Tips, Tricks, and Shortcuts to Improve Productivity and Efficiency with TracePro

Presented by:
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Format

• A 25-30 minute presentation followed by a question and answer session

• Please submit your questions anytime using Question box in the GoToWebinar control panel
Tips, Tricks, and Shortcuts to Improve Productivity and Efficiency with TracePro

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Webinar Topics:

• Using Simulation Mode: how, when, and why.

• Determining memory usage using the Windows Task Manager and the TracePro Raytrace Report

• Modifying multiple Surface Sources at one time using the Surface Source Editor

• Grouping and moving System Tree items for better organization

• Display options, shortcuts to move and orbit the model view
Webinar Topics:

• What is the “Detect Rays Starting in Bodies” setting and when you should use it

• Irradiance Map and Candela Plot tools to get more information out of your results

• Interactive Optimizer settings

• And many other topics…..

• Question and Answer session
Additional Resources

• Past TracePro Webinars
  • http://www.lambdares.com/webinars/

• TracePro Tutorial Videos
  • http://www.lambdares.com/videos/

• TracePro Tutorials
  • http://www.lambdares.com/technical_support/tracepro/tutorials/

• TracePro Training Classes
  • http://www.lambdares.com/technical_support/training/
Current TracePro Release

• TracePro 7.1.2

• TracePro 7.1.3 Early Access

• Can be downloaded by anyone with a current Maintenance and Support Agreement

• www.lambdares.com
Tips, Tricks, and Shortcuts to Improve Productivity and Efficiency with TracePro
The Simulation Mode Raytrace
Analysis Mode

• The default raytrace mode in TracePro is Analysis Mode

• Ray data is saved on every surface in the model, in RAM. This can use large amounts of memory, but it allows you to view plots such as Irradiance Maps, 3D Irradiance Maps, and Candela Plots on any surface at any time

• 32-bit TracePro can only use up to 2GB of RAM, so it is easy to exceed the available amount of RAM with large or complex models and raytraces

• 64-bit TracePro can use as much RAM as is available on your computer. This is better, but large raytraces may still exceed the available RAM.

• Simulation Mode is the solution
Simulation Mode

• Simulation Mode raytrace

  • Predefine Exit Surface or Surfaces where you want to save the ray data

  • User can also choose to save Candela and Ray Path data

  • Ray data is saved to the hard drive instead of RAM

  • Creates a .sim file in the same directory as the model

  • Rays are not shown
Simulation Mode

Defining an Exit Surface, or Exit Surfaces
Simulation Mode

Simulation Mode Options
Checking “Collect Path Sort Data” can increase raytrace times. If you are not looking at Path Sort data, leave this unchecked. The default setting is unchecked in the newest releases of TracePro.
Simulation Mode

Switching to Simulation Mode
Simulation Mode

Running a Simulation Mode Raytrace
Simulation Mode

Simulation Mode Raytrace Results
Use the Simulation File Manager and the .sim file to open an Irradiance Map for a previous Simulation Mode raytrace.
Simulation Mode

1. Create Initial Model
2. Run initial raytraces in Analysis Mode with low number of rays
3. Refine the model
4. Switch to Simulation Mode
5. Increase the number of rays traced
6. Higher resolution results for Irradiance Maps, Candela Plots, etc..

Typical Workflow using Simulation Mode
Determining Memory Usage by TracePro
Determining Memory Usage

Example Model - LED light with 7 LEDs and circular lens array
Determining Memory Usage

Windows Task Manager Performance Tab – Windows 7 64-bit
Run a smaller number of rays initially to determine memory usage

- No rays traced
  - 2.89GB of RAM
    - Model and other programs open

- 350k rays traced
  - 3.62GB of RAM
    - 0.73GB used

- 3.5M rays traced
  - 7.49GB of RAM
    - 4.6GB used
Determining Memory Usage

TracePro Raytrace Report – Reports->Raytrace
Determining Memory Usage

**TracePro Raytrace Report**

- **350k rays traced**
  - 0.194GB used for raytrace

- **3.5M rays traced**
  - 1.94GB used for raytrace

TracePro Raytrace Report – Reports->Raytrace
Determining Memory Usage

Why is there a difference in the RAM used as reported by the Windows Task Manager opposed to the TracePro Raytrace Report?

