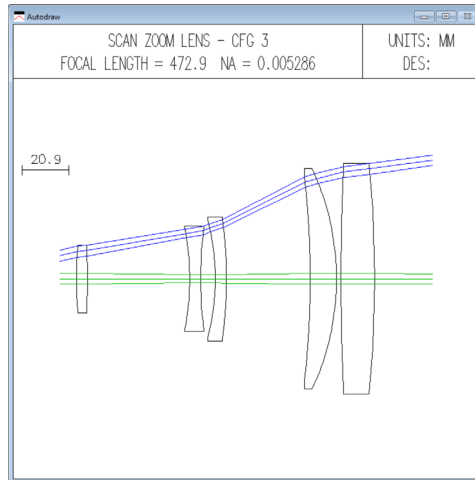
# TracePro 2022 22.5

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



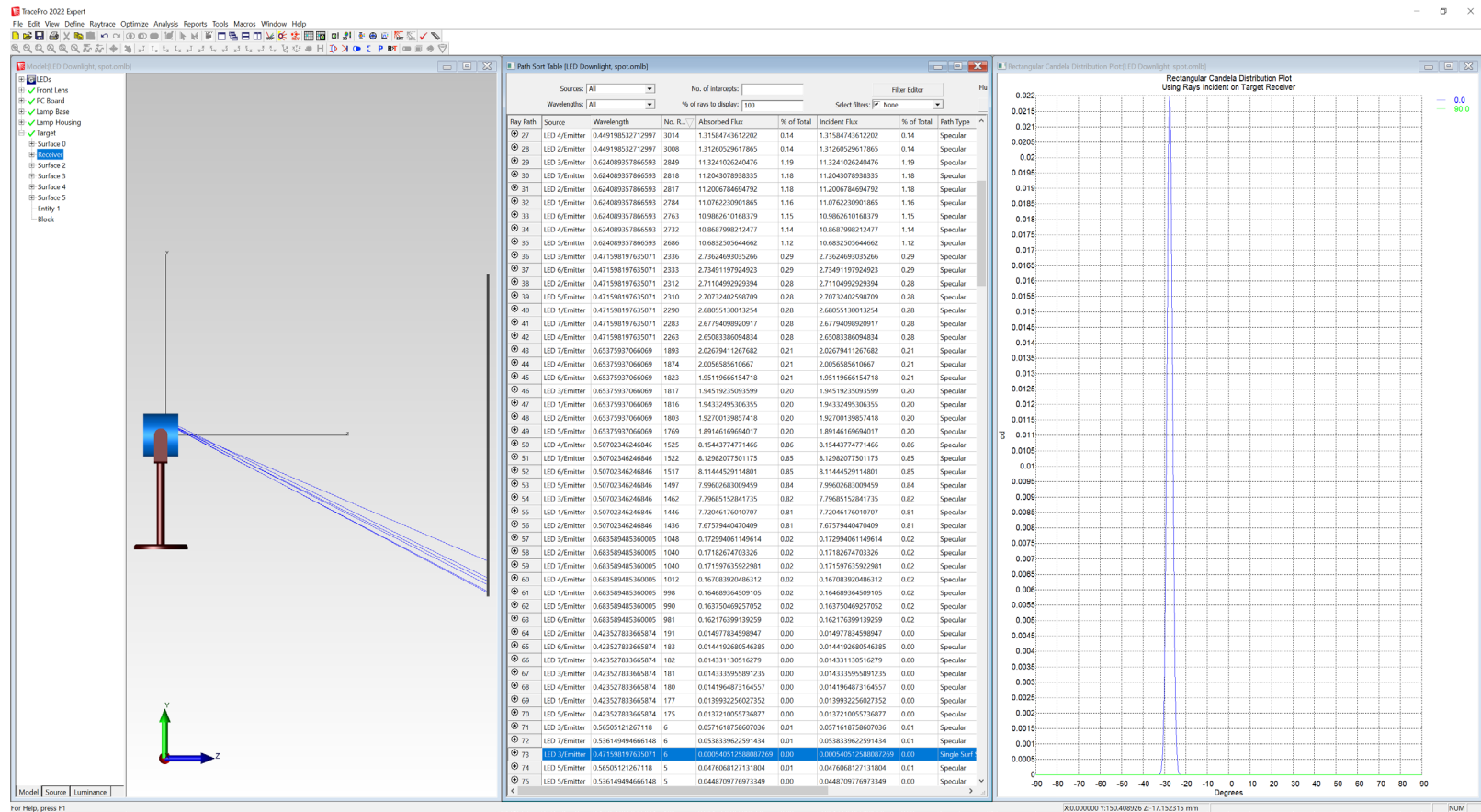
# TracePro 2022 22.5

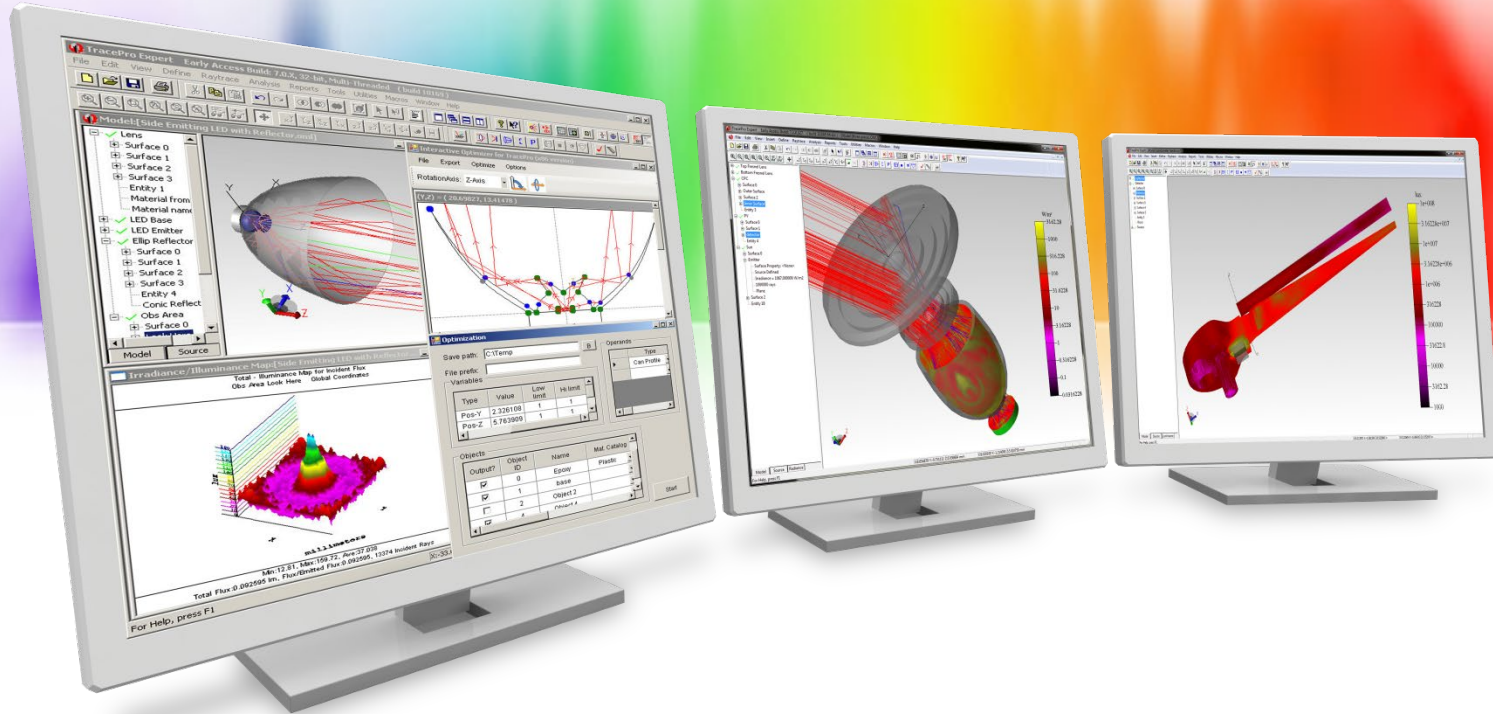
**TracePro – TracePro can now import multi-configuration files from OSLO and Zemax**



# TracePro 2022 22.5

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





# New Features in TracePro 2022 22.2

# TracePro 2022 22.2

## ➤ **TracePro**

- Group for imported lenses

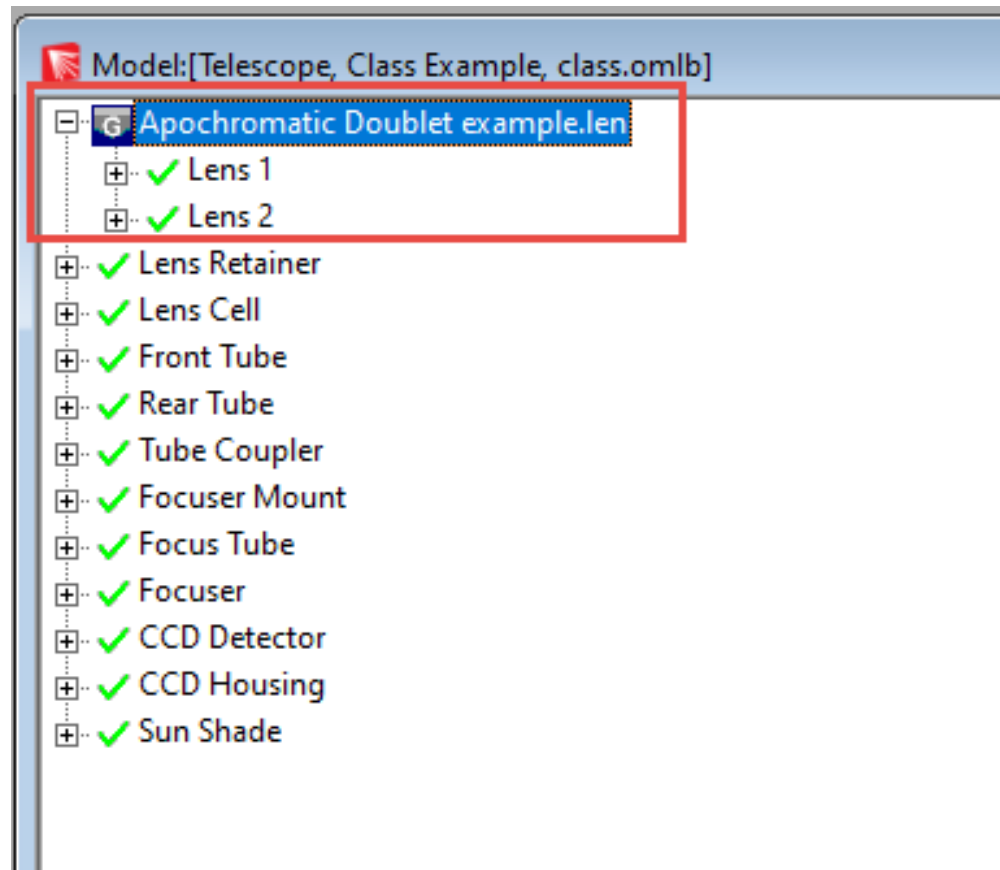
## ➤ **Light Source Builder**

- Convert Lucidshape and Zemax rayfiles to TracePro rayfile format



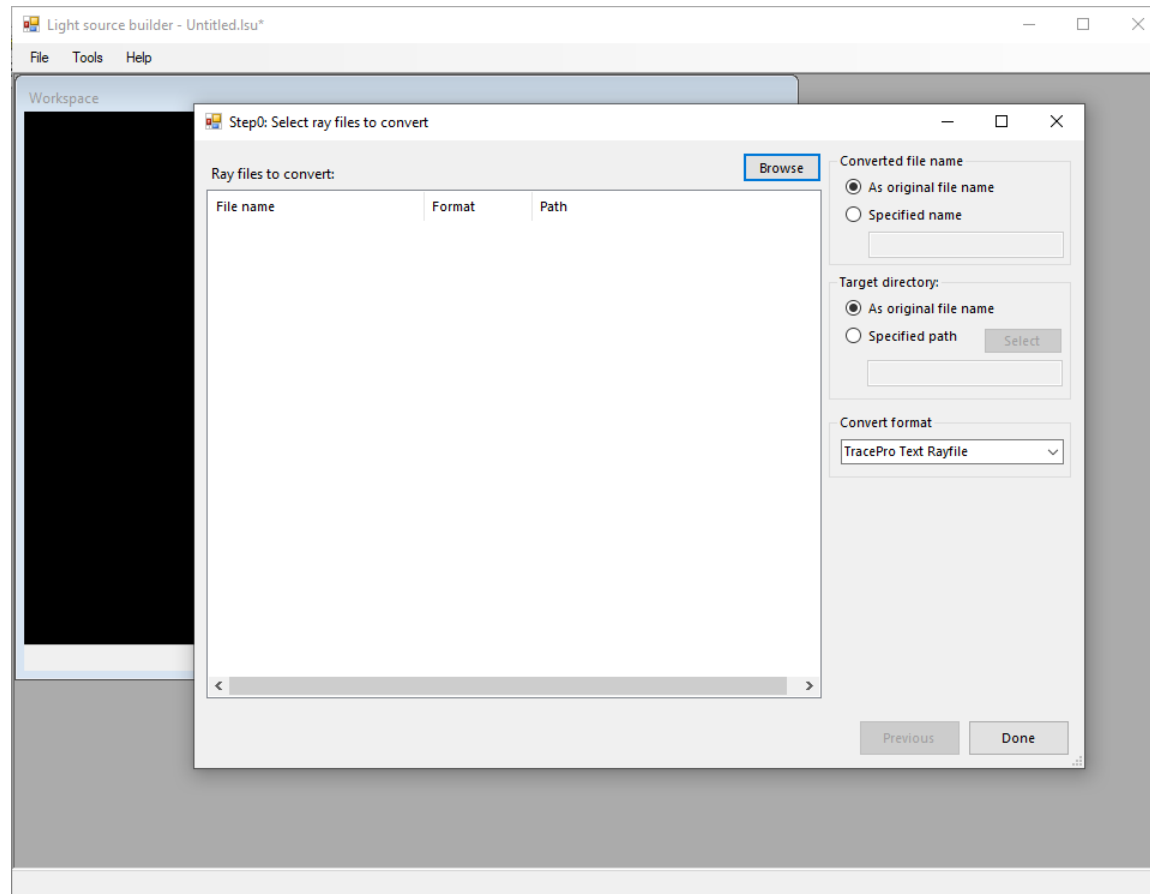
# TracePro 2022 22.2

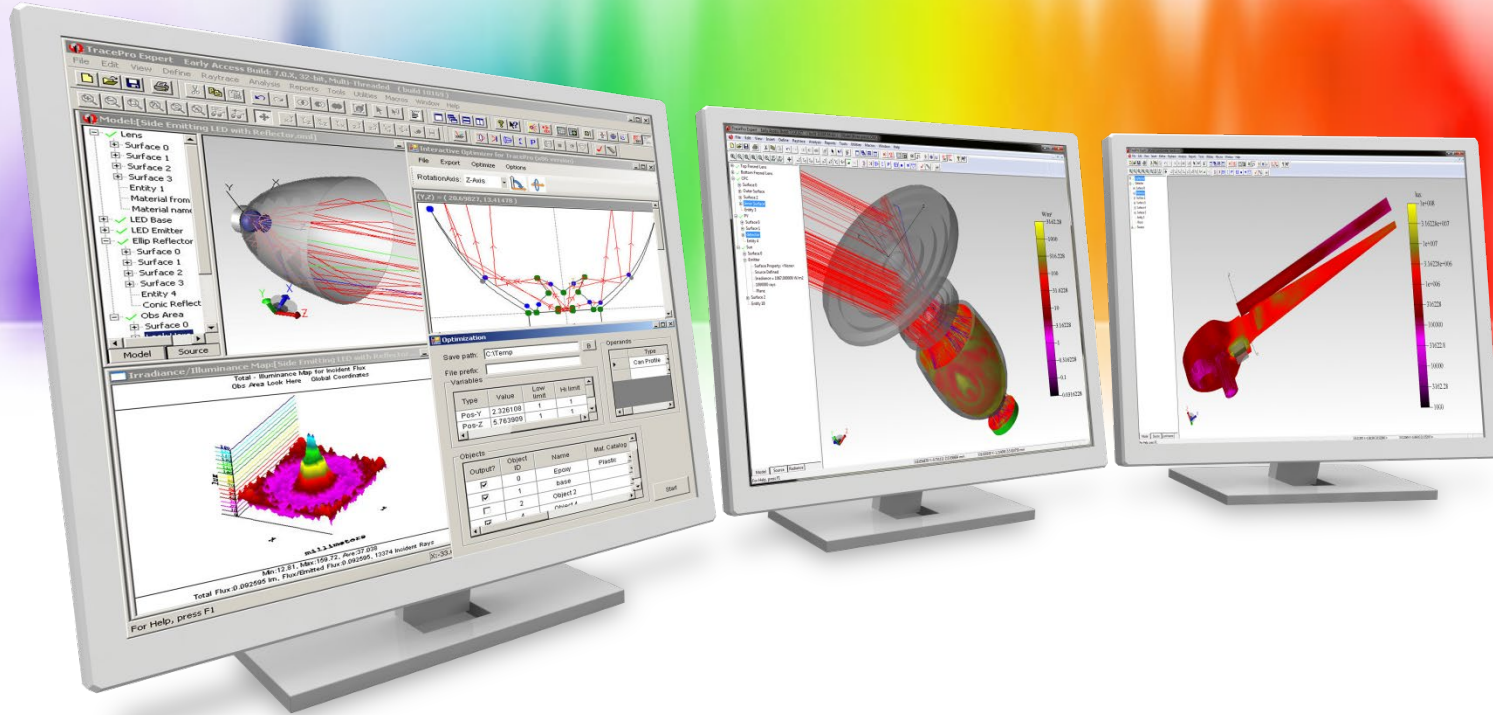
**TracePro – Imported lenses are now placed in a new group in TracePro.  
The name of the lens file will be the name of the group in TracePro.**



# TracePro 2022 22.2

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





# New Features in TracePro 2022 22.1

# TracePro 2022 22.1

## ➤ TracePro

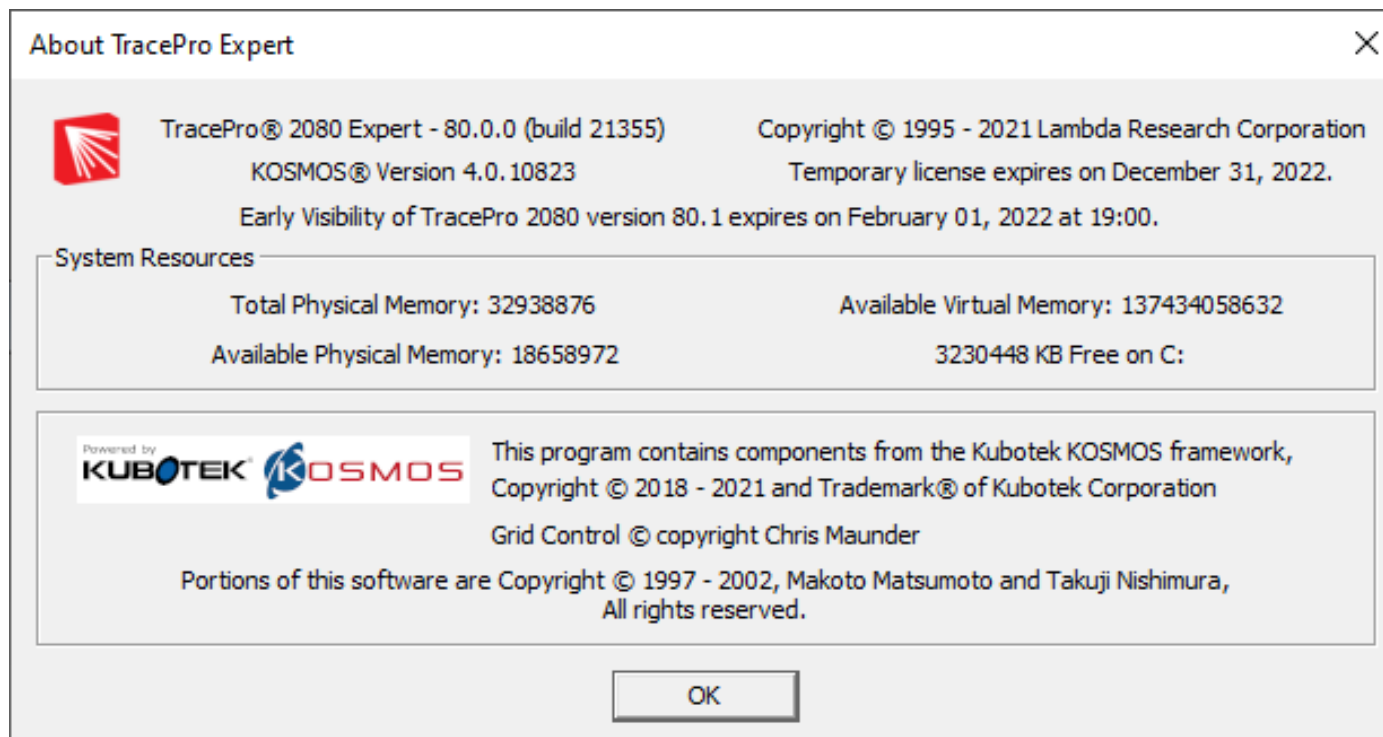
- New geometric modeler
- New surface types and aperture shapes for the Lens Element
- New All-mouse mode
- New dynamic highlighting and tooltips for identifying surfaces
- New file format \*.OMLB
- STEP and IGES translators now included at no charge
- New CAD importers included at no charge
- New Environment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

## ➤ Light Source Builder

- New source builder utility for making many different source types

# TracePro 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

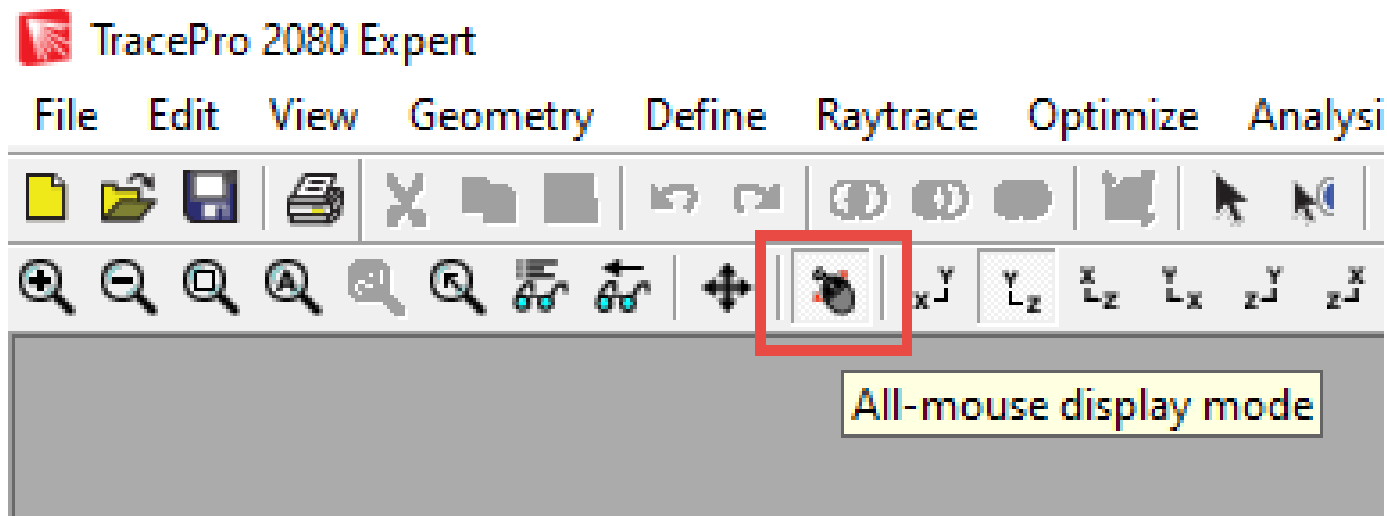
**TracePro – CAD translators and importers included at no additional cost**

