



The TracePro RepTile Property and the Texture Optimizer II

A Lambda Research Corporation Webinar September 22, 2016



Presenter

Presenter

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Moderator

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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





Additional Resources

- Past TracePro Webinars
 - http://www.lambdares.com/webinars
- TracePro Tutorial Videos
 - http://www.lambdares.com/videos
- TracePro Tutorials
 - <u>http://www.lambdares.com/features/tracepro-tutorials</u>
- Information on upcoming TracePro Training Classes
 - <u>http://www.lambdares.com/training/software-training</u>



Upcoming TracePro Training

- Jena, Germany
 - Introduction to TracePro October. 18-19, 2016
 - Optimization with TracePro October. 20-21, 2016
- Littleton, MA USA
 - Introduction to TracePro October. 25 26, 2016
 - Optimization with TracePro– October. 27-28, 2016



Latest TracePro Release

TracePro 7.7.2

Released April 1, 2016

TracePro 7.8 EA

Currently available for download

Customers with current maintenance and support agreements can download this new release at:

http://www.lambdares.com/CustomerSupportCenter/index.php/trace-pro/current-release







The TracePro RepTile Property and the Texture Optimizer II

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Agenda

- What is the TracePro RepTile property?
- Overview of the Texture Optimizer II
- Texture Types in the Texture Optimizer II
- Setting up the Texture Optimizer II
- The texture optimization process
- Using the Texture Optimizer II to apply texture features to curved surfaces
- Questions and Answers









What is RepTile?

- RepTile = Repetitive Tile
- Used to define repetitive microstructures in a convenient way
- Mathematical representations of the repetitive structure
- Allows for smaller file sizes as well as faster and easier modification of the structure
- RepTile properties may be applied to planar surfaces
- RepTile region is bounded by a rectangular, circular, or surface boundary
- Many geometry types may be made as either a Bump or Hole
- Requires TracePro Expert edition



RepTile Property Editor : Define->Edit Property Data->RepTile Properties

54		
RepTile Property	· Editor	
Catalog	Catalog: Default V Name: Name: www.wame.com	
Add Catalog	Description:	
Delete Catalog		
Add Property		
Delete Property	Vanadon i ype: N/A vildu: 0	
Copy Property	Geometry Type: N/A Height: 0	
- Data Reinte	Tile Type: N/A	
Data Points		
<u>A</u> dd		
Delete		
	Table	



RepTile Example – 1mm diameter hemisphere

RepTile Property Editor	
Catalog Catalog: Davel Name: 1mm hemisphere Add Catalog Description: Hole Delete Catalog RepTile Type Tile Parameters Add Property Variation Type: Constant Delete Property Geometry Type: Sphere Height: 2	 Bump or Hole Tile Size
Add Delete Radius (mm) Depth/Height (mm) 0.5 0.5	
Feature Dimensions	





Apply Properties - RepTile

Duk Statter	RepTile	
Class and User Data Color Diffraction Exit Surface Fluorescence	Property Data Catalog: Webinar Textures	RepTile
Gradient Index		Name
Material Mueller Matrix Prescription Raytrace Flag RepTile	Surface Catalog: Default	
Surface	Use Surface Bounds Depth: 0.005	
Temperature Temperature Distribution	Boundary Center Texture Origin Texture Up Boundary Up X: 1.5 X: 0 X: 0 Y: 0 Y: 1 Y: 1 Z: 0 Z: 0 Z: 0	RepTile Boundary
	Pixel Dimensions Width: 0.1 Height: 0.1 Bump ▼	