The TracePro Raytrace Report only shows the amount of memory used for the raytrace itself. Additional tasks such as displaying the rays, opening an Irradiance Map or a Candela Plot, etc… consume additional memory.

The Windows Task Manager is the more accurate method for determining memory usage and availability.
Using the Surface Source Editor to Modify Applied Surface Source Properties
Surface Source Editor

Example Model - LED light with 7 LEDs and circular lens array
Use the Surface Source Editor to modify any or all of the Surface Sources in a TracePro model – Define->Surface Source Editor
Surface Source Editor

Click on a column header to select all of the Surface Sources, or select individual sources in the spreadsheet, then click Modify to enter changes. Values can be Scaled or Set To a discrete value. Catalog and Name can only be edited one at a time in the Surface Source Editor.
To apply a different Surface Source Property to each source in the model at one time, use Edit->Select->Advanced to select all of the Surface Sources with a given name. The Surface Source Property can then be changed for all of the selected sources using the Apply Properties Dialog Box.
Moving and Grouping Objects in the Model Tree for Better Organization
Organizing the Model Tree

To move objects in the Model Tree, right click in the Model Tree and select Enable Drag/Drop. Then select the object to move with the left mouse button and move it to its new location.
Organizing the Model Tree

To add Object Groups to the Model Tree, right click in the Model Tree and select New Group Object. Then name the new Object Group and drag the objects into that group.
Adding Object Groups can help organize the Model Tree and make objects easier to identify and locate. It can also make for a more compact Model Tree as Groups can be collapsed when not being used.
Shortcuts for Panning and Orbiting the Model View
Panning and Orbiting the Model View

Select the appropriate icon in the toolbar and hold down the left mouse button in the model window to pan or orbit the model.
Panning and Orbiting the Model View

• **Ctrl-right click** and drag to pan the view

• **Shift-right click** and drag to orbit the view

• Drag on one of the axes of the 3 colored XYZ axes to rotate the view

• Double click on an axis to make it point into the screen

• Double click on the shaded arc between the colored axes to display a plan view
Detect Rays Starting in Bodies
TracePro assumes rays are starting in air. This can give the wrong result if rays are started inside an object with a different index of refraction.
When starting rays inside an object, check the box for “Detect Ray Starting in Bodies” at Raytrace->Raytrace Options->Options.
Getting More Information from the Irradiance/Illuminance Maps and Candela Plots
Irradiance/Illuminance Maps

Example Model - LED light with 7 LEDs and circular lens array

We want to see where these rays are coming from

“Receiver” Surface
We want to see where these rays are coming from.

Irradiance/Illuminance Maps

Illuminance Map on “Receiver” Surface – Log Scale
Irradiance/Illuminance Maps

Select area of interest by **Shift- left mouse click** and dragging a box around the area of interest
Irradiance/Illuminance Maps

To display the selected rays, go to Analysis->Display Selected Rays, or right click in the Irradiance/Illuminance Map window and choose Display Selected Rays.
Irradiance/Illuminance Maps

To display the selected rays, go to Analysis->Display Selected Rays, or right click in the Irradience/Illuminance Map window and choose Display Selected Rays.

Higher flux rays are “leaking” around the edge of the lens element. Painting the space between the lens elements black would solve the problem.
3D Irradiance/Illuminance Maps

The 3D Irradiance/Illuminance Map allows you to see the distribution of light on multiple surfaces at one time. The TrueColor mode is shown here.

3D Irradiance/Illuminance Map shows the flux distribution on multiple surfaces in this crossed Czerny-Turner spectrometer model.
Path Sort Table and Display Selected Paths

Analysis->Path Sort Table will open a table showing all the paths in a model. To display a path, select it in the Path Sort Table and then go to Analysis->Display Selected Paths

Irradiance Map showing rays selected in the Path Sort Table
Example Model - LED light with 7 LEDs and circular lens array
To find the lumens in a given “zone”, go to Analysis->Display Selected Rays. Then go to Analysis->Select Rays to open the Select Rays dialog box.

Enter Polar and Azimuth angles here to define the “zone”.