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



# TracePro 2022 22.1

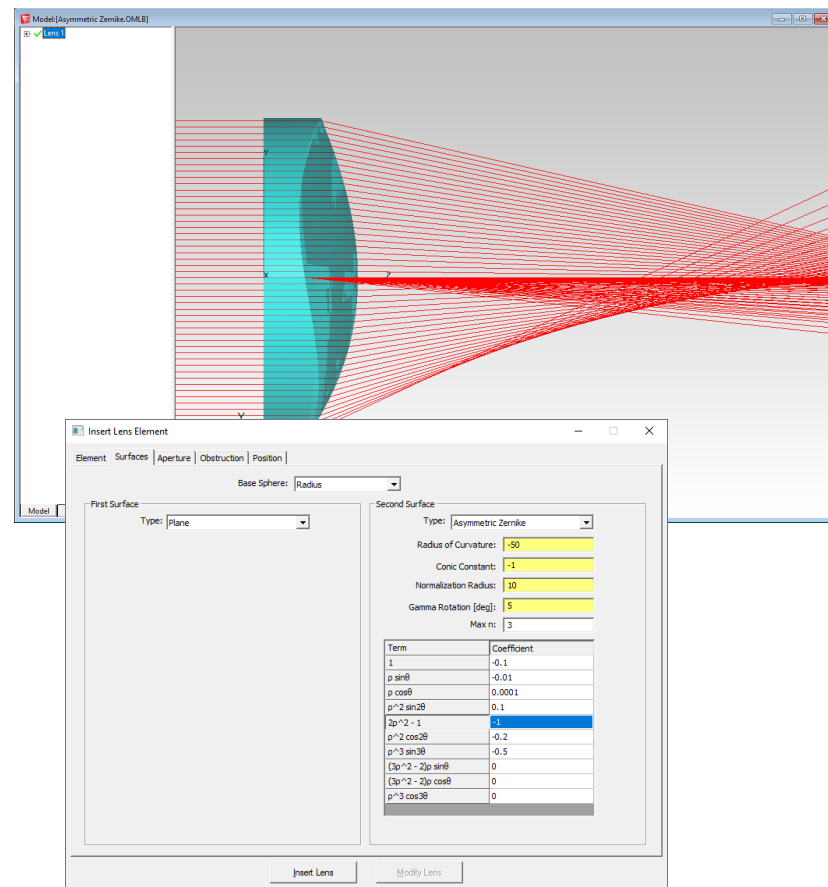
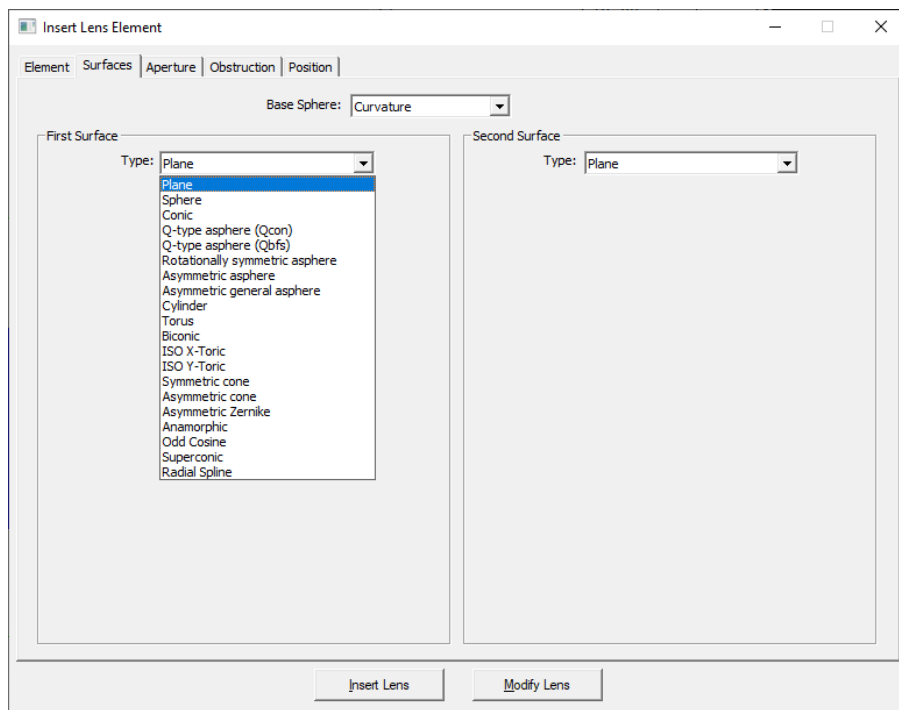
**TracePro – New All-mouse mode enables users complete many view manipulations using only the mouse**



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

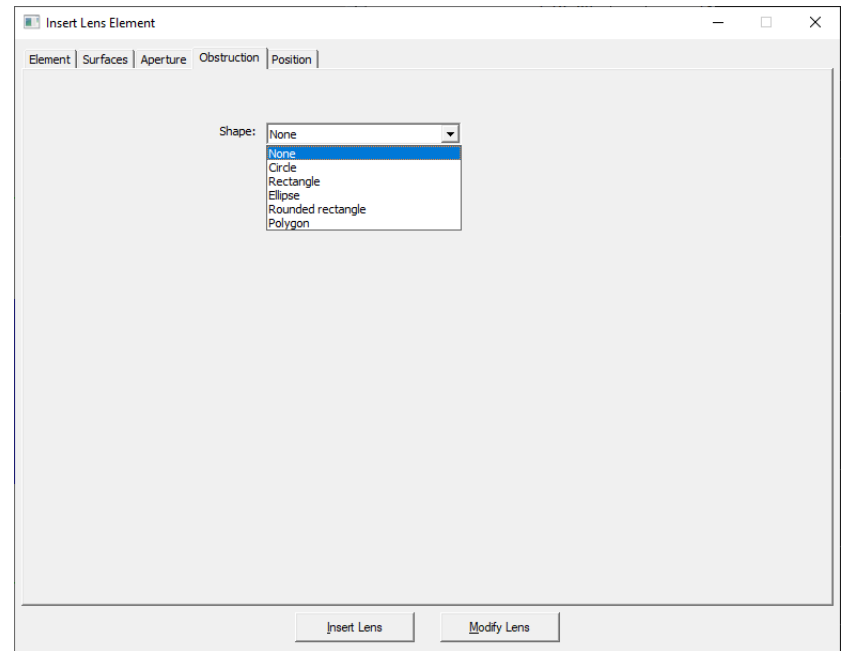
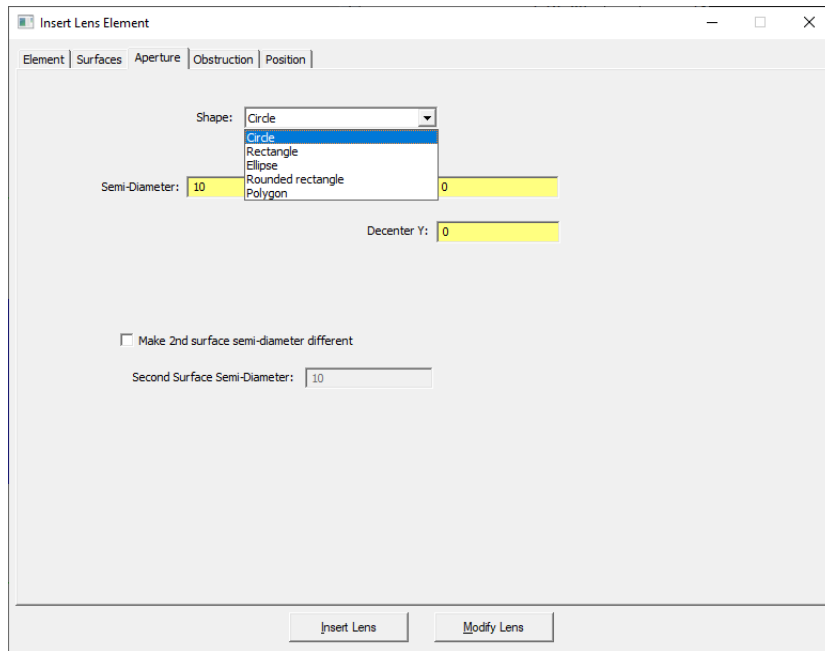
# TracePro 2022 22.1

**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.**



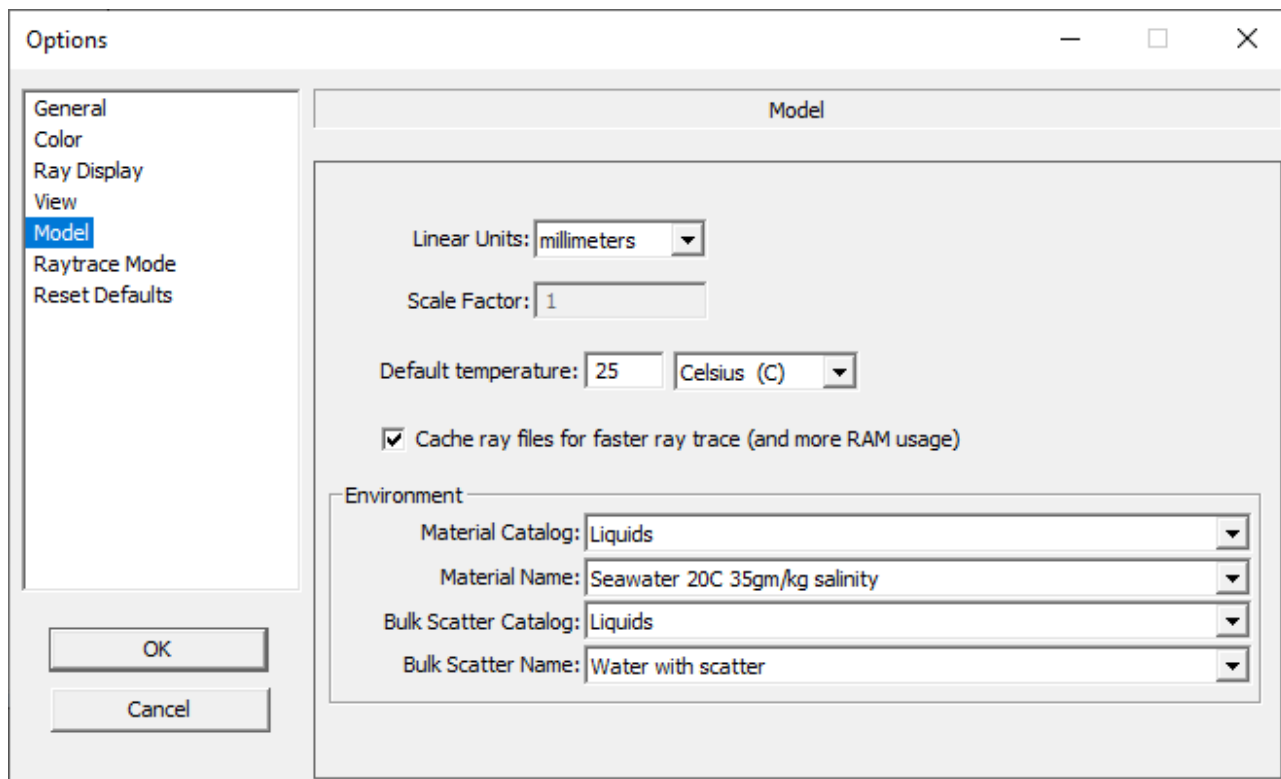
# TracePro 2022 22.1

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



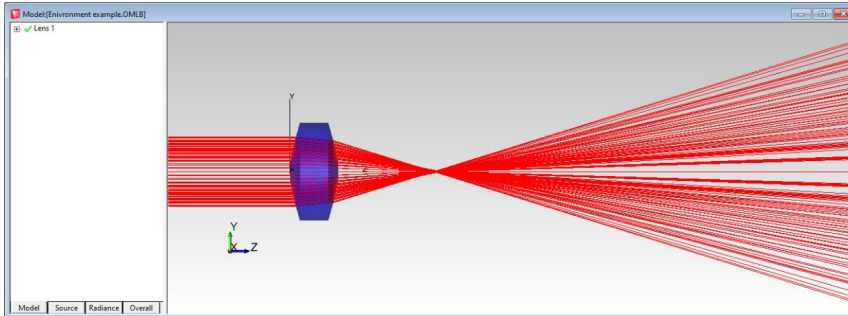
# TracePro 2022 22.1

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

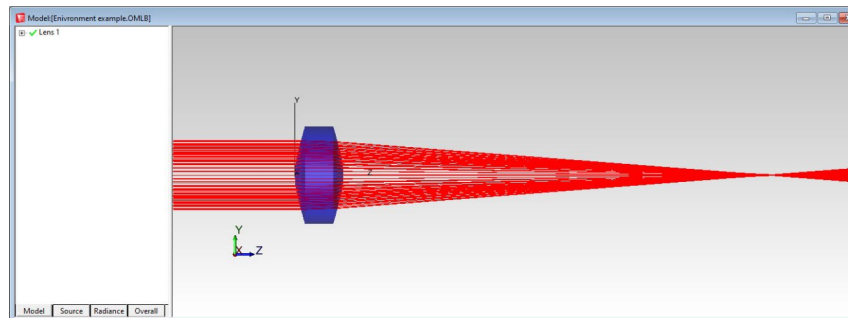


# TracePro 2022 22.1

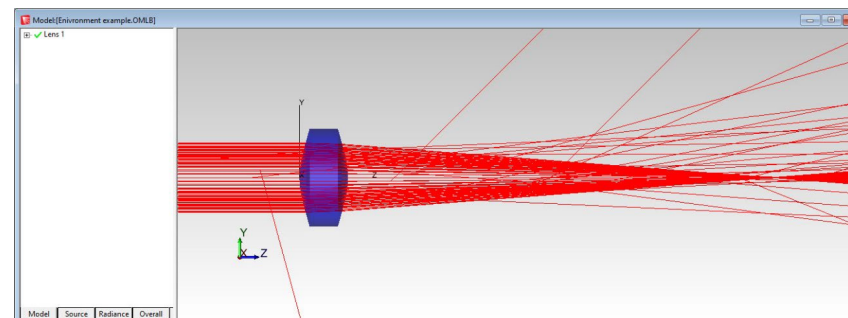
**TracePro – Material and Bulk Scatter Properties can now be applied to the environment in TracePro**



**BK7 lens in air**



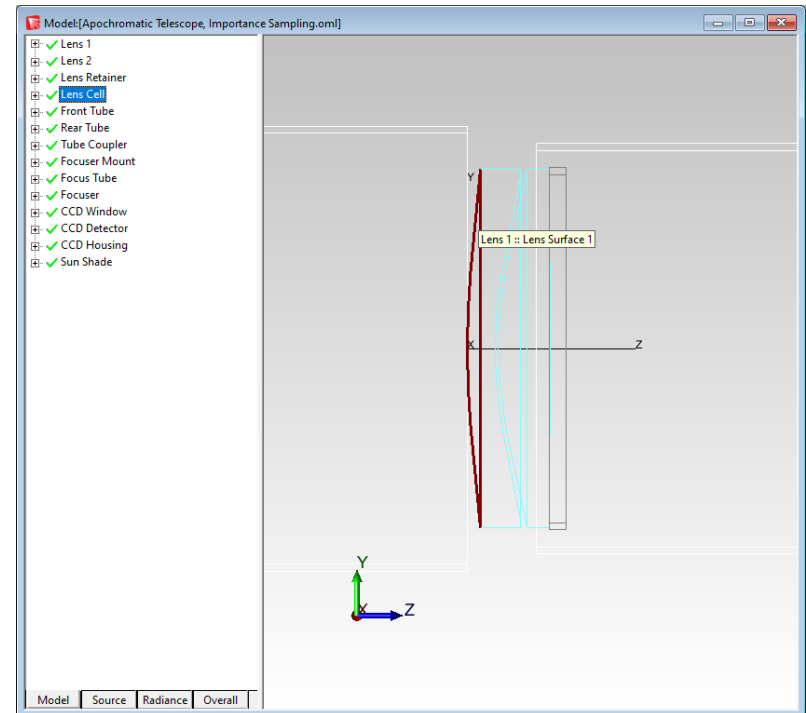
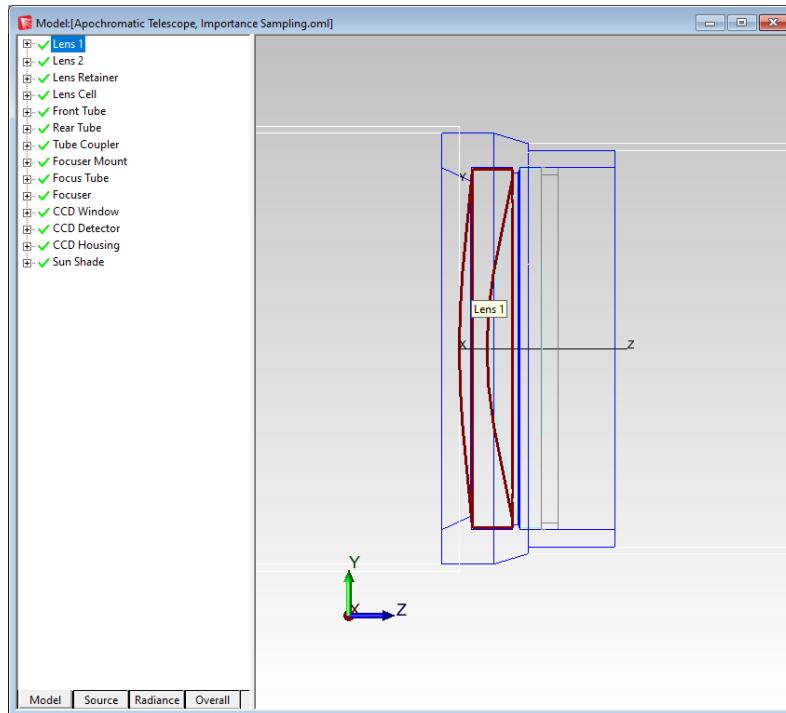
**BK7 lens in seawater**