Apply Properties - RepTile

Bulk Scatter	RepTile	
Class and User Data Color Diffraction Exit Surface Fluorescence Gradient Index Importance Sampling Material Mueller Matrix Prescription Raytrace Flag RepTile Surface Surface Source Temperature Temperature Distribution	Property Data Catalog: Webinar Textures Name: Smaller Ink Dot, optimized Name: Smaller Ink Dot, optimized Texture File Image: Catalog: Surface Catalog: Default Surface Name: Diffuse White Boundary and Orientation Depth: Use Surface Bounds Depth: Boundary Center Texture Origin X: 1.5 Y: 0 Z: 0 Z: 0 Export Apply View Data	The RepTile can have any Surface Property in the TracePre Surface Property Databas



To Display a RepTile: View ->Display RepTiles -> RepTiles & Boundary





To Display a RepTile: View ->Display RepTiles -> RepTiles & Boundary



Changing RepTile feature parameters

💷 RepTile Property i	citor 🗖 🗖 🔁 🔁
2 2 2	
Catalog Add Catalog Delete Catalog Add Property Delete Property Copy Property Data Points	Catalog: DaveJ Description: RepTile Type Variation Type: Constant Geometry Type: Sphere Tile Type: Rectangles
Delete	Radius (mm) Depth/Height (mm) 1 1 Change Feature Dimensions
	Table



Changing RepTile feature parameters





Microlens array – Solid model vs RepTile

() TracePro Expert		
File Edit View Insert Define Raytrace Analysis Reports Tools Utilities Macros Window	Help	
- <u>D</u> #8 & X=6 > ~ 000 / X+4 = <u>D</u> 880 <u>×</u>		
Model:[Microlens array only.om]	🕞 💷 🔀 🔮 Model:[LED Model, RepTile	e, webinar.oml]
B → MicroLens	🖽 🗸 Micro Lens Array	
→ ✓ Sphere 1		
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Sphere 1		
Model Source Radiance remaking model	Model Source Radian	RepTile property file
For Help, press F1	X:-76.426521 Y:147.32	4051 Z:-218.2

TracePro

RepTile Geometry Types

Enter New RepTile Pr	operty	×
Property Name:		
Test		
Adding to Catalog: Da	avel	
Variation Type:	Constant	•
Geometry	Fresnel	-
Tile Type:	Fresnel Cone Sphere	^
ОК	Ellipsoid Hip (Mansard) Roof Cube Corner	
	Rounded Prism Log Enhanced Prism	
	Flattened Cone Pointed Cone DMD	
	Block	~

inter New RepTile Pr	operty	×
Property Name:		
Test		
Adding to Catalog: Da	aveJ	
Variation Type:	Constant	-
Geometry	Fresnel	-
Tile Type:	Hip (Mansard) Roof Cube Corner Prism Rounded Prism Log	^
OK	Enhanced Prism Flattened Cone Pointed Cone	
	Block Chiseled Log Torus	
	Asphere Polygon	~



RepTile Variation Types	Enter New RepTile Property ×
, and the second of the second s	Property Name: Test
	Adding to Catalog: DaveJ
	Variation Type: Constant
	Geometry Variable Rings/Rows
	Tile Type: Texture File
	OK Cancel

- Constant Enter data for one tile and it is repeated
- Variable ring/row Enter data for all tiles for each row. Each row has all the same tiles
- Parameterized Enter a formula for each geometry dimension and tile dimension
- Texture Each geometry feature is placed free-form, by entering the coordinates and dimensions in a txt file

Parameterized RepTile Variation Type Example

RepTile Property Editor		
Catalog Catalog: Examples Name: Sphere - Bump - Rectangles - Pa		
Add Catalog Description: Bump		
Delete Catalog RepTile Type		
Add Property Variation Type: Parameterized Width: 1		
Delete Property Geometry Type: Sphere Height: 1		
Tile Type: Rectangles		
Data Points		
Add Radius (mm) Depth/Height (mm) Decenter x (mm) Decenter y (mm) Delete .3+.2*cos(irow*.4) .15+.2*cos(jcol*.4) 0 0 III Table		
Height varying vs. column # and radius varying vs. row #		
	V	



