COPYRIGHT AND TRADEMARK ACKNOWLEDGMENTS

COPYRIGHT

The TracePro software and all documentation are Copyright © 2014 by Lambda Research Corporation. All rights reserved.

This software may only be used by one user per license obtained from Lambda Research Corporation.

This document contains proprietary information. This information may not be copied in whole or in part, or reproduced by any means, or transmitted in any form without the prior written consent of Lambda Research Corporation.

TRADEMARKS

TracePro® and OSLO® are registered trademarks of Lambda Research Corporation.

TracePro Bridge™ is a trademark of Lambda Research Corporation.

ACIS® is a registered trademark of Spatial Corporation.

Adobe and Acrobat are trademarks of Adobe Systems Incorporated.

SolidWorks® is a registered trademark of SolidWorks Corporation.

Windows® and Microsoft® are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

CodeMeter® is a registered trademark of WIBU-SYSTEMS AG.

All other names and products are trademarks of their respective owners.
Contents

Introduction 1

What’s New in TracePro 7.5? 1

New licensing with CodeMeter key 1

New Scatter Model features 2
   1D BSDF Models ................................................................................................................ ..... 2
   BSDF Database and Editor ............................................................................................... 3
   Composite BSDF Modeling ............................................................................................. 3

Texture Optimizer II 5

Check for Updates 5

3D Interactive Optimizer enhancements 5

Photorealistic Rendering enhancement 5

Group node icon in Model Tree 5

7.4.X Updates 6
   RepTile Enhancements ........................................................................................................ 6
   Polygon Geometry ............................................................................................................. 6
   Simplified Display of RepTiles ......................................................................................... 7
   Help menu ....................................................................................................................... 7
   3D Interactive Optimizer .................................................................................................. 8
   IES/LDT Analysis ............................................................................................................. 8
   Surface Source Property Generator ............................................................................... 8
   Texture Optimizer ......................................................................................................... 8
INTRODUCTION

TracePro 7.5 is a minor release. This document serves as a guide for you to transition from TracePro 7.4 to 7.5. The major enhancements in TracePro 7.5 are new licensing with CodeMeter® and new BDSF modeling features. There were also enhancements in the 7.4.x dot releases that have not been described in any previous Update Guide.

WHAT’S NEW IN TRACEPRO 7.5?

Changes in TracePro 7.5 compared to 7.4 are summarized as follows:

- Improved licensing process with new CodeMeter key.
- New Scatter Model features
- Texture Optimizer II
- Check for Updates
- 3D Interactive Optimizer enhancements
- Photorealistic Rendering enhancement
- Group node icon in Model Tree

7.4.x updates:
- RepTile enhancements: new RepTile geometry shape (polygon); and a new Simplified RepTile Display mode for faster display have been added.
- Help menu: new menu selections Online Tutorials and Online Examples.
- 3D Interactive Optimizer: create curved faceted reflector; new Beam Width operand; new object types Reflector and TIR lens; and Zoom All icon in the Surface Editor.
- IES/LDT Analysis: Road luminance
- Surface Source Property Generator: rectangular pattern generator.
- Texture Optimizer: Support for Asphere RepTile.

NEW LICENSING WITH CODEMETER KEY

TracePro 7.5 is being released under CodeMeter® licensing. This new technology allows us to make several improvements to the licensing process for TracePro:

- New Key – All customers will need a new CodeMeter key to run TracePro 7.5.x. The first time you launch TracePro 7.5.x, just click the “USB Key” or “Software Key” button to request the new key. The old key can be retained to run TracePro 7.4.x and earlier releases.
- License Updates (New Release) – When a new release of TracePro is installed, and the PC has internet access, the license is automatically updated behind the scenes, there is no action required for the TracePro user.
- Automatic Detection - All licenses on the network are automatically detected, and network license users no longer need to enter a Server Name to access the network license.
NEW SCATTER MODEL FEATURES

The new scatter model features in TracePro 7.5 consist of three new capabilities:

- One-dimensional (1D) BSDF models.
  - Allows modeling of surfaces with one-dimensional scatter, for surfaces with a “grain” like brushed or machined surfaces.

- BSDF database and BSDF Editor.
  - You can create BSDF models in a separate BSDF database for use with surface properties.
  - The BSDF Editor enables control of the BSDF models and catalogs.

- Composite BSDF modeling.
  - When you create a surface property, choose scatter model: Use BSDF Properties.
  - You can add any number of BSDF properties to the Surface Property in a separate tab in the Surface Property Editor.

1D BSDF Models

1D BSDF models produce a line of scattered light, and are useful for modeling surfaces with a strong “grain” that produce a strong one-dimensional component of scattered, i.e. scattering mainly into a plane perpendicular to the grain direction. TracePro 7.5 supports two 1D Scatter Models: 1D ABg, and 1D Table.