**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**



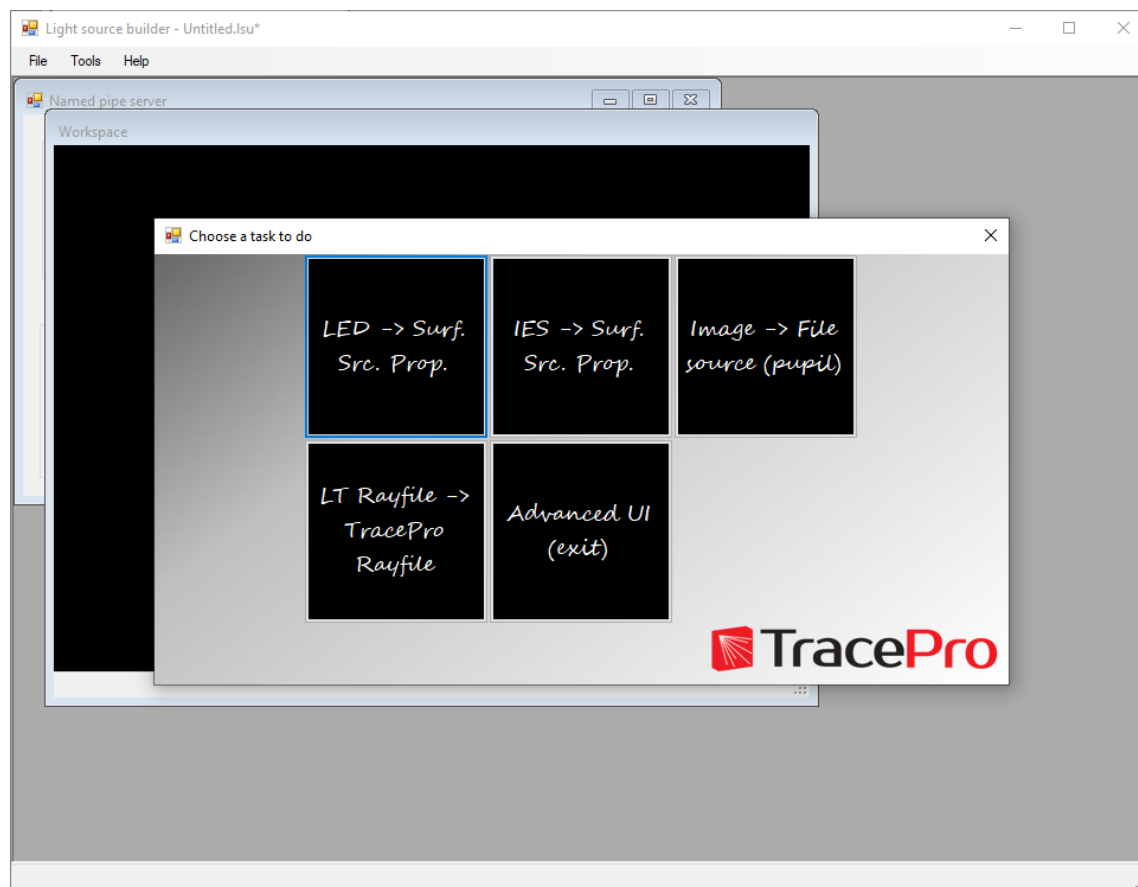


# TracePro 2022 22.1

**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.**

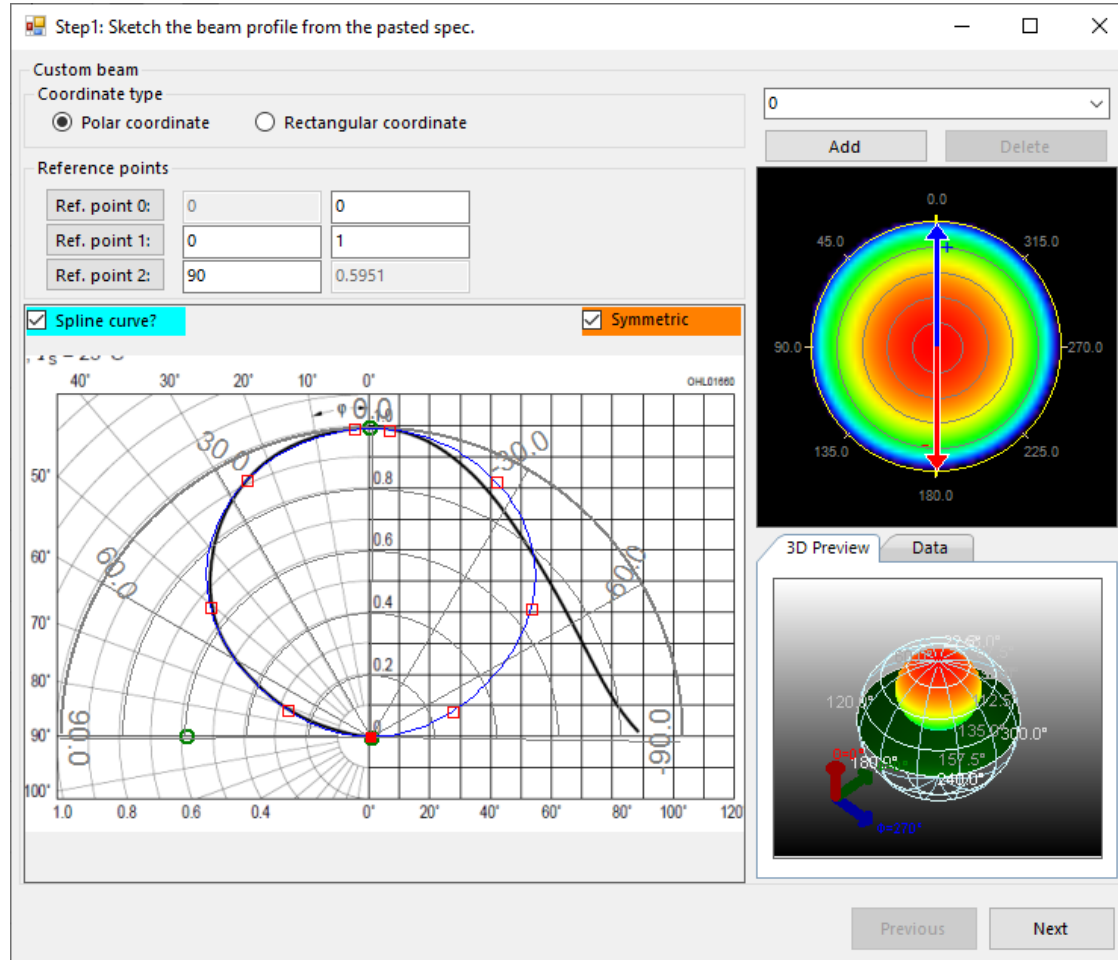
# TracePro 2022 22.1

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



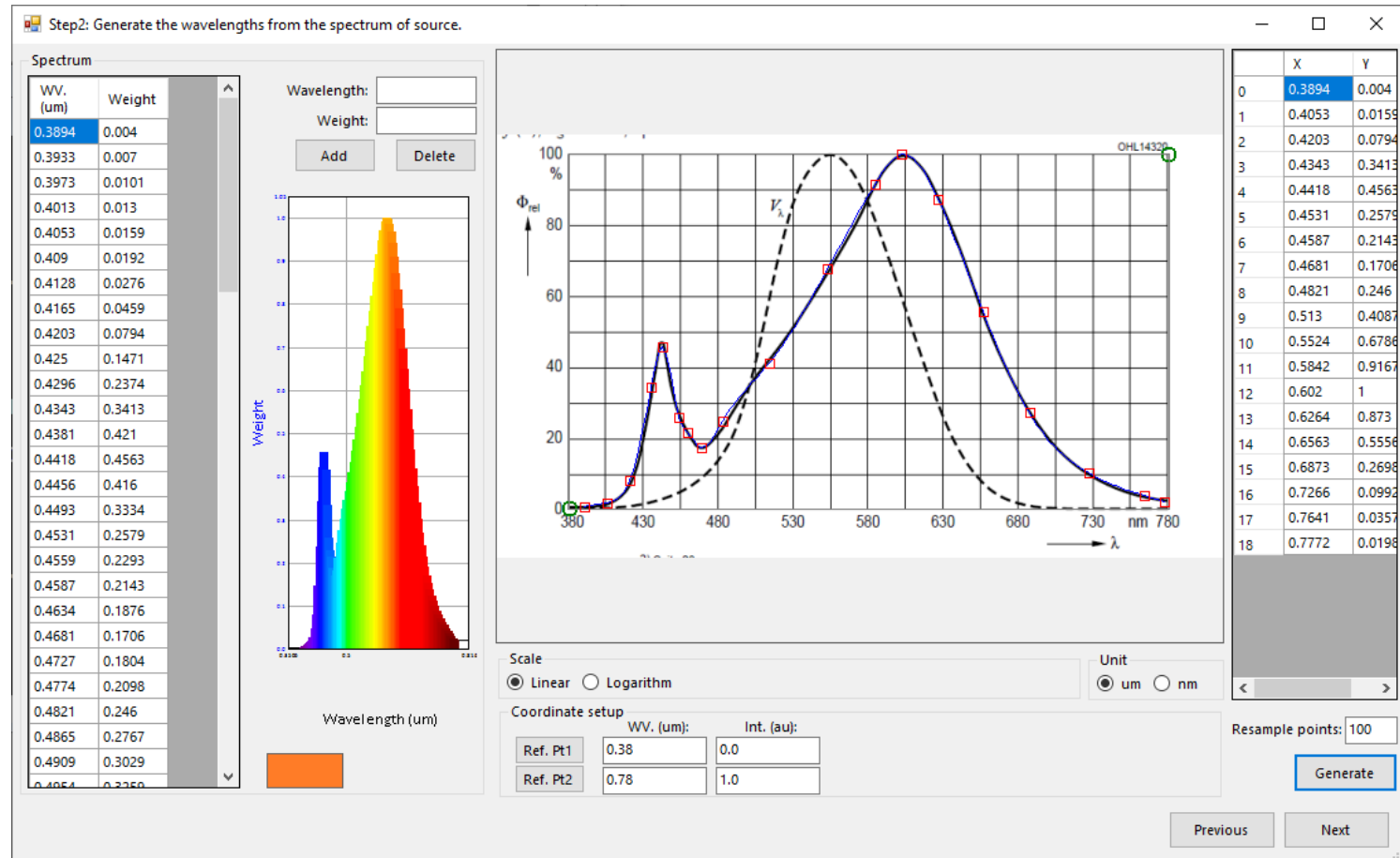
# TracePro 2022 22.1

## 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

Step1: Select an IES file to load

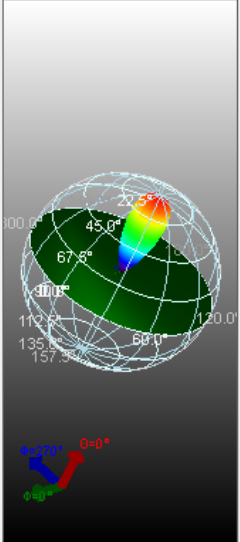
IES file: C:\Users\djacobsen\Documents\Dave\ Documents\Customer Demos\Demo Examples\LED spot with Difuser, IES.ies B

Load

Theta-Phi Array Beam

Polar (Theta) Num: 19 Azimuth (Phi) Num: 39

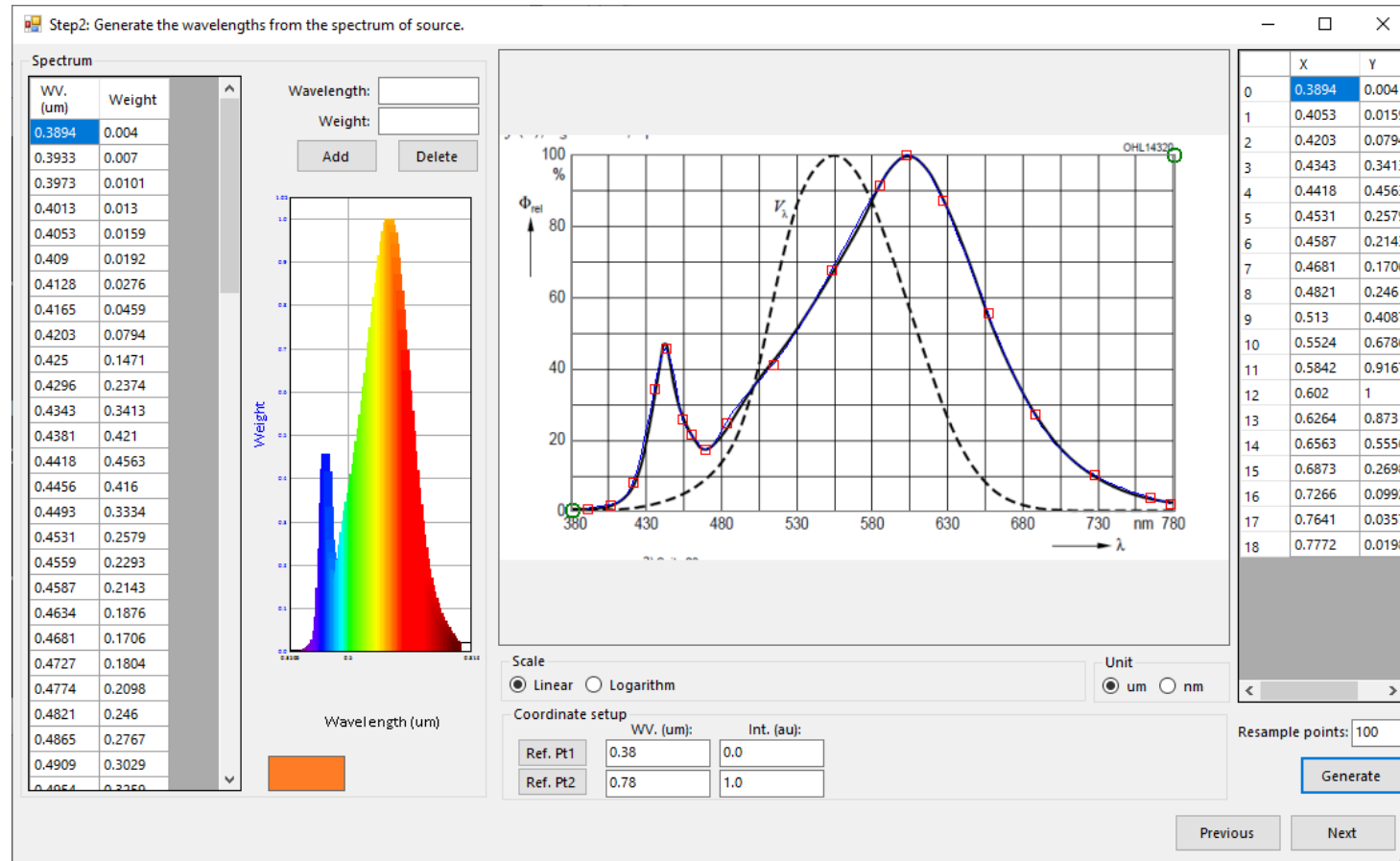
$\theta \backslash \phi$	0	9.47	18.9425	28.4175	37.89	47.3625	56.8375	66.3125
0	1541.069276	1541.069276	1541.069276	1541.069276	1541.069276	1541.069276	1541.069276	1541.069276
5	1514.429338	1518.024386	1522.328479	1522.778504	1518.339476	1517.680036	1515.215293	1518.024386
10	1406.299458	1406.741753	1412.690497	1415.802228	1421.883836	1426.325316	1417.067077	1414.429338
15	1176.123135	1168.698824	1170.582641	1184.998681	1185.675487	1188.795497	1173.512912	1181.069276
20	852.16618	858.151749	859.563633	859.048585	853.854484	854.413106	850.31668	855.069276
25	544.11054	549.407012	547.126362	543.791106	537.327337	544.139156	544.423422	536.069276
30	306.805103	312.080491	315.536942	310.806806	307.447622	310.549668	313.074276	310.069276
35	172.271423	169.824213	173.485761	172.06404	171.315792	171.160648	176.921088	174.069276
40	95.817549	93.552031	98.374245	98.614975	99.319036	101.591583	104.039642	101.069276
45	58.806321	60.140225	61.767839	61.961413	59.818978	61.329469	61.494795	64.069276
50	43.628841	43.257531	42.65771	43.26134	40.802523	41.313079	42.537062	43.069276
55	32.121384	31.256715	30.515384	30.595593	31.432254	31.378397	31.860134	32.069276
60	23.488101	22.672001	23.251288	22.532762	23.140041	23.394909	23.254375	23.069276
65	17.156877	16.173229	16.262771	15.480261	16.593275	16.289148	15.421443	16.069276