RepTile Tile Types



Rectangular Tile







Hexagonal Tile



Staggered Ring Tile Staggered Rectangular Tile





RepTile Examples – Backlight with no texture applied to bottom surface for light extraction





RepTile Examples – Backlight with RepTile texture applied to bottom surface for light extraction





RepTile Examples – PMMA Plastic Microlens Array made using RepTile Property





RepTile Texture File

- Allows the User to define the location and feature type explicitly for each feature of the RepTile surface
- Allows mixing and matching of feature types. For example, a combination of spheres and cones could be defined
- Allowable geometry types: Sphere, Cone, Hip Roof, Ellipsoids, Enhanced Prism, Log, Flattened Cone, Pointed Cone, DMD Mirror, Block, Chiseled Log, Torus, Polygon
- Can be Bump or Hole
- Full description starting on page 7.108 of the TracePro User Manual



RepTile Texture File



New RepTile property using the Texture File

RepTile Property	y Editor		
22 2			
Catalog Add Catalog Delete Catalog Add Property Delete Property Copy Property Data Points Add Delete	Catalog: Webinar Description: RepTile Type Variation Type: Texture Geometry Type: N/A Tile Type: N/A	 Name: TextureFileExample Bump Tile Parameters Def Width: 0 Def Heiden 0 Enter New RepTile Property File: Property Name: WebinarExample Adding to Catalog: Webinar Variation Type: Texture File Geometry Type: Tile Type: Texture File OK Cancel 	
۰ III +			



New RepTile property using the Texture File

RepTile Property I	Editor
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Catalog	Catalog: Webinar Vame: WebinarExample
Add Catalog	Description: Hole
Delete Catalog	RepTile Type Tile Parameters
Add Property	Variation Type: Texture Def Width: 10
Delete Property	Geometry Type: N/A Def Height: 10
Copy Property	Tile Type: N/A File: C:\Users\djacobsen\Documents\Webinars\'
Data Points	
<u>A</u> dd	
Delete	Browse to location of the Texture File
•	Table



Applying the RepTile property

Bulk Scatter RepTile Class and User Data Property Data Color Diffraction Exit Surface Property Data Fluorescence Gradient Index Importance Sampling Material Mueller Matrix Prescription RepTile Surface Catalog: Default Surface Flag Boundary and Orientation RepTile Boundary and Orientation Surface Source Texture Origin Temperature Texture Origin Temperature X: 0 Y: 0 Y: 0 Y: 0 Y: 1 Y: 0 Y: 1 Pixel Dimensions Width: 10 Height: 10 Hole	Apply Properties	
Color Diffraction Exit Surface Property Data Fluorescence Importance Sampling Material Surface Catalog: Mueller Matrix Texture File Prescription Surface Name: Raytrace Flag Boundary and Orientation RepTile Surface Source Temperature Description Reptile Surface Source Temperature Description Reptile Surface Source Temperature Texture Origin Temperature Y: Temperature Distribution Y: Pixel Dimensions Width: Width: 10 Height: 10 Hole Texture	Bulk Scatter	RepTile
Export Apply View Data	Bulk Scatter Class and User Data Color Diffraction Exit Surface Fluorescence Gradient Index Importance Sampling Material Mueller Matrix Prescription Raytrace Flag RepTile Surface Surface Surface Source Temperature Temperature Distribution	RepTile Property Data Catalog: Webinar Name: WebinarExample Image: Texture File Surface Catalog: Default Surface Catalog: Default Surface Name: <none> Boundary and Orientation Image: Rectangular Width: 10 Height: 10 Depth: Y: 0 Y: 0 Y: 0 Y: 1 Z: -1 Z: 0 Y: Pixel Dimensions Height: 10 Hole Image: Export Apply View Data View Data</none>