1D BSDF is modeled as a product of two functions, one describing the shape of the 1D function, and the other a Gaussian cross-section:

$$BSDF = f_x(\beta_x) \cdot f_y(\beta_y).$$

Here $\beta_x$ is shorthand for $(\beta - \beta_0)_x$, and $\beta_y$ is shorthand for $(\beta - \beta_0)_y$.

$f_x(\beta_x) = \text{ABg model or table}$, and

$f_y(\beta_y) = e^{-2\beta_y^2/\sigma^2}.$

$\sigma$ is the half-width of the line in direction-cosine coordinates. For light at normal incidence, $\sigma \approx \sin(\text{half-angle})$.

Figure 1 shows an example ABg BSDF model, with scattering into a plane.
The 1D Table BSDF Model allows negative values of Scatter Beta when creating the property. This allows you to make asymmetric 1D scatter models.

**BSDF Database and Editor**

The BSDF Database allows you to create BSDF properties that can be used with surface properties. The appearance and function of the BSDF Property Editor is similar to the other Property Editors in TracePro. XXX shows an example ABg BSDF model created with the BSDF Property Editor.

All scatter models are supported in the BSDF database, including the new 1D BSDF models. Once you have created one or BSDF properties, you can use them when creating Surface Properties as discussed in the next section.

**Composite BSDF Modeling**

You can make a Surface Property that uses one or more BSDF Properties. To make such a Surface Property, click Add Property in the Surface Property Editor, and select Scatter Model: *Use BSDF Properties* as shown in Figure 3.
Figure 3. To add a surface property to the Surface Property database that uses BSDF Properties, click Add Property in the Surface Property Editor, then select Scatter Model: *Use BSDF Properties*.

Figure 4. Example Surface Property after adding some wavelengths and angles, as well as Absorptance and Specular Reflectance data. Note the tab at the bottom of the editor for BSDF Property.
TEXTURE OPTIMIZER II

New Utility with improved user interface and RepTile features available for optimization.

CHECK FOR UPDATES

If your computer has internet access, TracePro will detect that there is a new release available, and prompt to download and install it.

3D INTERACTIVE OPTIMIZER ENHANCEMENTS

The “periodic” segment type is now available
The capability to import a BSpline surface from a file has been added.
The Macro Language has been updated to include after-scheme commands to retrieve the position of control point.

PHOTOREALISTIC RENDERING ENHANCEMENT

The user can now set the maximum number of photons to trace in the Photorealistic Rendering setup.

GROUP NODE ICON IN MODEL TREE

A Group Node icon has been added to the Model Tree to facilitate applying the Green check or Red X that indicates that objects are included in the raytrace to all objects in a group.
Several updates were released during the 7.4.X dot release series. Update Guides are only issued for minor releases, so the new features in 7.4.X are described here.

**RepTile Enhancements**

Two new features have been added for RepTile (TracePro Expert only): a new geometry type (polygon) and a simplified display mode for fast display when very large numbers of RepTile features are present.

**Polygon Geometry**

Polygon geometry allows you to model shapes that are regular polygonal prisms. A polygonal prism is like a block, but instead of a four-sided solid with planar top and bottom, you have an n-sided solid with planar top and bottom.

Polygon RepTile geometry is a solid regular polygon specified by the radius of a circle circumscribing the polygon, thickness, number of sides, x center, y center, depth/height, and (x,y,z) rotation angles. Parameterized polygons can also be decentered in x and y.

![Figure 6 Example of a six-sided regular polygon (hexagon) RepTile feature.](image)

The depth/height specifies the distance from the base plane to the center of the polygon. For bump geometry, depth/height is the height above the base plane, and for hole geometry, depth/height is the depth below the base plane.
Simplified Display of RepTiles

For faster display of RepTile geometry, a new Simplified Display feature has been added to the View|Display RepTiles menu selection. This selection will display a dot at the center of the RepTile feature instead of displaying the feature in detail. This is useful when the RepTile surface has a very large number of features, and full display of the RepTile features would consume a large amount of memory and time. To use this feature, select View|Display RepTiles| Simplified RepTiles & Boundary.

Help menu

The Help menu in TracePro includes two new selections: Online Tutorials and Online Examples. Either of these selections will launch your default web browser and open the appropriate page on the TracePro Technical Support section of www.lambdares.com.
3D Interactive Optimizer

Several new features are available in the 3D Interactive Optimizer (TracePro Standard and Expert Editions):

- Create curved faceted reflector
- Beam Width operand
- New object types: Reflectors and TIR lens
- Zoom All icon in the Surface Editor.

For more information on these features, see the online help for the 3D Interactive Optimizer.

IES/LDT Analysis

The IES/LDT Analysis Utility has a new feature for analyzing Road Luminance for street lighting applications. See the online help for the IES/LDT Analysis Utility for more information.

Surface Source Property Generator

The Surface Source Property Generator Utility has a new feature for generating rectangular patterns. See the online help for the Surface Source Property Generator for more information.

Texture Optimizer

The Texture Optimizer now supports the Asphere RepTile geometry. See the Texture Optimizer online help for more information.