Previous Next

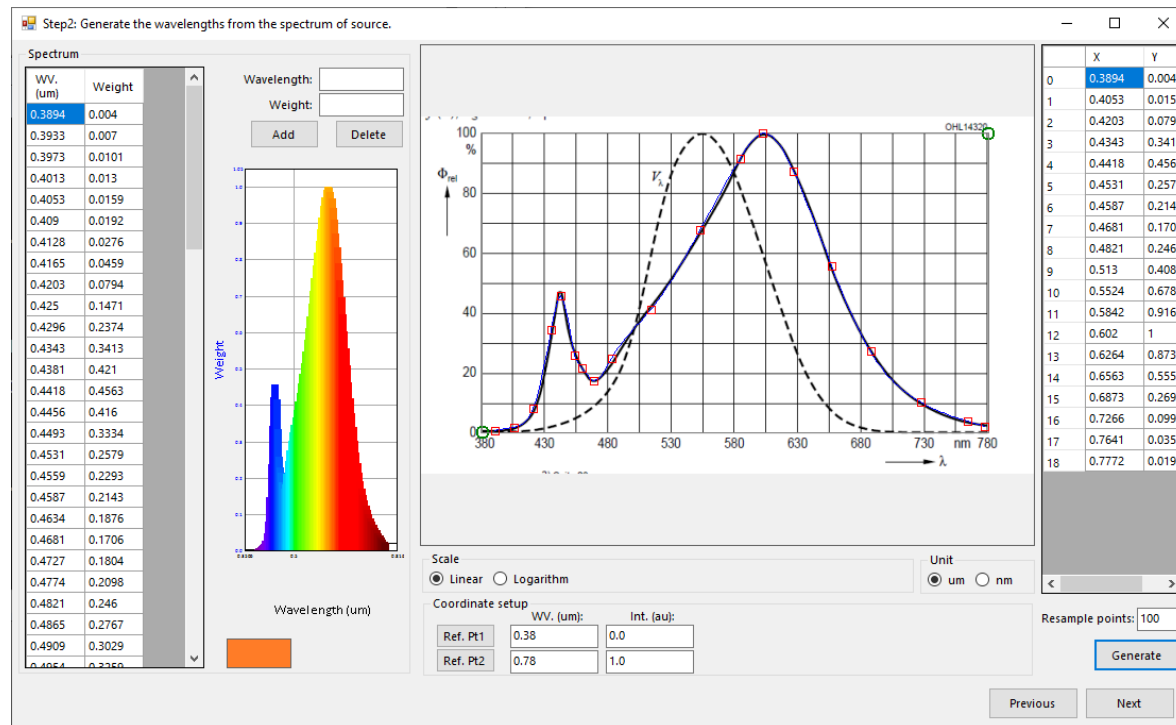
# TracePro 2022 22.1

## Light Source Builder – Surface Source Property from IES file

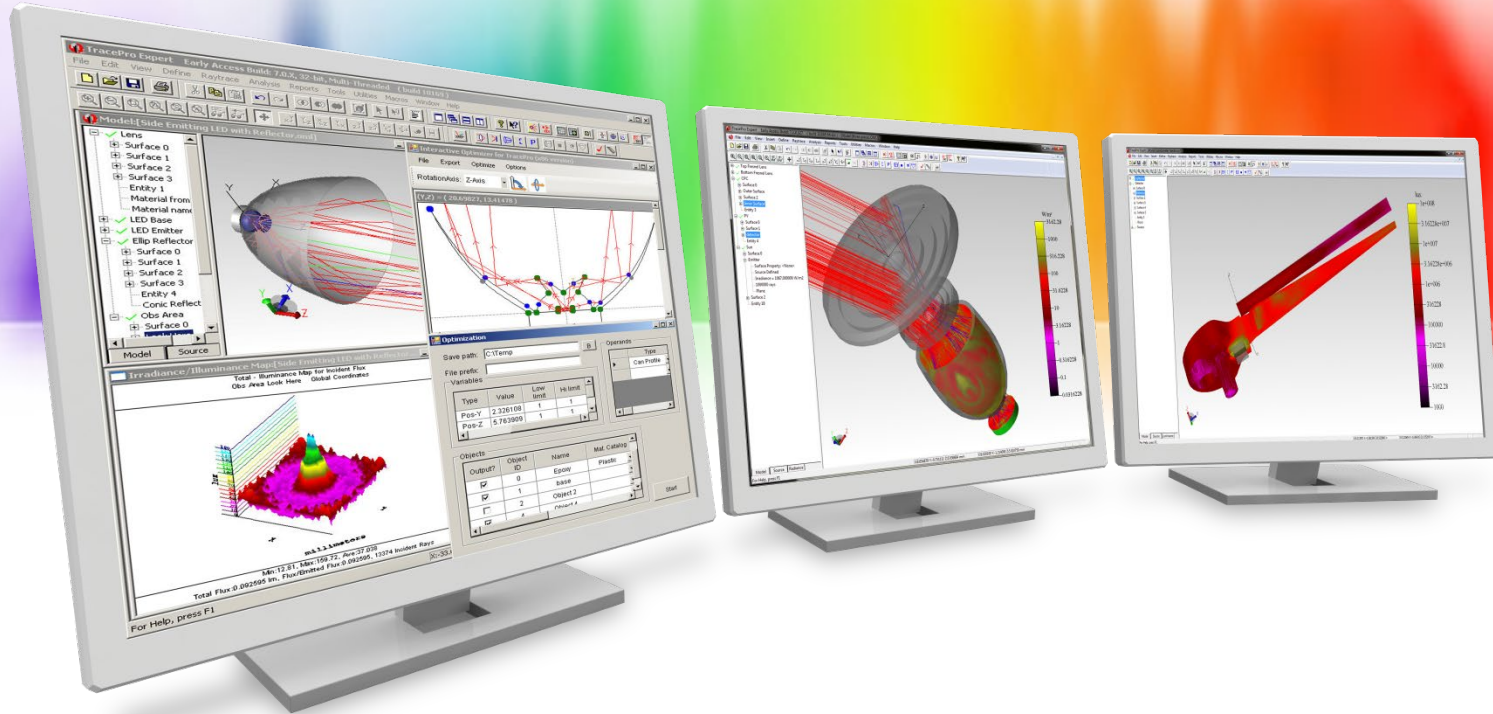


# New Light Source Builder

## Surface Source Property from IES file







# New Features in TracePro 2021 21.5

# TracePro 2021 21.5

## ➤ **TracePro**

- New Stary Light Analyzer utility

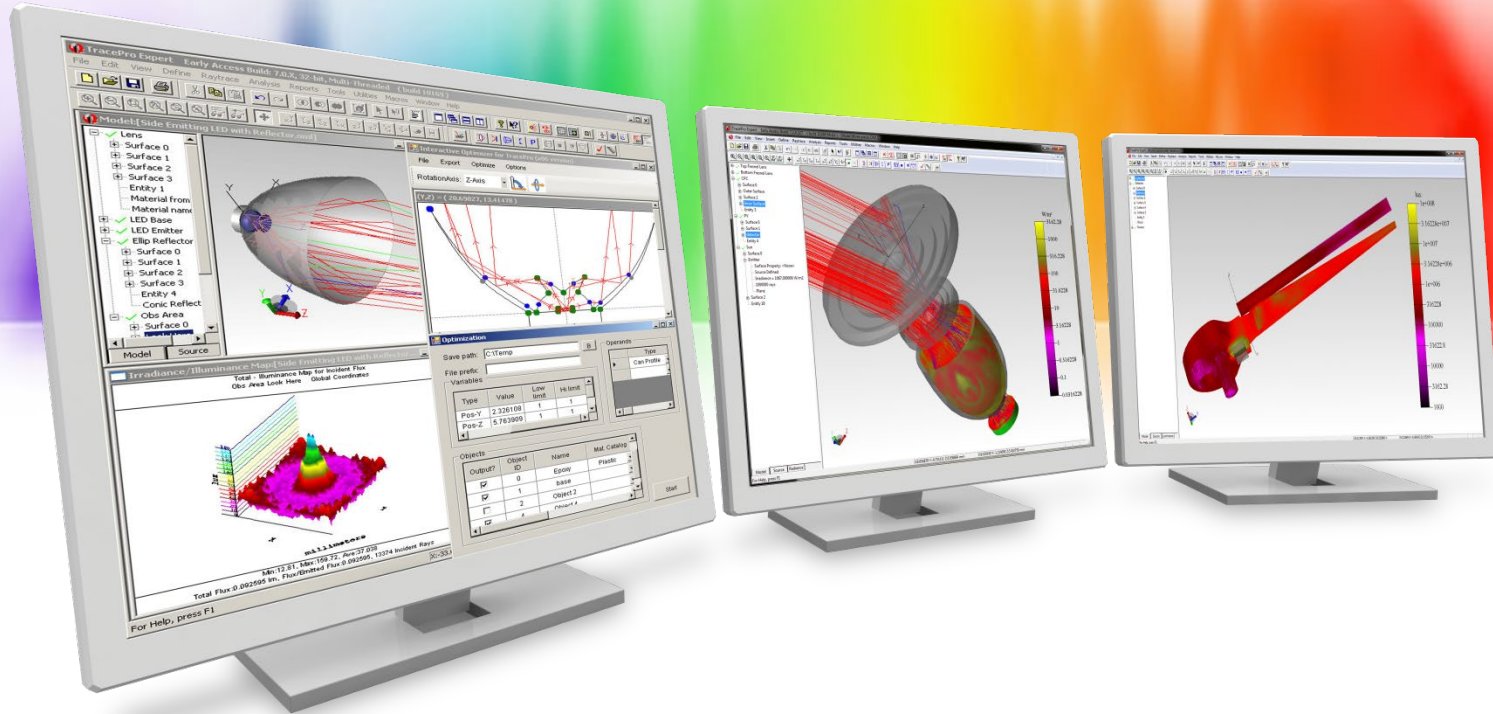
## ➤ **Interactive Optimizer**

- 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**



# New Features in TracePro 2021 21.4

# TracePro 2021 21.4

## ➤ **TracePro**

- New Stary Light Analyzer utility

## ➤ **Interactive Optimizer**

- New rectangular hole option has been added to the Reflector object type

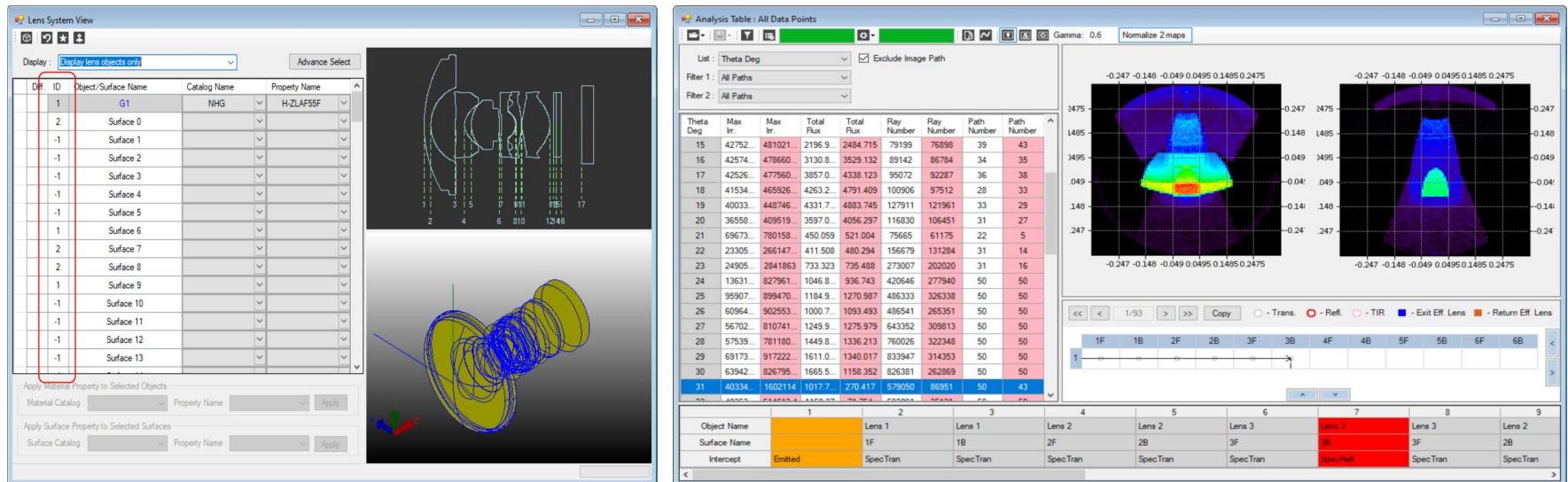
## ➤ **Lighting Toolkit**

- New regulations have been added
- Regulations have been updated

## ➤ **New Scheme commands**

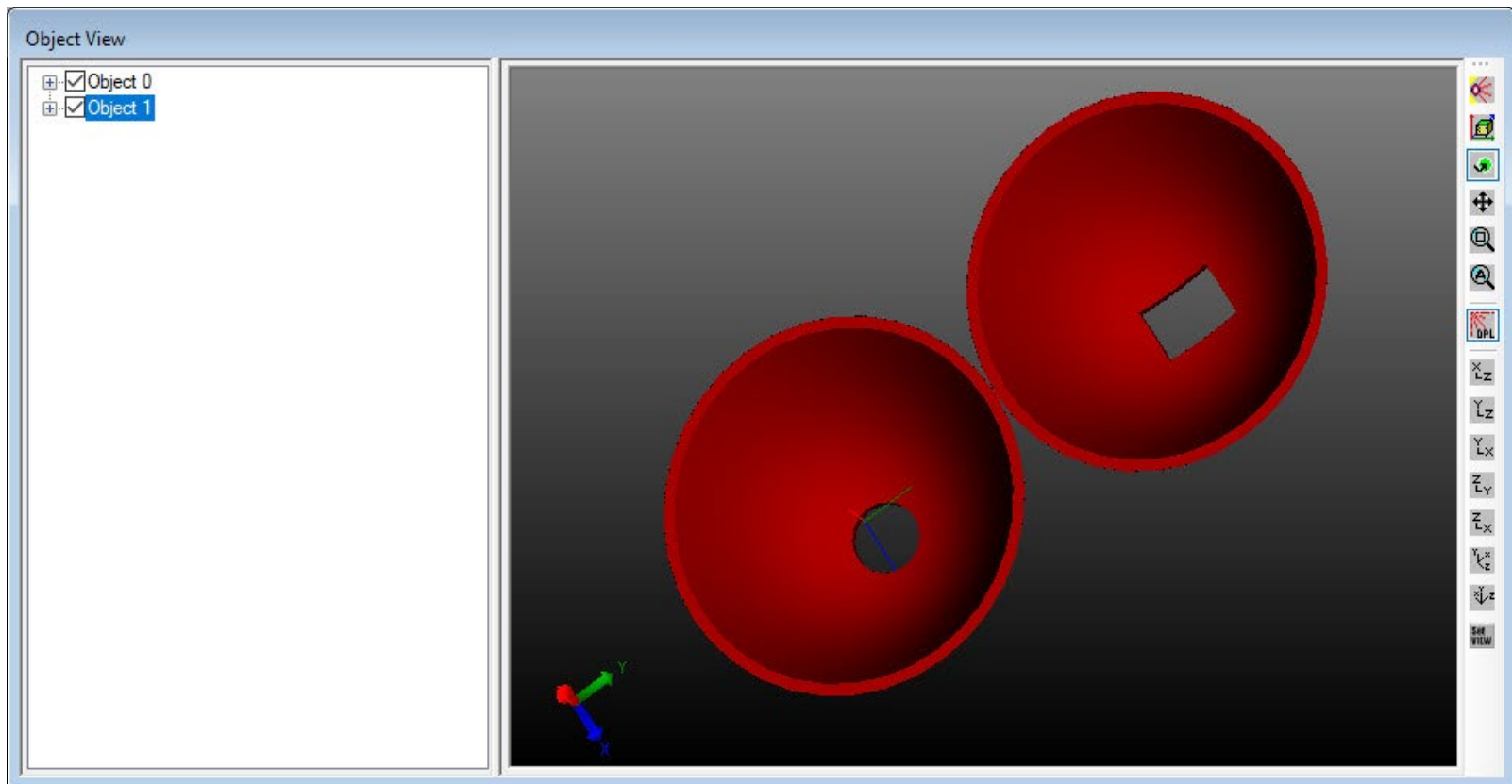
# TracePro 2021 21.4

**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

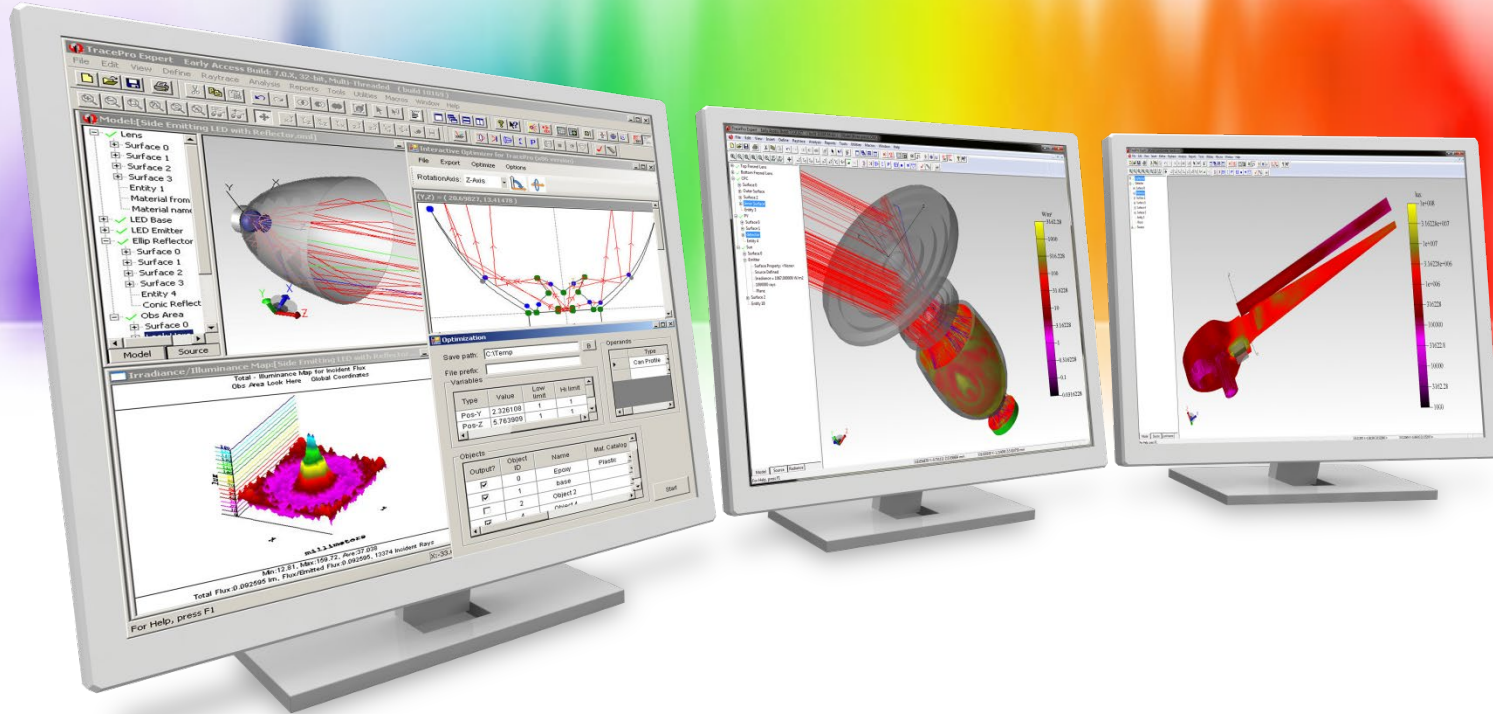
- ECE R6
- ECE R3
- ECE R91
- ECE R98
- ECE R112 (2010, 2012)
- FMVSS 108 Figures 17, 27, 28



# TracePro 2021 20.3

## ➤ **New Scheme commands**

- geometry:get-block-parameters
- modify:primitive-block



# New Features in TracePro 2021 21.3

# 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

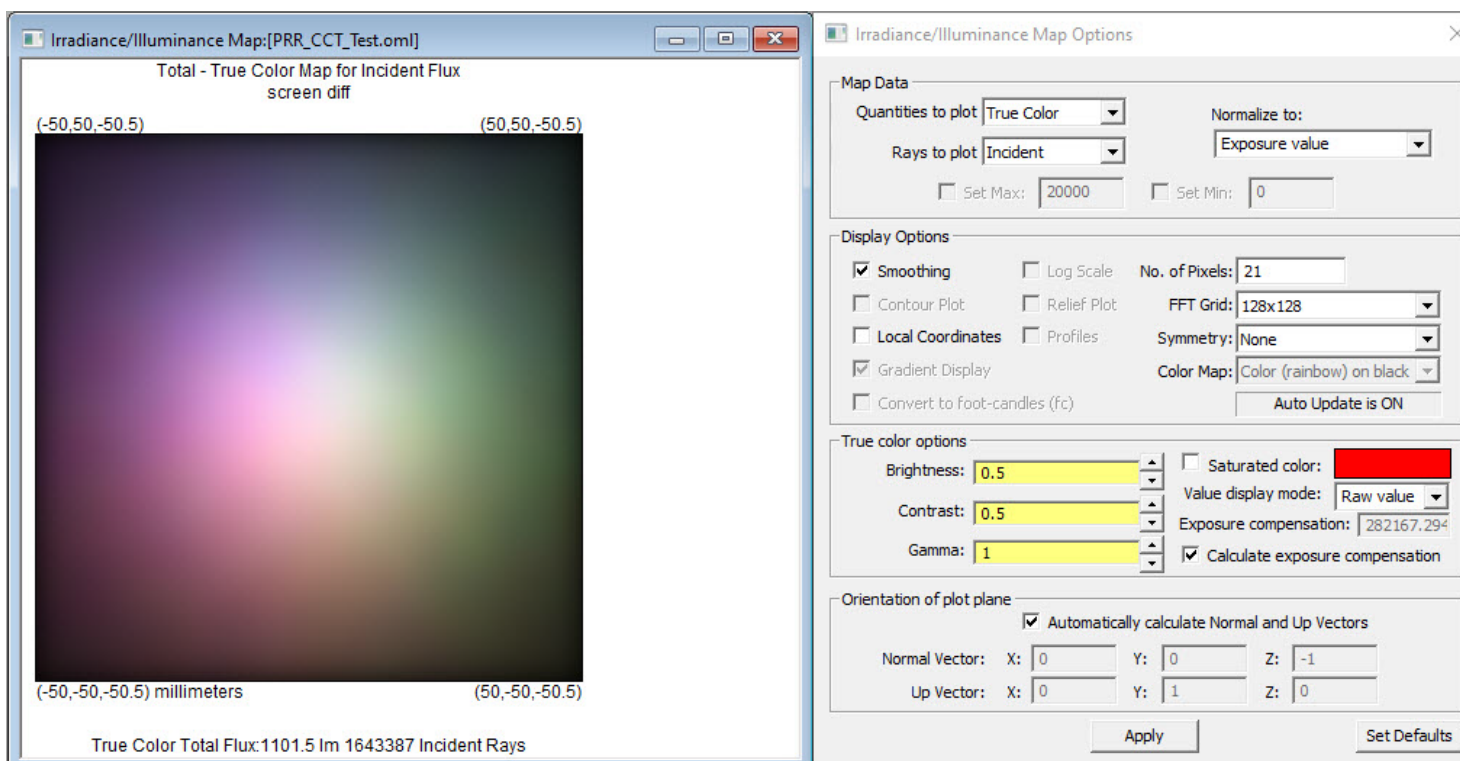
## ➤ **Analysis Toolkit**

- A polygon analysis shape for luminance analysis has been added

## ➤ **New Scheme commands**

# TracePro 2021 21.3

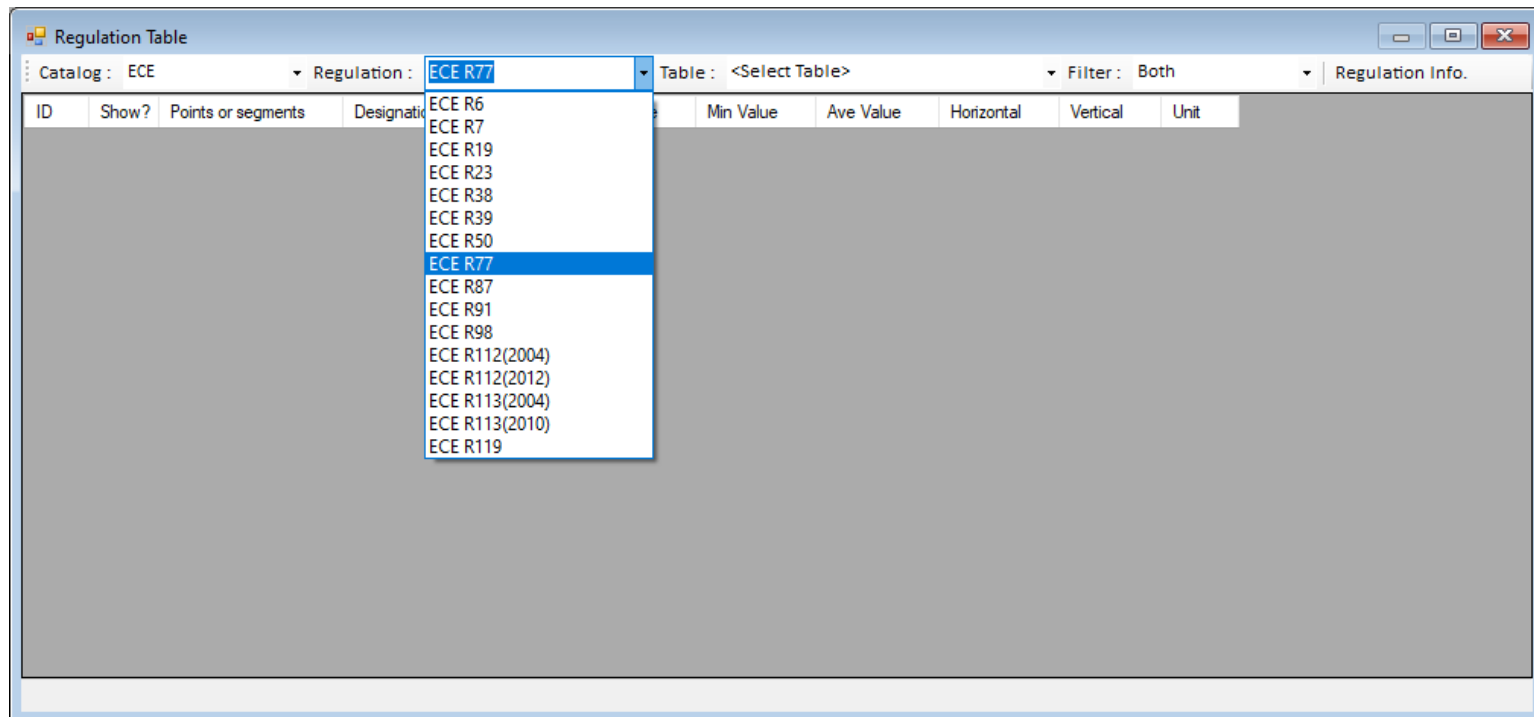
**TracePro – A new Exposure Compensation option has been added to the Photorealistic Rendering and TrueColor Plots. This allows normalizing the color to a saturated white or monochromatic color. There is also a new option to normalize to the highest color in the plot.**



# TracePro 2021 21.3

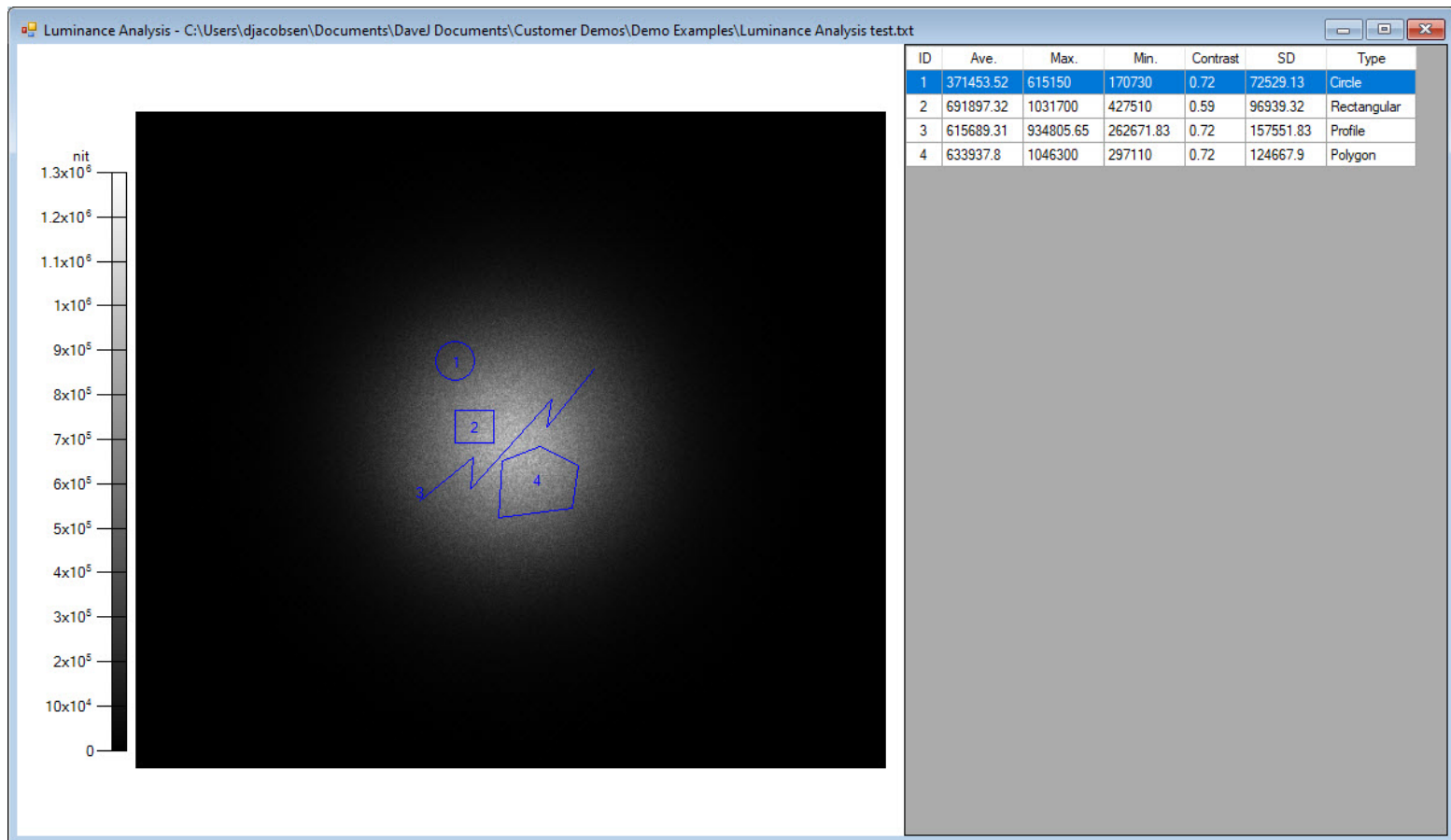
## Lighting Toolkit – Three new ECE regulation tables