RepTile property applied to surface in TracePro





RepTile Summary

- RepTile allows you to create repetitive structures quickly and easily
- Numerous geometry types are available
- Several variations are available for tile positioning
- Model sizes are greatly reduced and raytrace times can be faster
- Geometry is easily changed by editing the RepTile property file
- Texture File allows you to explicitly define feature types and location and allows mixing and matching of feature types







TracePro Texture Optimizer II



TracePro Texture Optimizer II

What is the Texture Optimizer II

- Included with TracePro Expert in the Optimize menu
- Used with the RepTile property in TracePro
- Allows the user to define the surface boundary for the RepTile, the surface partitioning, the method for filling the cells, and the RepTile feature type
- The surface boundary can be defined using the name of the surface in TracePro, this allows for complex surface boundaries
- Surface partitioning options include uniform, grid, and ring options
- Numerous options are available for filling the cells
- 12 RepTile feature types available for use
- 2 main parts, the Dot Generator and the Optimization windows


TracePro

TracePro Texture Optimizer II

Dot Generator window

undarv	Partition	Incell	Dot shape	
Postonelo Annhy			Sobere	
Apply Apply		Generate	Rump sign: Rum	
idth: 100 Height: 100	Cells: 100		bump sign. Bur	
ayer ID:			Param	Value
t viewer			radius	0.5
		Display Display Partition Density map Dots Density tools Density tools	Scale	Export

Boundary Options

File Import Ex	oport Action
Boundary	lan l
Rectangle	- Apply
Rectangle	
Ring	
<file></file>	
<surface(uv)></surface(uv)>	
(-89.5994,55)	



Boundary Options





In-cel

In-cell

One-Cer





Partition Options







In-cell fill options - - -Dot generator File Import Export Action Boundary Partition In-cell Dot shape Apply Grid Generate Assigned density-Uniform Sphere Rectangle ✓ Generate Height: 100 X-Num: 20 Y-Num: 20 Density: 0.05 Bump sign: Bump 🗸 🗹 Dot preview Width: 100 Param Layer ID: Value radius 0.1 Dot viewer height Displa Dot generator File Import Export Action Boundary Partition In-cell Dot shape ✓ Generate Sphere Rectangle ~ Apply Grid Assigned density-Grid ✓ Generate Bump V Dot preview Width: 100 Height: 100 X-Num: 20 Y-Num: 20 Density: 0.05 Bump sign: Value Laver ID: Param radius 0.1 Dot viewe height 1 A B Generating 16000 dots done! (7.078 sec) Dienla - -Dot generator File Import Export Action Dot shape Boundary Partition In-cell Rectangle Grid Generate ✓ Generate Sphere Apply Assigned density-Hex \sim Bump sign: Bump V Dot preview X-Num: 20 Y-Num: 20 Density: 0.05 Width: 100 Height: 100 Value Layer ID: Param radius 0.1 Dot view height **8** Display Generating 15875 dots done (0.11 sec) Boundary Partition Scale Export Density map Dots Density tools N Generating 15844 dots done (0.11 sec) (46.174752 , 7.918911)







Dot shape options – Dot preview on

Dot shape		Projected radius = 0.5 mm
Sphere	~	
Bump sign: Bum	np 🗸 🗹 Dot preview	
Param	Value	
radius	0.5	
height	0.5	
Scale	Export	Ž X



Dots display – on/off

🖳 Dot generator				
File Import Export Action	5			
Boundary	Partition		Dot shape Sphere	
Rectangle V Apply	Uniform V Generate	Assigned density-Uniform V Generate	Sphere	
Width: 100 Height: 100	Cells: 100	Density: 0.1	Bump sign: Bump	✓ Dot preview
Layer ID:			Param	Value
			radius	0.5
Dot viewer			height	0.5
(17.508,	(65 0 B97	Boundary ✓ Partition Density map ✓ Dots Density tools 	Scale Cell operations Target cells: All Filter: Operation: Select	Export ~ Apply
enerating 1273 dots done! (0.25 sec)		(0.00%)		(55.021201 , 3.29232)