Display Selected Rays and Select Rays can also be selected by right clicking in the Polar Iso-Candela Plot window.
Making an IES File

Right click in the Candela Plot window, choose SaveAs, and change the File Type to IESNA LM-63 (*.ies)

Please see our October 2010 webinar for more information on IES and LDT files in TracePro
The Flux Threshold Setting
Flux Threshold

• The Flux Threshold setting in TracePro determines when TracePro will stop keeping track of rays.

• Once rays fall below the Flux Threshold they are terminated

• The default setting for the Flux Threshold is 0.05, or 5% of the initial flux value of the ray

• The Flux Threshold setting can be changed at
• Raytrace->Raytrace Options->Thresholds

• The Flux Report can be used to see if rays are falling below the Flux Threshold
Flux Threshold

Example Model - Simple light guide with LED source
Default Flux Threshold of 5% - 5.44 lumens out of 99.9 lumens are lost due to falling below the Flux Threshold. This is about 5.44% lost.
Flux Threshold

Change Flux Threshold to 0.5%

Flux Threshold of 0.5% - 0.234 lumens out of 99.9 lumens are lost due to falling below the Flux Threshold. Now only 0.23% is lost.
Apply Properties Before Copying
If you need to make an array of multiple objects, apply all properties to the base object before making the array. The properties will then be copied with the object.
Speeding Up Raytracing
Speeding up Raytracing

• Voxelization is a method of “allocating” the geometry in the model to specific zones to improve raytrace speed

• Increasing the number of voxels improves raytrace speed at the expense of Audit speed

• There are two types of voxels in TracePro, Octree and Uniform

• The default is Uniform, which creates equally sized 3D voxels across the system

• Octree voxelization concentrates voxels near objects and places fewer voxels in empty spaces in the model. This is best for models with large spaces between objects. For example, a luminaire and the floor.
Speeding up Raytracing

Voxel settings can be changed at Raytrace->Raytrace Options->Advanced
Speeding up Raytracing

Fluorescent fixture and floor model – 10 meters from fixture to floor
Speeding up Raytracing

The Octree voxels version of this model raytraced 56% faster than the Uniform voxels version.
Interactive Optimizer Tips
Interactive Optimizer Tips

To make a Ray Fan, draw the initial ray by left clicking and dragging in the desired direction. Then press CTRL and make the fan by dragging left or right.

To make a Beam, draw the initial ray by left clicking and dragging in the desired direction. Then press Shift and make the beam by dragging left or right.

Making Ray Fans and Beams in the Interactive Optimizer Sketch Window
Interactive Optimizer Tips

Relative Variables are defined as being relative to the position of the control point on the segment.
Interactive Optimizer Tips

Relative Variables are defined as being relative to the position of the control point on the segment.

If you stop the optimization after the control point has moved, save the .SOD with the same name, and then re-open, the variable will be defined as relative to the new position of the control point.

This could lead to the creation of bad geometry such as self intersecting segments.

Relative Variables are defined as being relative to the position of the control point on the segment.
Absolute Variables are defined by absolute coordinates and are not tied to the current location of the control point.
Interactive Optimizer Tips

Absolute Variables are defined by absolute coordinates and are not tied to the current location of the control point.

If you stop the optimization after the control point has moved, save the .SOD with the same name, and then re-open, the variable will still have the same “range” as initially defined.

Absolute Variables are defined by absolute coordinates and are not tied to the current location of the control point.
Current Promotions
OSLO Promotion

Customer who have purchased OSLO in the past, and are currently out of support, can update to the current release of OSLO, OSLO 6.6, with one free year of support, for one low price. The price will depending on their edition of OSLO. Details of the promotion are shown below:

**OSLO PROMOTION LIMITED TIME : APRIL 1, 2012 THROUGH JUNE 30, 2012**

<table>
<thead>
<tr>
<th>OSLO Node Locked License</th>
<th>OSLO Promotional Pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSLO PREMIUM</td>
<td>$1,500</td>
</tr>
<tr>
<td>OSLO STANDARD</td>
<td>$1,125</td>
</tr>
<tr>
<td>OSLO LIGHT</td>
<td>$750</td>
</tr>
</tbody>
</table>

Example:

- OSLO Premium Node Locked two years out of support -- Cost to customer $1500.00
- OSLO Premium Node Locked ten years out of support -- Cost to customer $1500.00

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Thank You
Questions and Answers
For Additional Information
Please Contact:

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