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



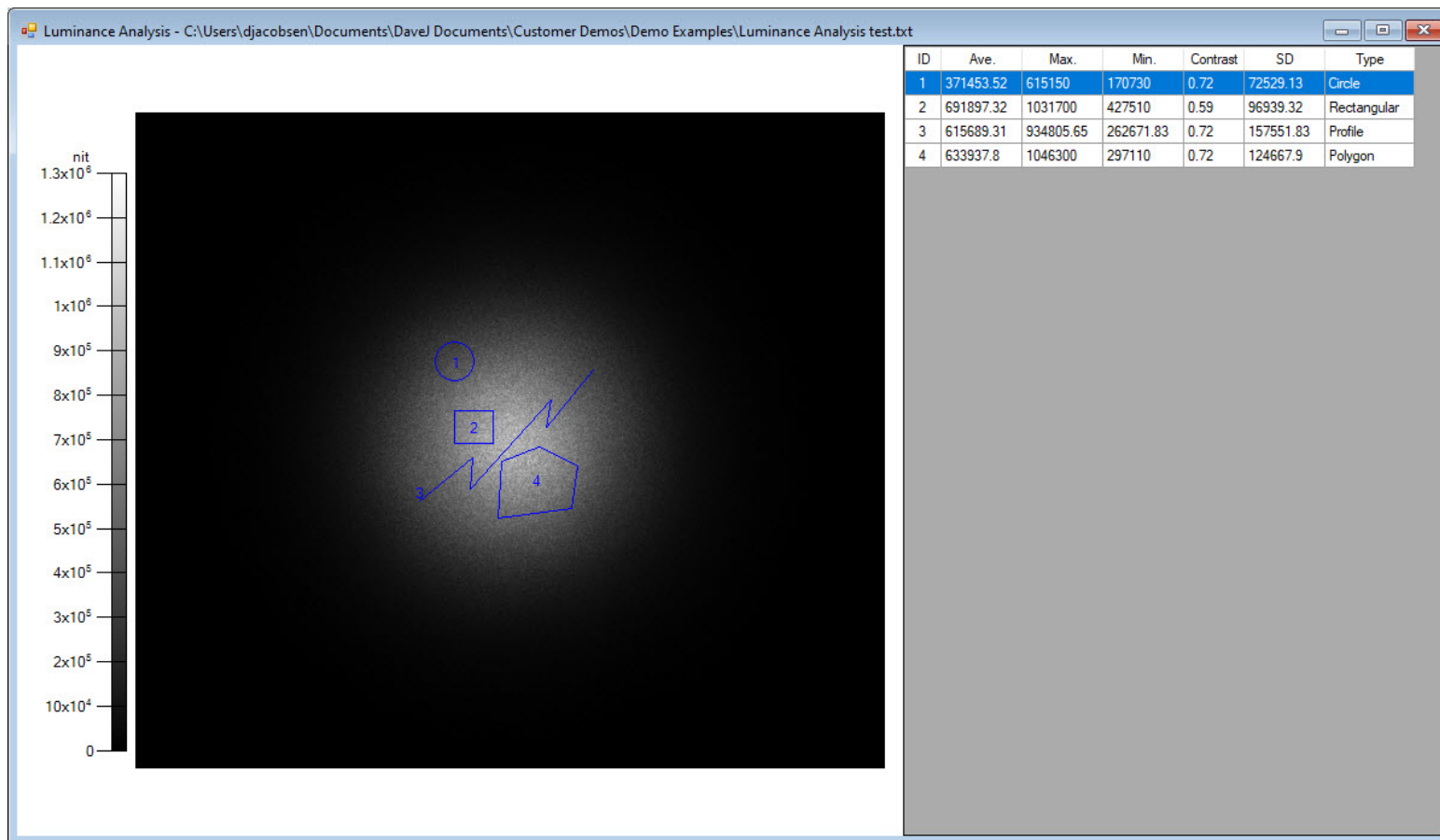
# TracePro 2021 21.3

**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**

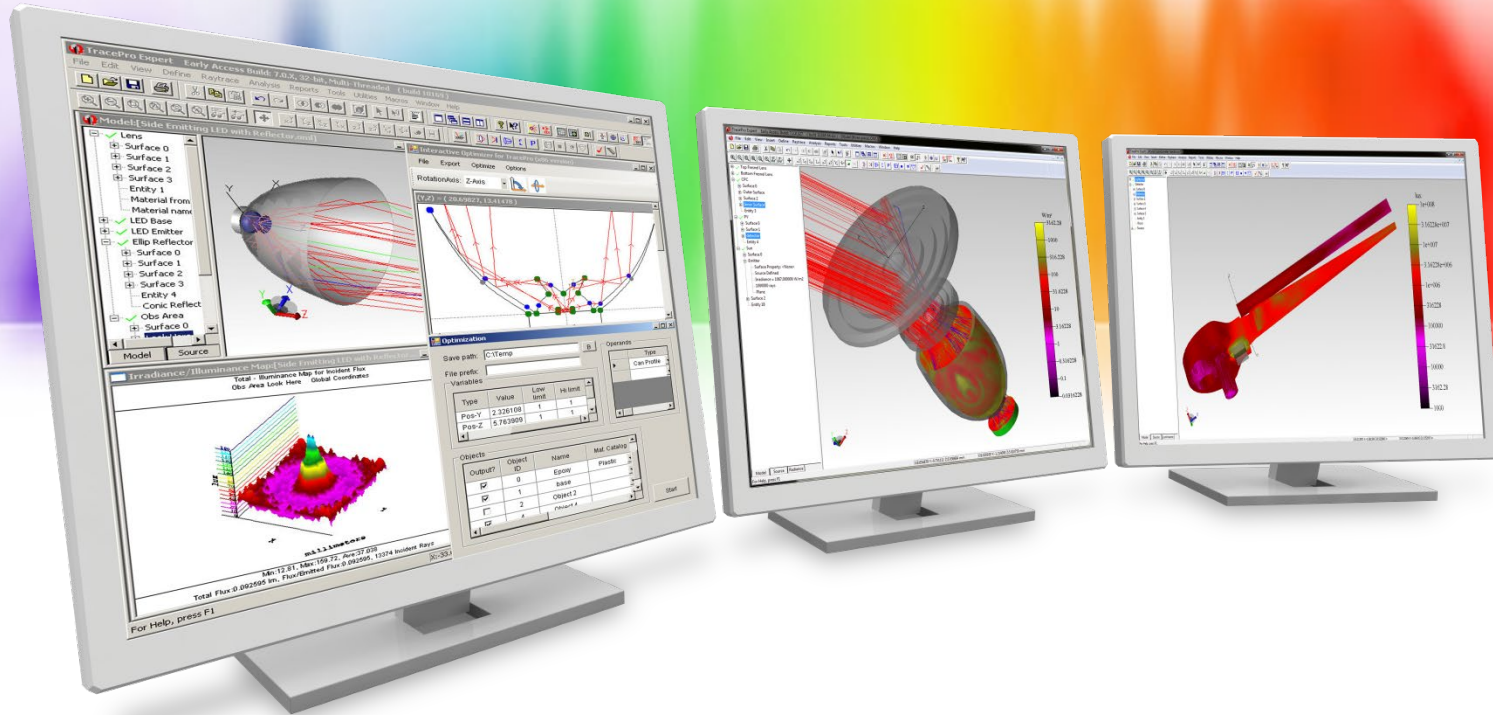


# TracePro 2021 20.3

## ➤ **New Scheme commands**

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





# New Features in TracePro 2021 21.2

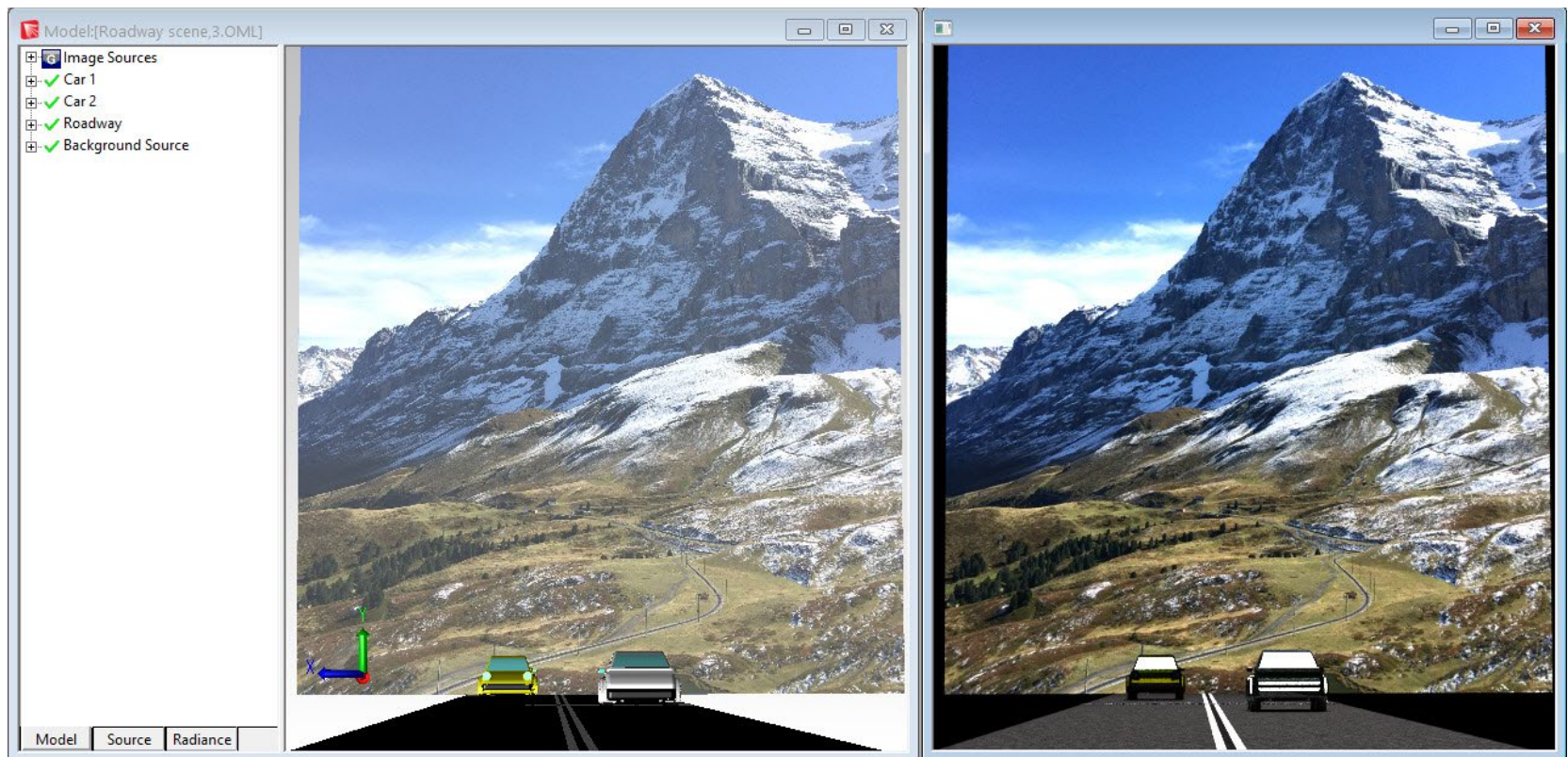
# TracePro 2021 21.2

## ➤ 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.**

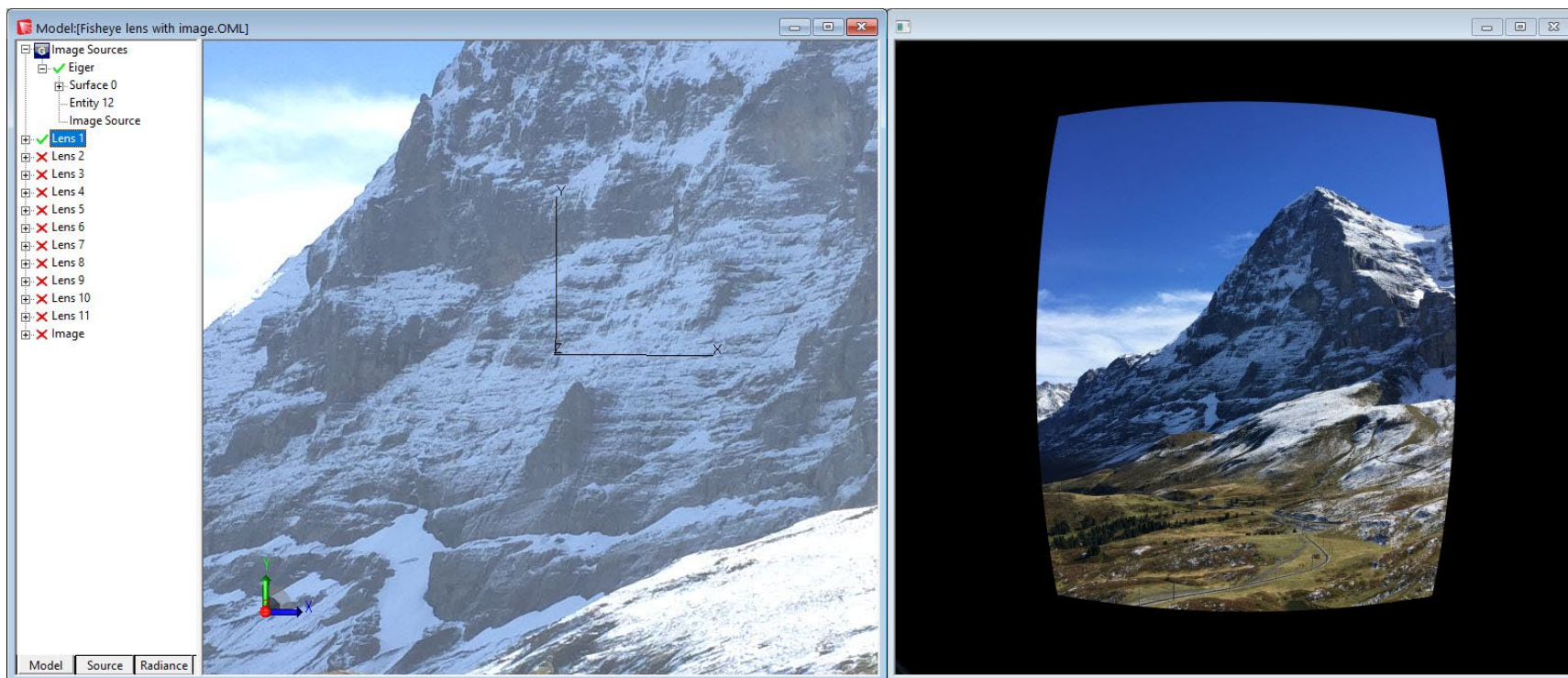
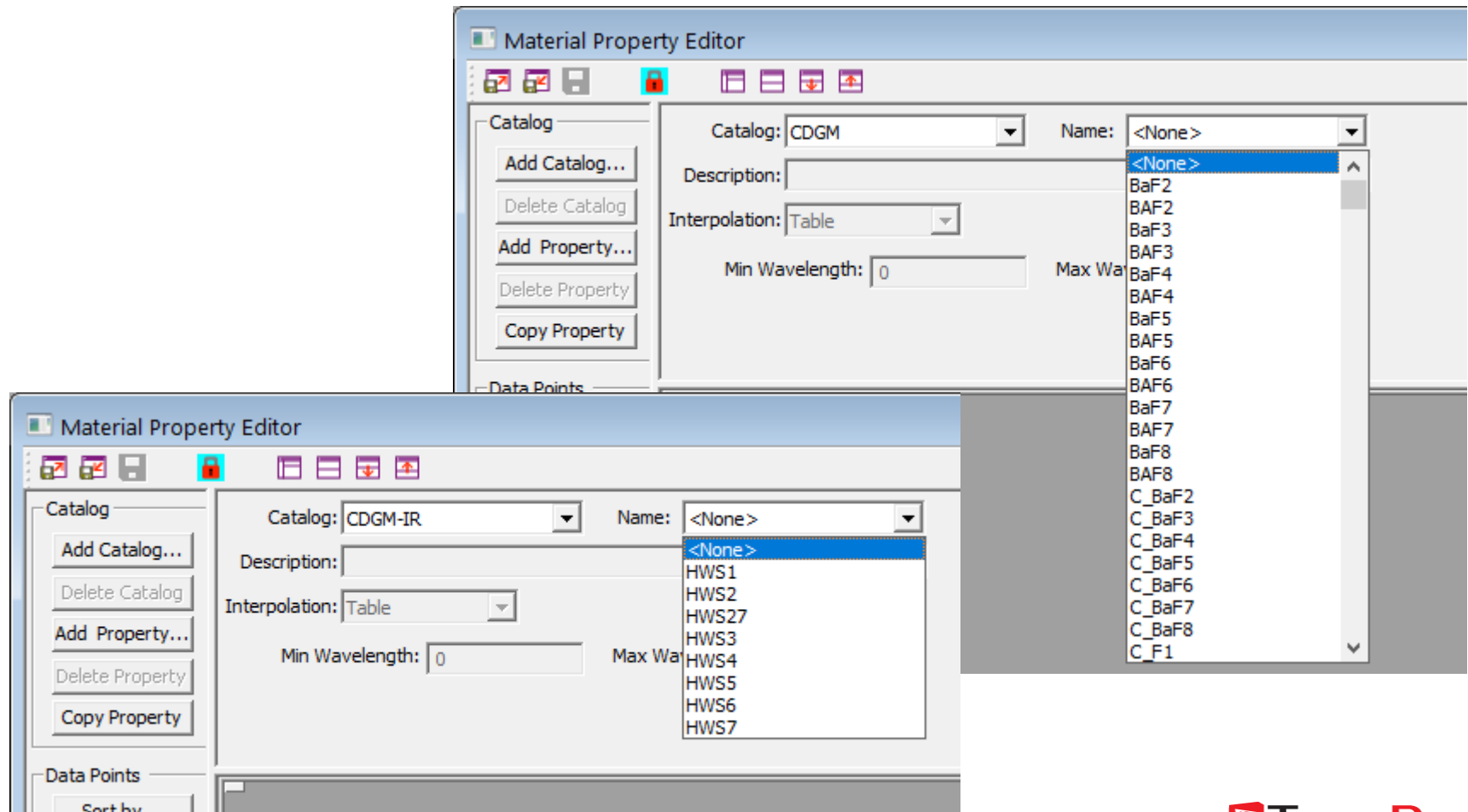
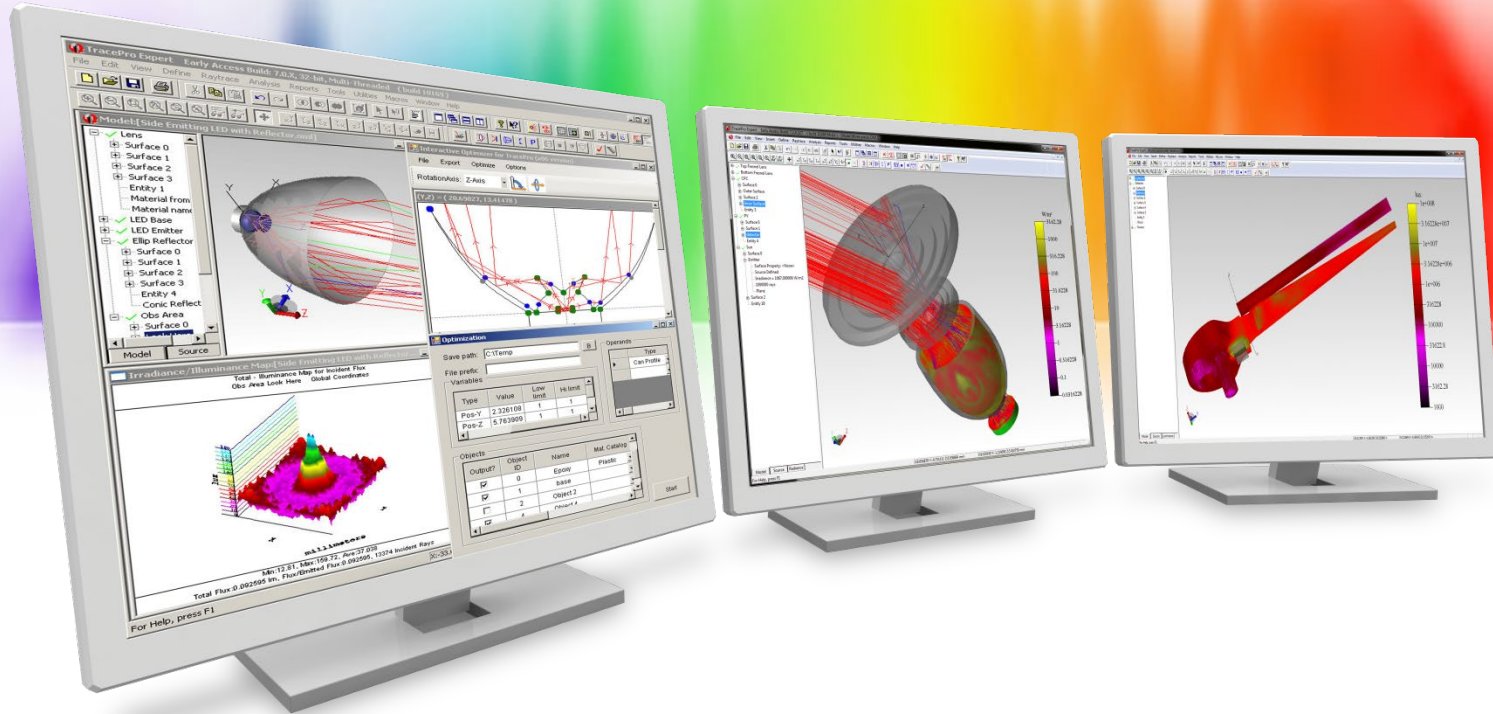


Image as viewed through a wide angle lens

# 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.**





# New Features in TracePro 2021 21.1

# TracePro 2021 21.1

## ➤ **Interactive Optimizer**

- New capability for editing values of points in the Irradiance Profile operand

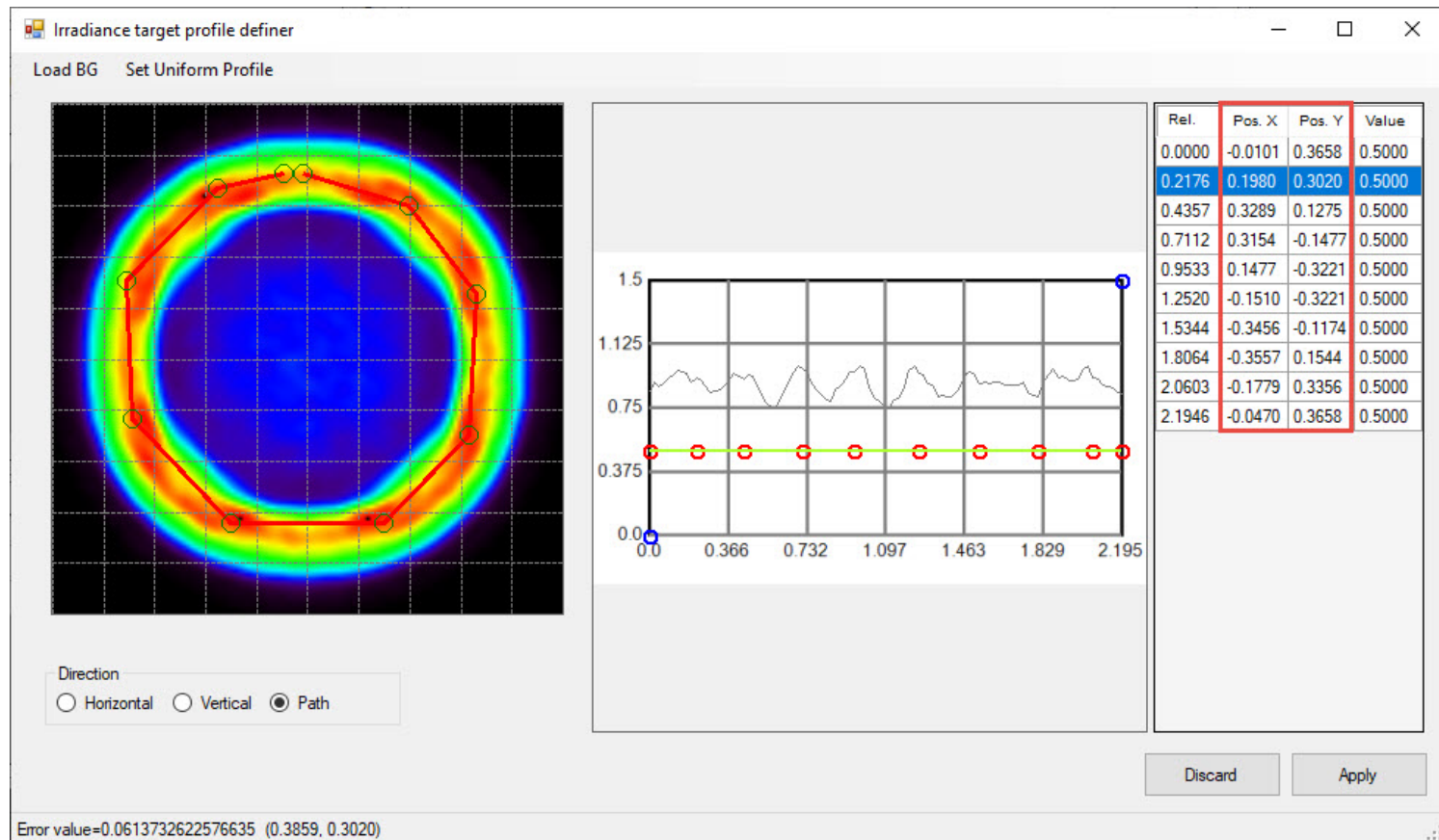
## ➤ **Lighting Toolkit**

- 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**

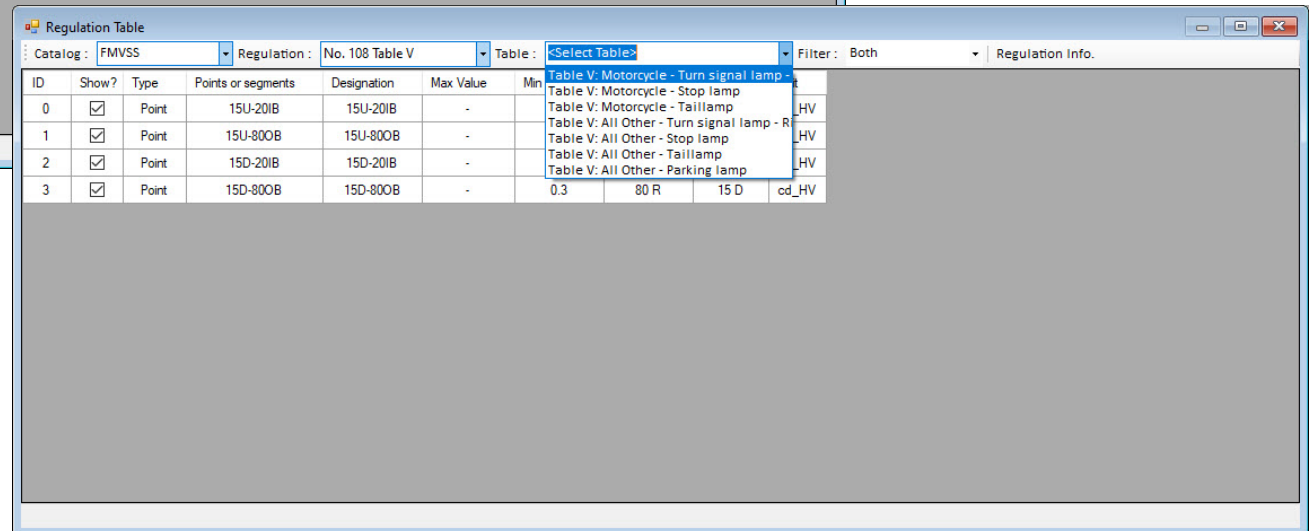
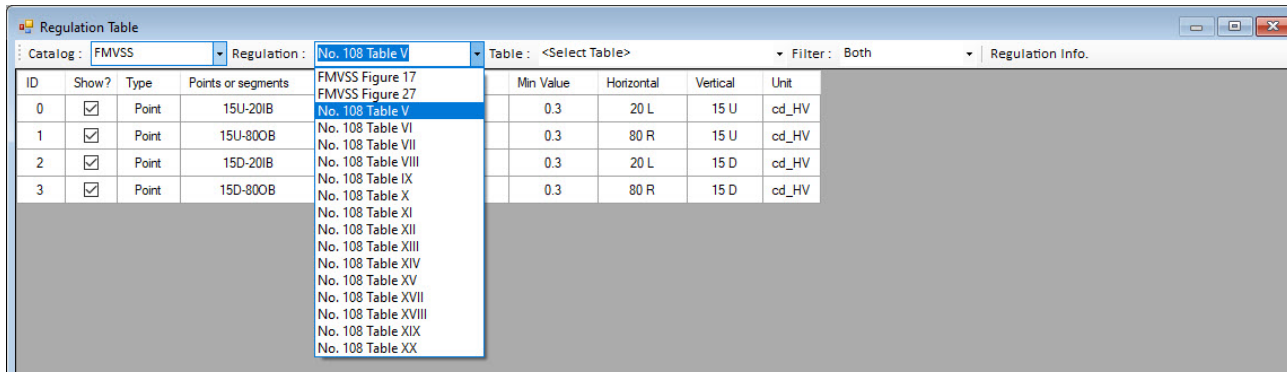




# TracePro 2021 20.1

## ➤ Lighting Toolkit

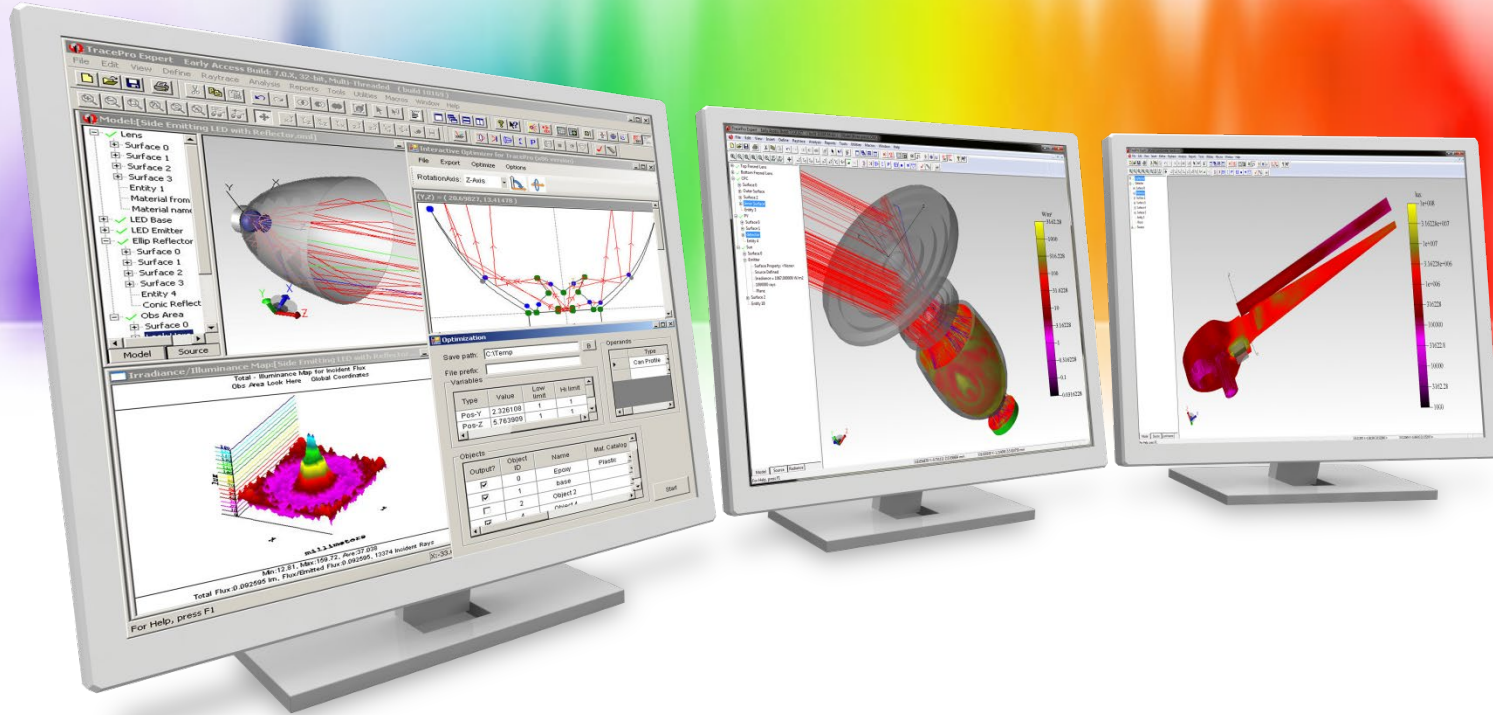
- 62 FMVSS 108 regulations have been added



# TracePro 2021 20.1

## ➤ **New Scheme command**

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



# New Features in TracePro 2020 20.6

# TracePro 2020 20.6

## ➤ **TracePro**

- New RepTile geometry shape – Circular Hip Roof

## ➤ **Lighting Toolkit**

- New SAE J595 regulations have been added

## ➤ **Surface Property Generator**

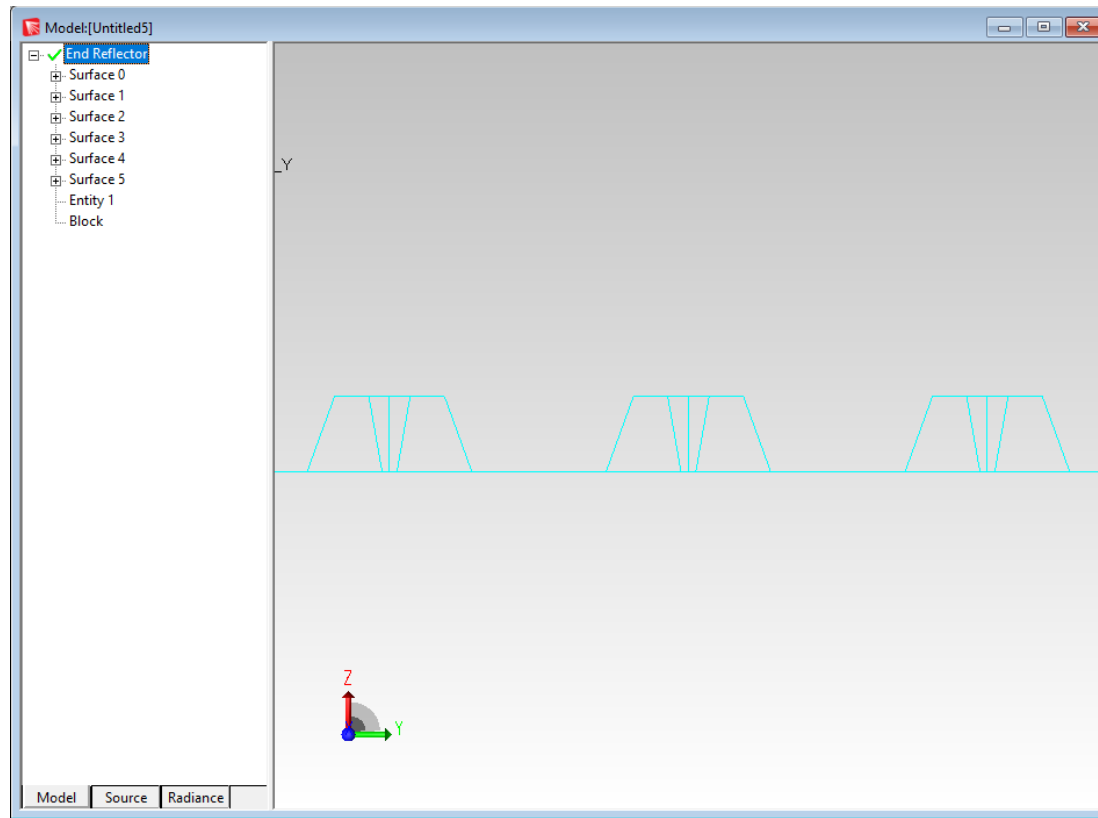
- New Import Data options have been added

## ➤ **New Scheme commands**

# TracePro 2020 20.6

## ➤ TracePro

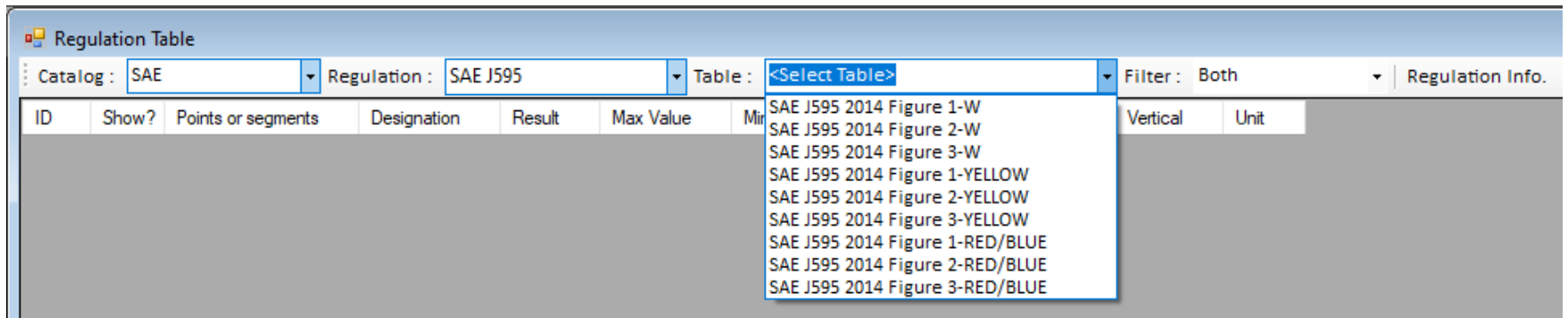
### ➤ New RepTile shape – Circular Hip Roof



# TracePro 2020 20.6

## ➤ Lighting Toolkit

- 9 SAE J595 regulations have been added



# TracePro 2020 20.6

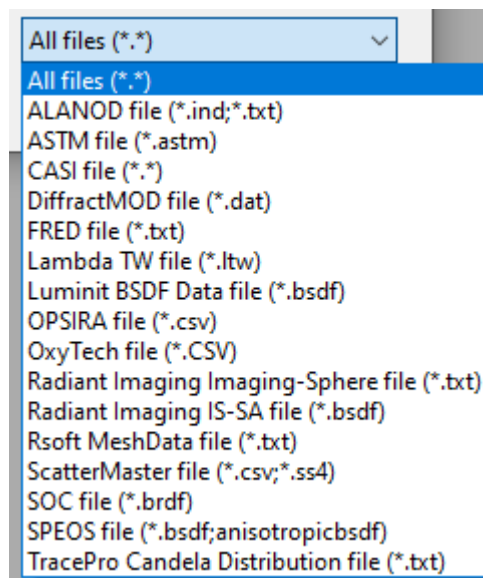
## ➤ Surface Property Generator

➤ Import of 3 new data types is now supported

➤ ASTM file format

➤ Rsoft NeshData format

➤ OPTIS – brdf surface file v3.0

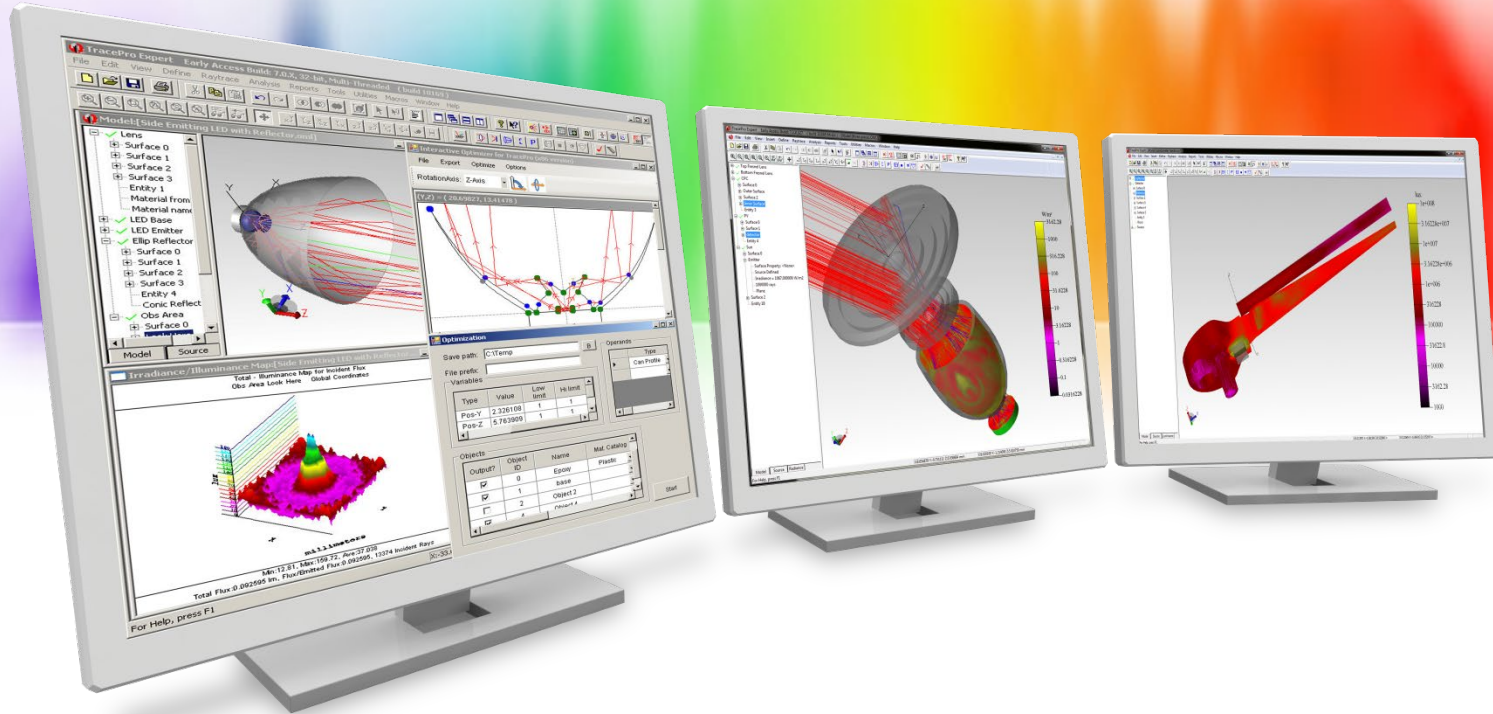


# TracePro 2020 20.6

## ➤ **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



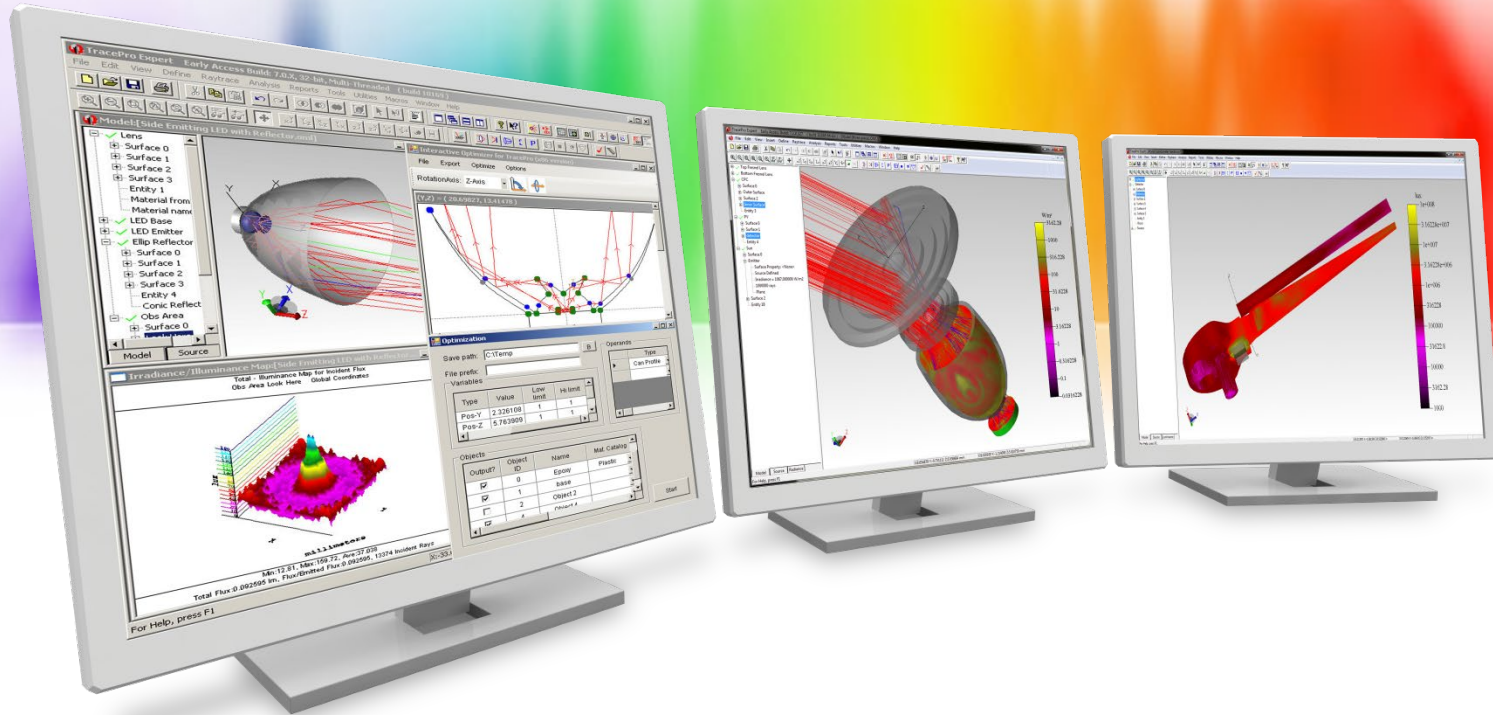


# New Features in TracePro 20.5

# 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?)



# New Features in TracePro 2020 20.4

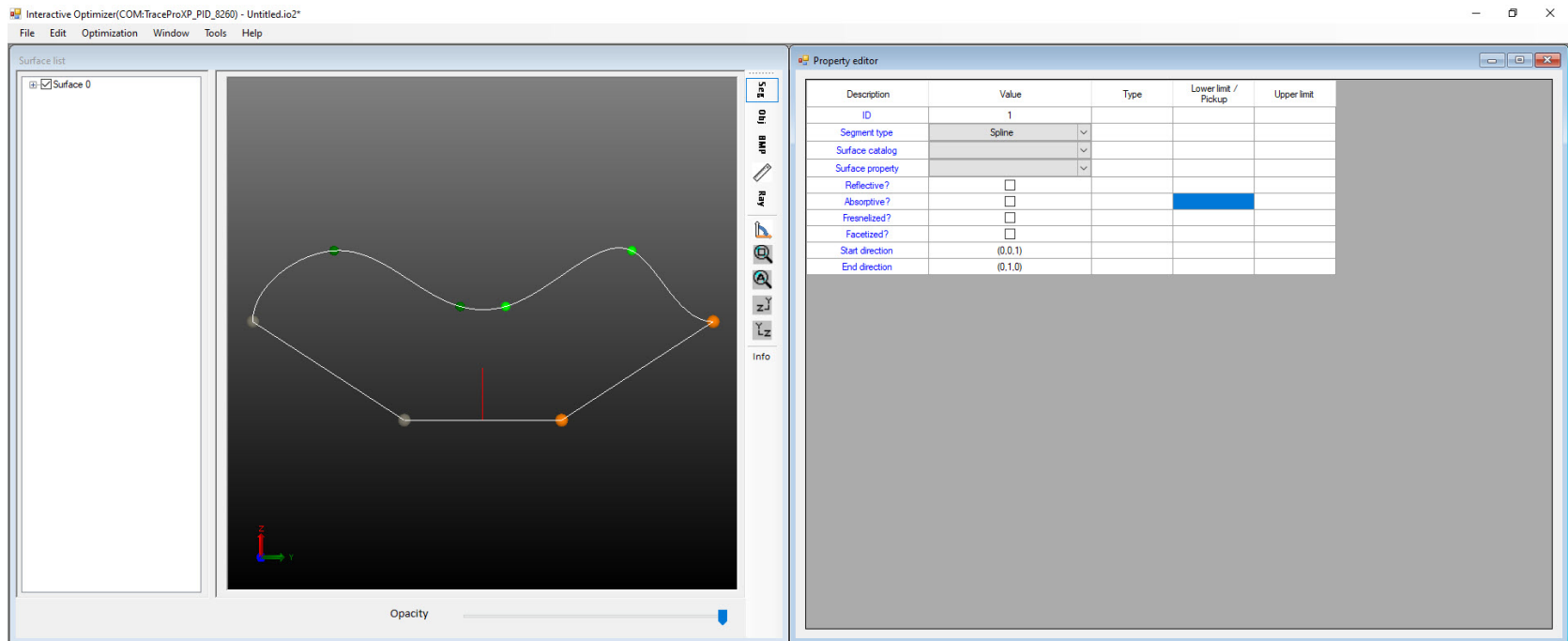
# TracePro 2020 20.4

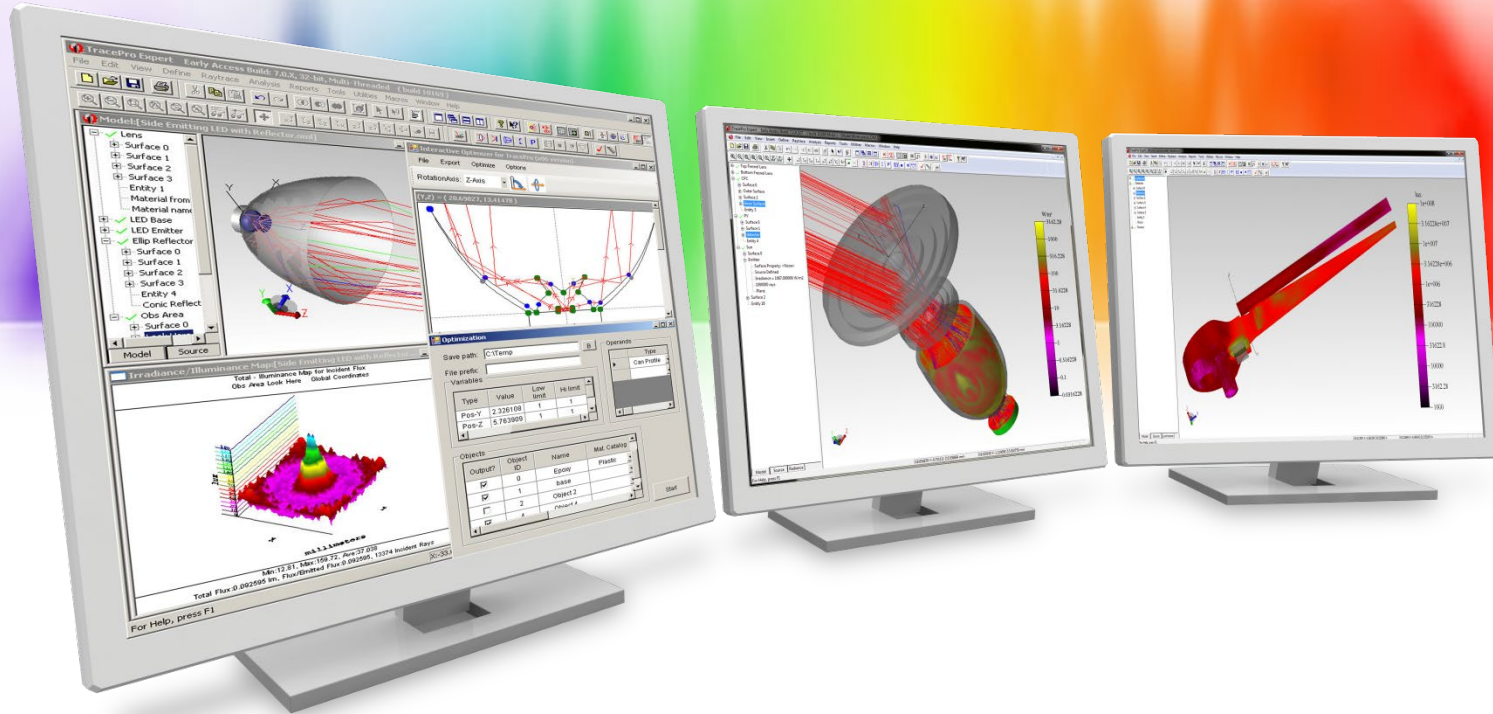
## ➤ **Interactive Optimizer**

- 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**





# New Features in TracePro 2020 20.3

# 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

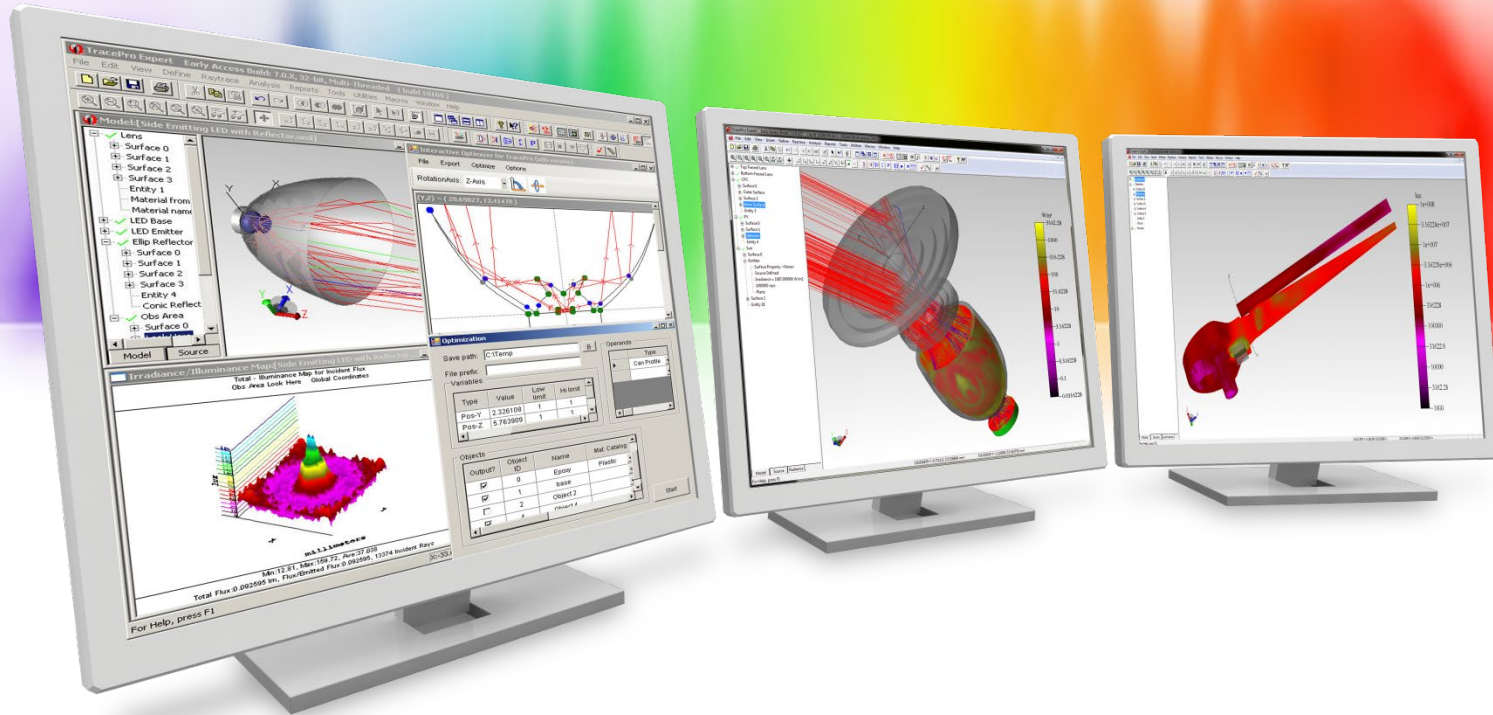
Errors: None

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:



# New Features in TracePro 20.20.2

# TracePro 2020 20.2

## ➤ TracePro

- New Material Property catalog for Dow Silastic moldable silicone materials

## ➤ Texture Optimizer II

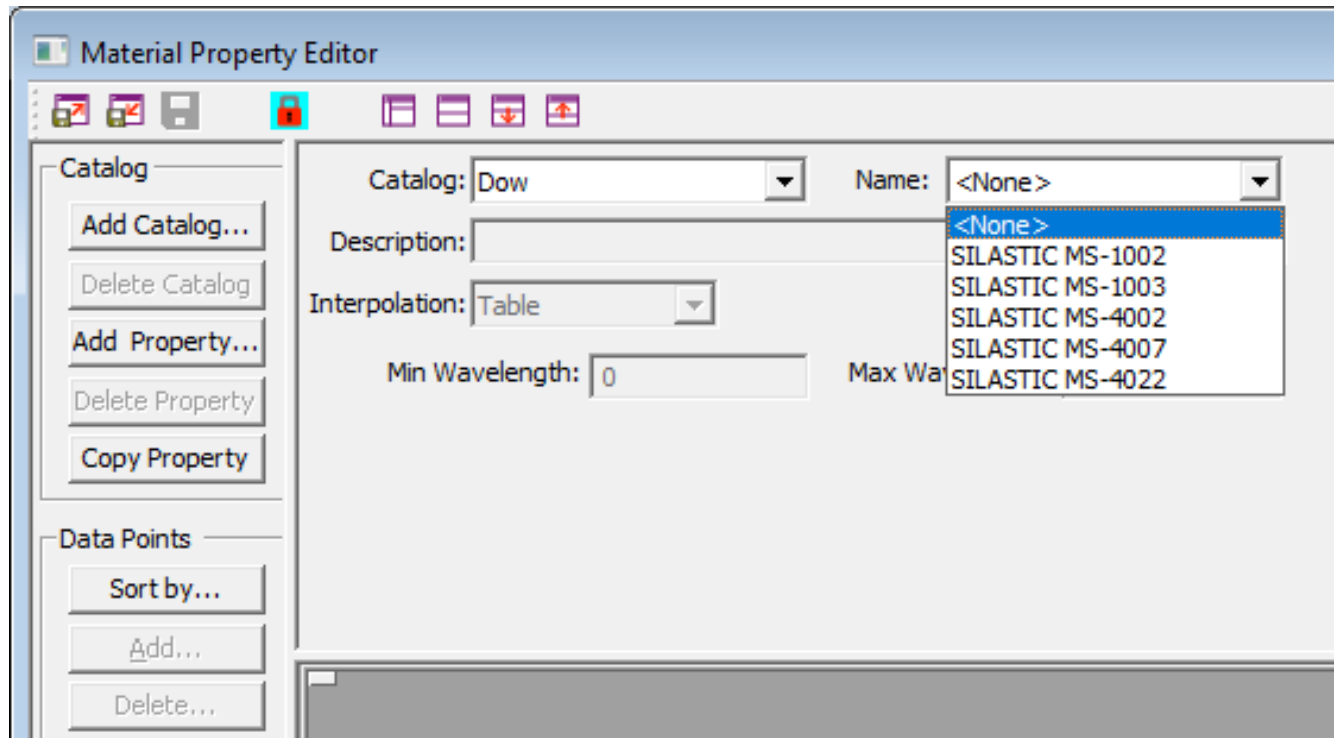
- New capability for a random dot distribution
- New capability for smoothing the dot distribution
- New tool to measure Dot spacing

## ➤ 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

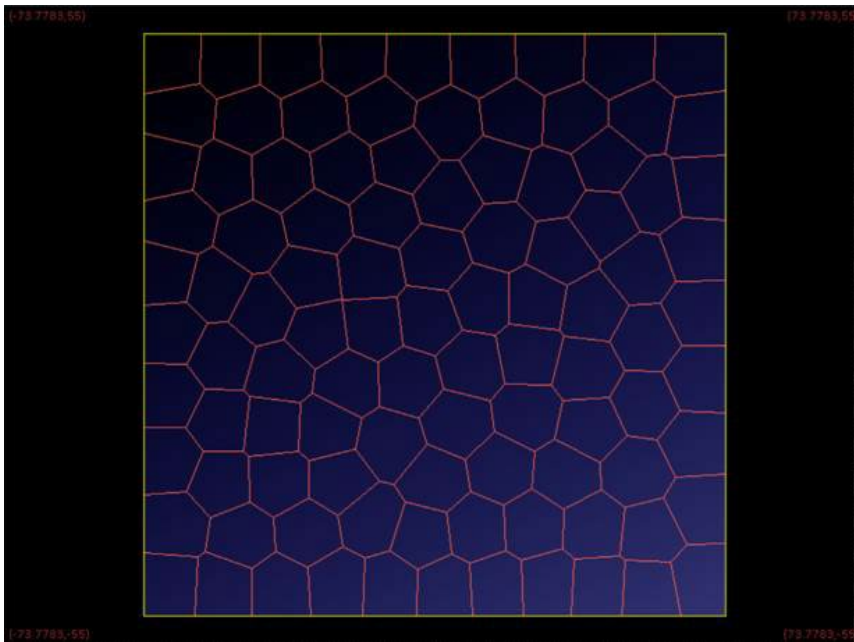
# TracePro 2020 20.2

**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**

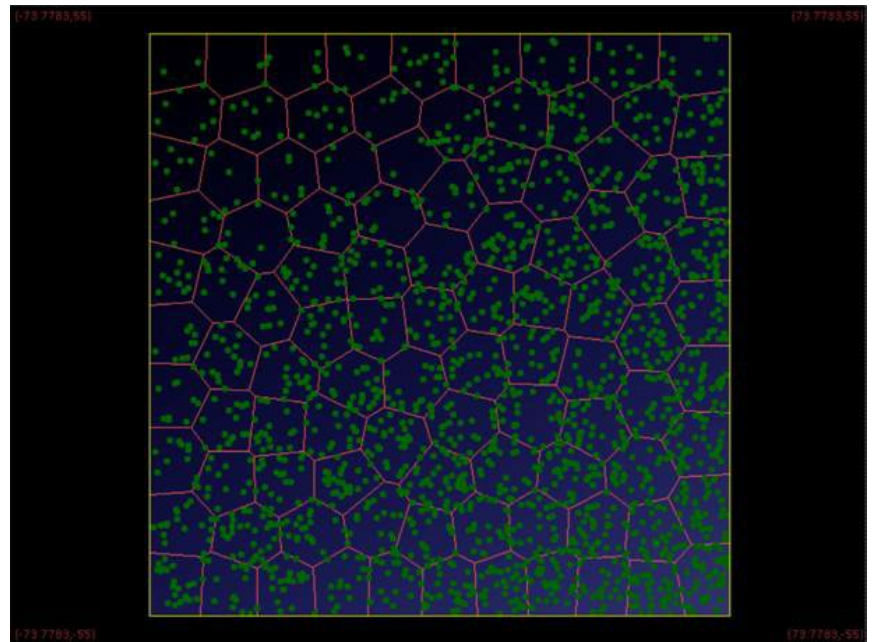


# TracePro 2020 20.2

**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

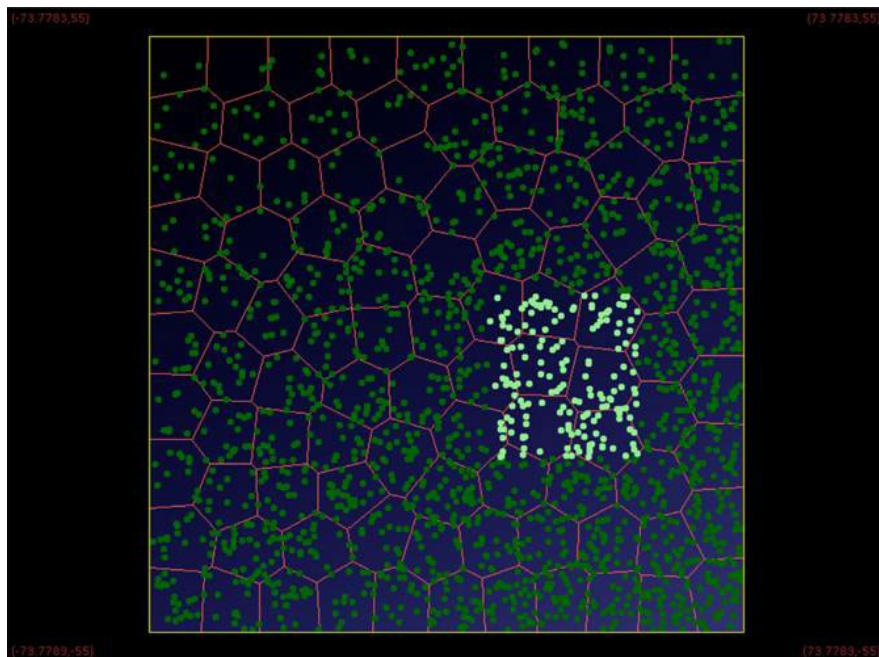


Random dots using density map

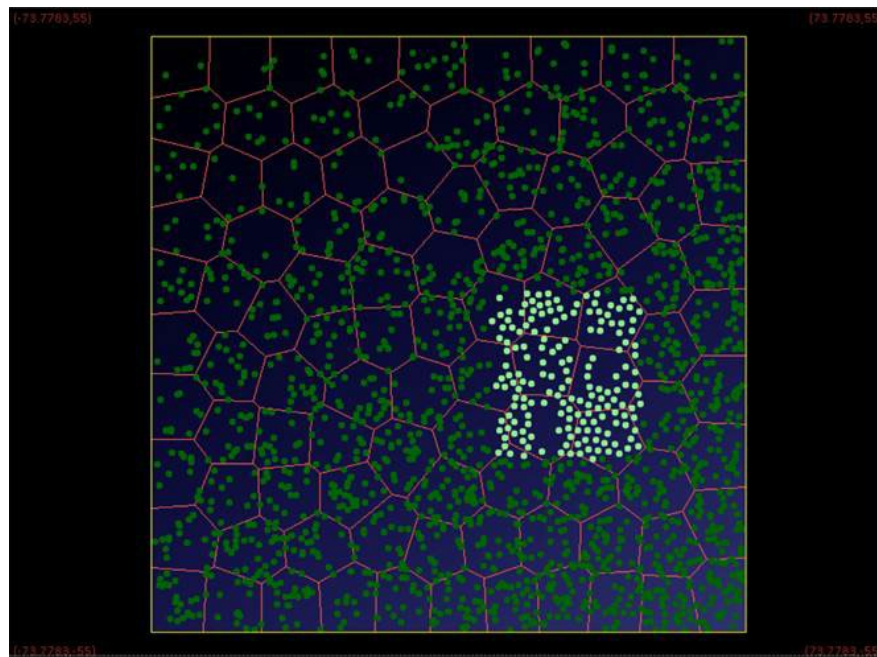


# TracePro 2020 20.2

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



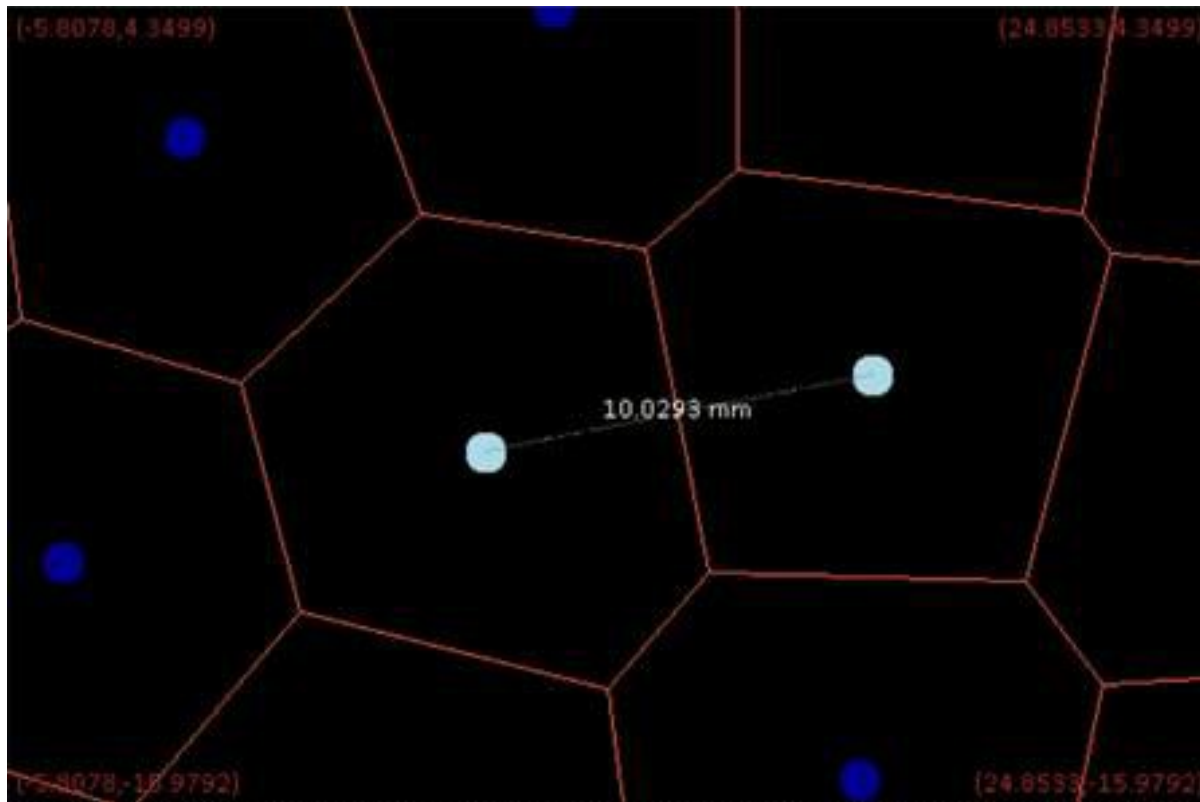
A group of dots selected for smoothing,  
some dots are overlapping



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

# TracePro 2020 20.2

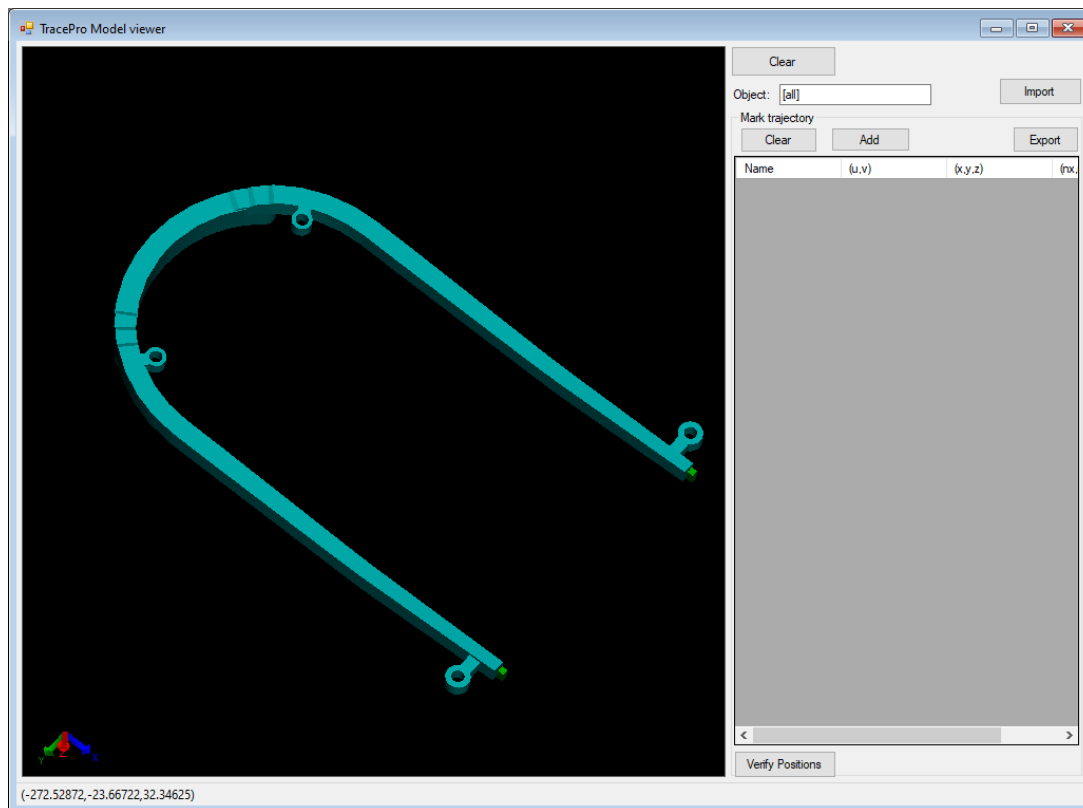
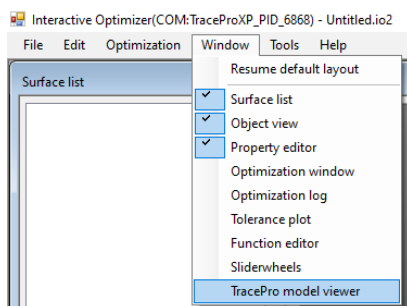
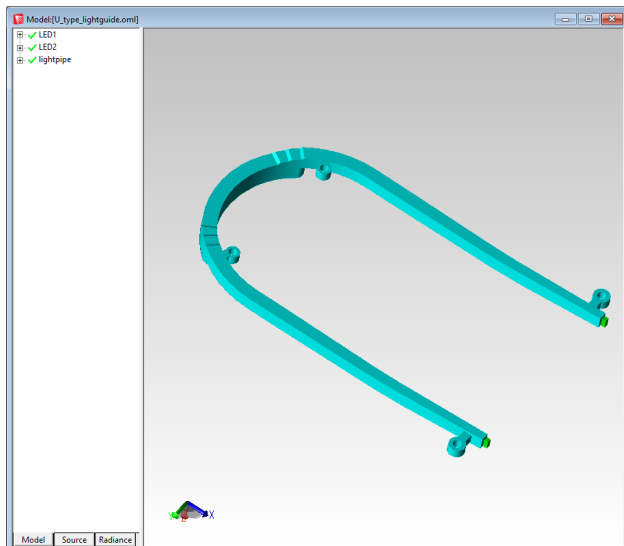
**Texture Optimizer II – The distance between two dots selected for smoothing can be displayed**





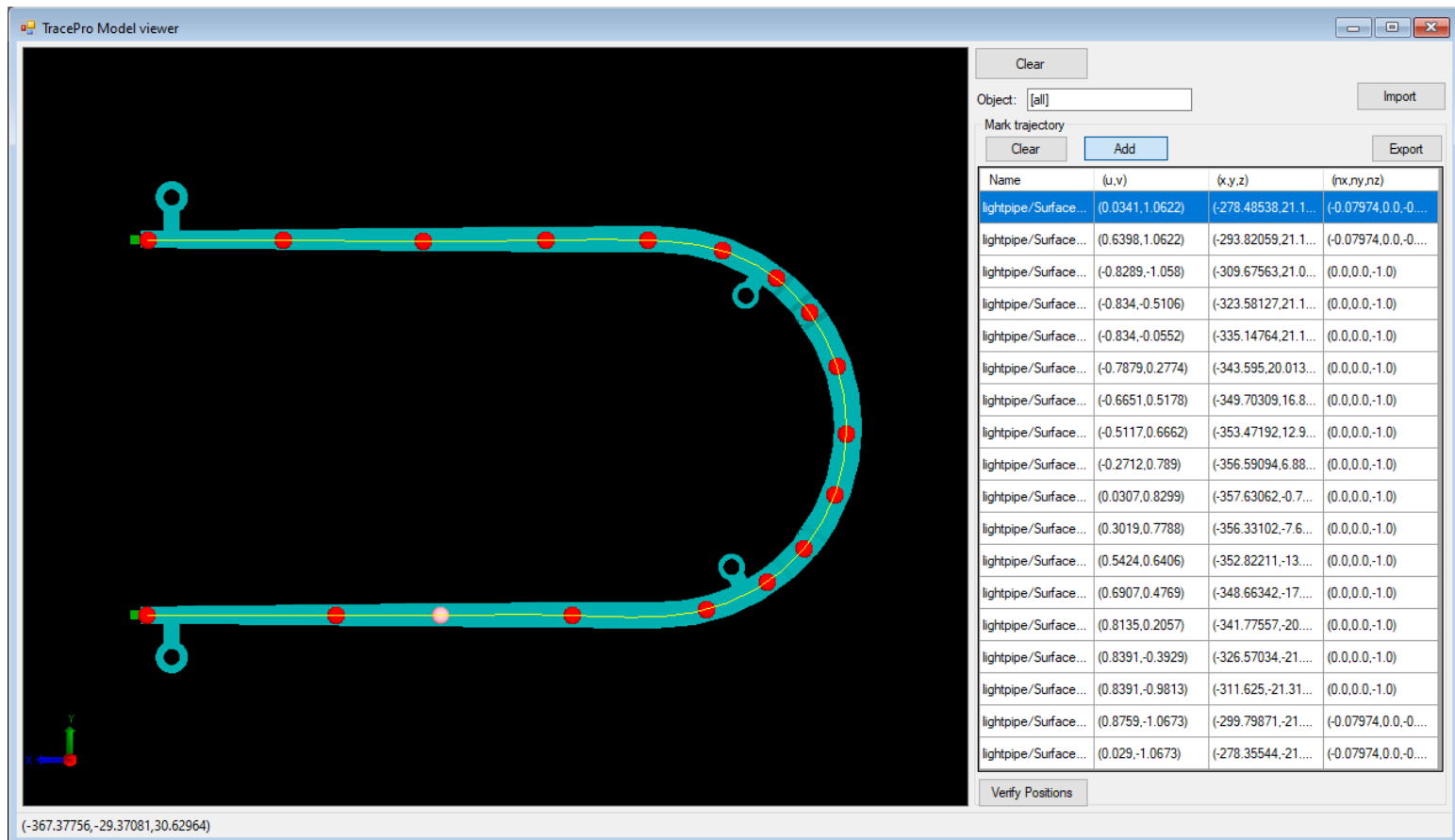
# TracePro 2020 20.2

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



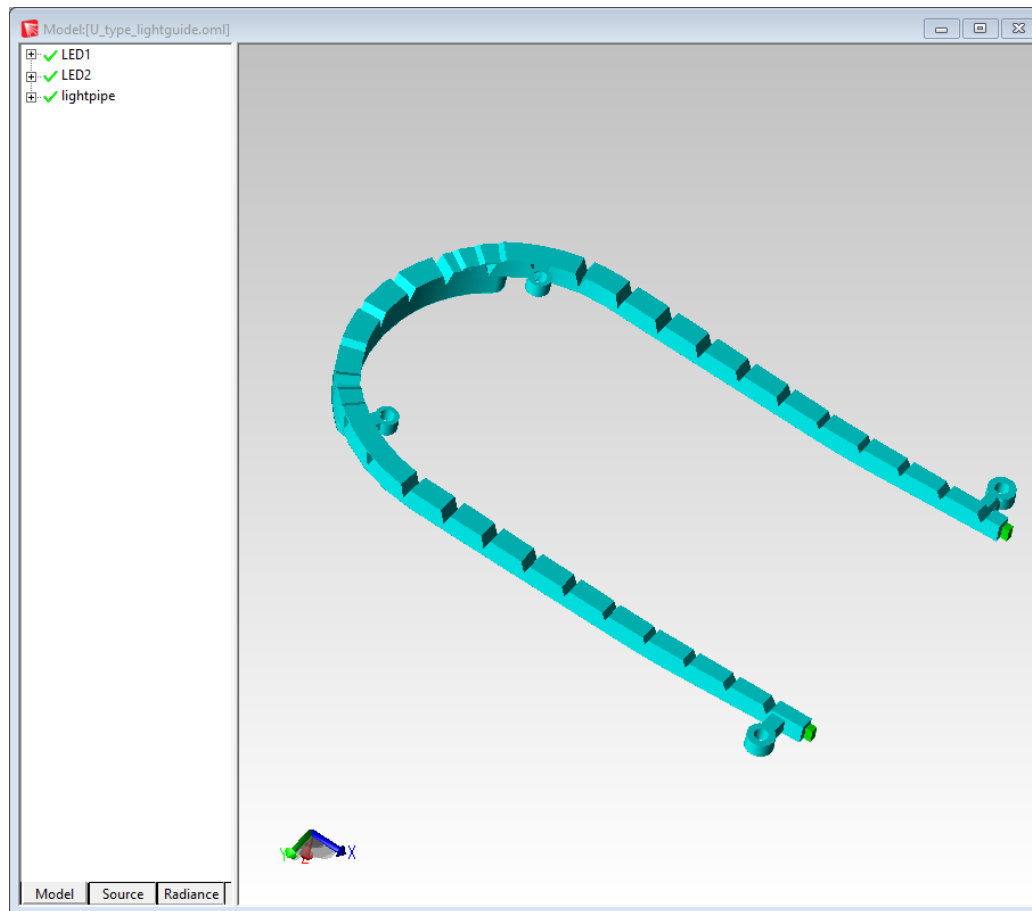
# TracePro 2020 20.2

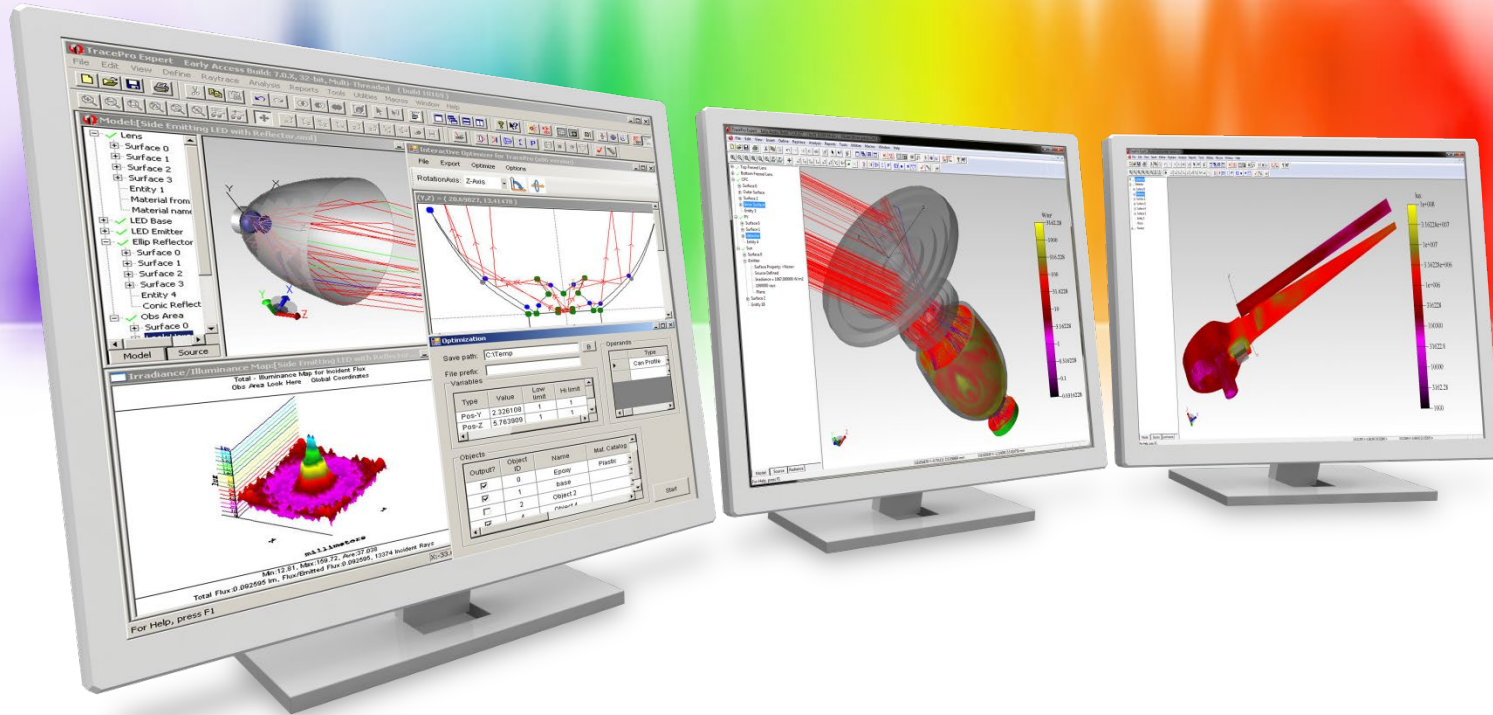
**Interactive Optimizer – The trajectory of a path along a surface of the model from TracePro can be easily plotted**



# 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**





# New Features in TracePro 2020 20.1

# TracePro 2020 20.1

## ➤ **TracePro**

- Enhanced Thin Sheet capabilities including new shape options and the ability to modify existing Thin Sheet primitives

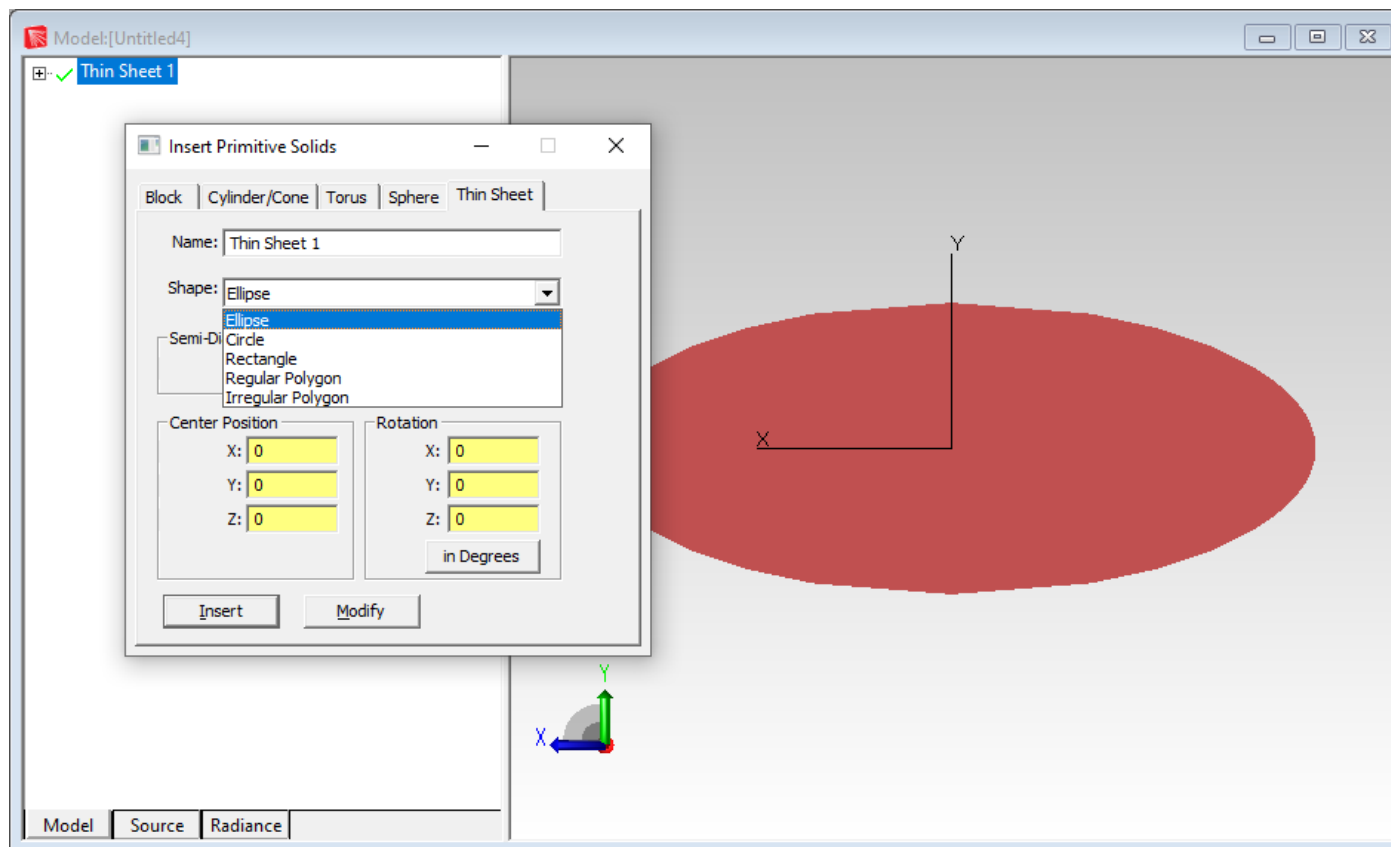
## ➤ **Surface Property Generator**

- Added capability to import scatter data files from Surface Optics Corp.

## ➤ **New Scheme Commands**

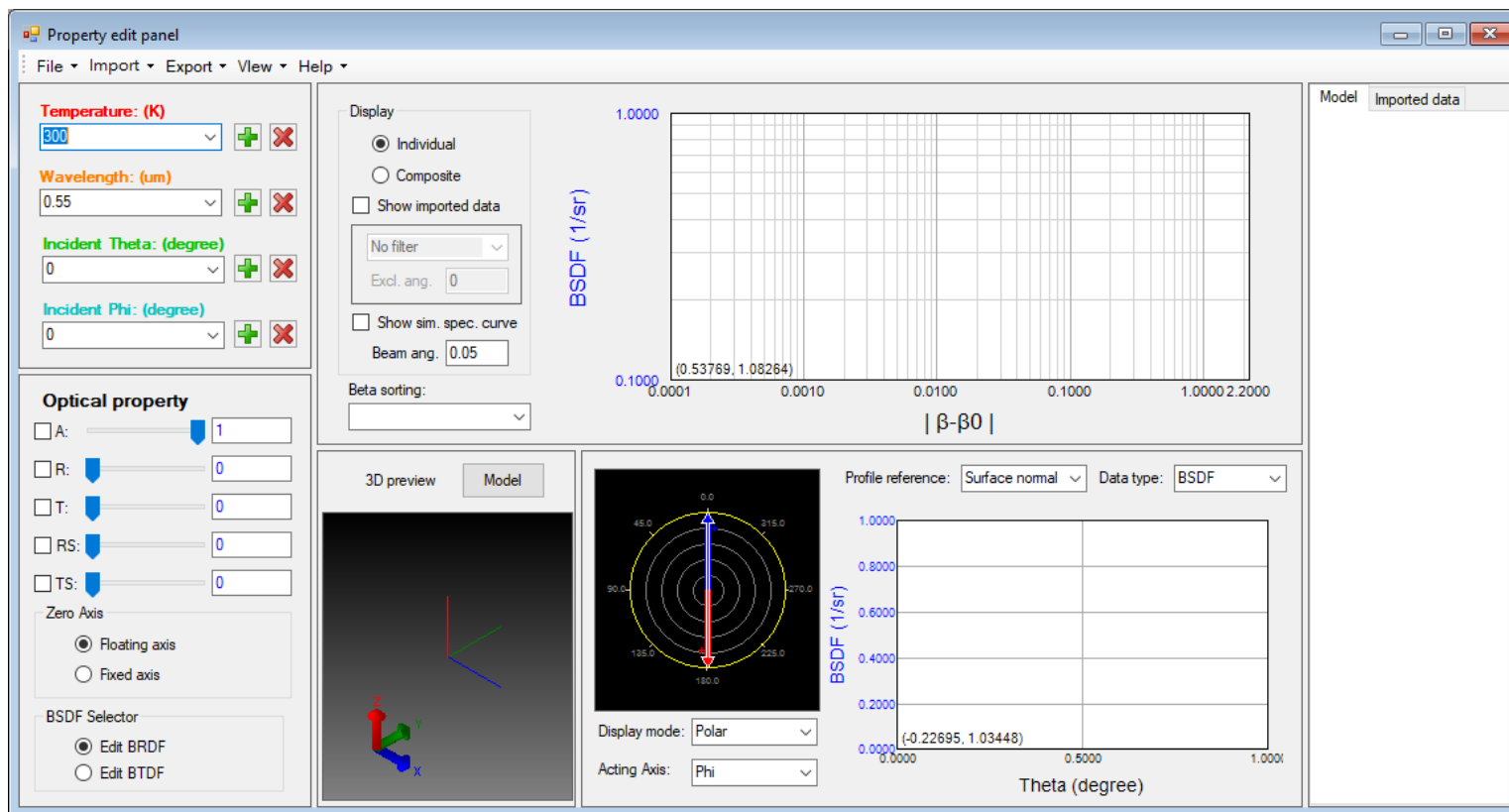
# TracePro 2020 20.1

**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)