Optimization window

🖳 Dot generator		
File Import Export Action		
Boundary Optimization	In-cell	Dot shape
Rectangle Calculate cell density ~	Generate Assigned density-Uniform V Generate	s Sphere ~
Width: 100 H Edit density map D	Density: 0.1	Bump sign: Bump V Dot preview
Layer ID:		Param Value
		radius 0.5
Dot viewer		height 0.5
(17.508), (17.508)	Clisplay Display Display Partition Density map Dots Density tools Clisplay Density tools Clisplay Density tools Clisplay Density tools Clisplay Density tools Clisplay Density tools Clisplay Density tools	Scale Export Cell operations Target cells: Target cells: All Filter: Operation: Select V
Senerating 1273 dots done! (0.25 sec)	(0.00%)	Cell Density value = 0.0



Optimization window

- Optimization	
Start Result viewer	
Algorithm Target type	Setup
Cell partitioned	Distribution: Random distribution V Opt. option: V
Target	Funant tamat: Taxtum file
Target name: Uniformity only	Taxture file:
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	Initial mode: Start as initial density V Initial density 0.1
	Max density: 0.6 Check Null flux Saved items
	Resultioner.
	Dot shape
	Sphere V Dot preview
	Bump sign: Bump V Scale
	Param Value X axis reverse
	radius 0.5 🗌 Y axis reverse
	height 0.5









le Import Export Action	n						
oundary	Partitio	n		In-cell		Dot shape	
Rectangle ~	Apply Unifor	n v	Generate	One-Centroid	✓ Generate	Sphere	~
Width: 100 Height:	100 Cells:	100				Bump sign: Bump	✓ Dot preview
						Param	Value
						radius	0.5
Dot viewer						height	0.5
				Density tools		Jun	Deport







Sphere

Dot shape		Dot preview
Bump sign: Bump ~	Dot preview	Projected radius = 0.5 mm
Param V	alue	
radius 0.1	5	
height 0.4	j	
Scale	Export	Ž Ž



Cone

ot shape Cone Bump sign: Bump	∽ √	Dot preview	
Param	Value		
height	0.5		-
end radius	0.3		
cone angle	45		
chamfer height	0.01		
chamfer angle	45		
Scale	Export	ź.	



Hip Roof

Hip Roof		~
Bump sign: Bum	np 🗸 🗹 Dot p	review
Param	Value	^
height	0.5	
y width	1	
y angle	45	
x width	0.5	
x angle	45	
<	1	>
Scale		Export





Ellipsoid

ot shape				
Ellipsoid		~	Dot preview	
Bump sign: Bun	np 🗸 🗹 Dot p	preview		
Param	Value	^		
height	0.5			
x radius	1			
y radius	0.5			
z radius	0.5			
x rotate	0		5	
<		>		
C 1		Export	z	



Log

Log		~	Dot preview
Bump sign: Bum	o 🗸 🗹 Dot p	preview	
Param	Value	^	
height	0.5		
length	1		
end1 radius	0.3		
end2 radius	0.5		
x rotate	0		
<	Let	>	
Scale		Export	-



Pointed Cone

Dot shape		Dot preview
Bump sign: Bump	✓ ✓ Dot preview	Projected radius = 1.24853 mm
Param	Value	
height	1	
cone angle	45	
peak radius	0.3	
trough radius	0.3	
Scale	Export	Ž X



Flattened Cone

Jot snape Flattened cone Bump sign: Bump	> Dot preview	Projected radius = 1.32426 mm
Param	Value	
height	1	
end radius	0.2	
cone angle	45	
peak radius	0.3	
trough radius	0.3	
Scale	Export	Z
		X



Asphere

Oot shape			
Asphere		\sim	🖳 Dot preview
Bump sign: Bump	p 🗸 🗹 Dot pre	view	Height = 0.00534 mm
Param	Value	^	
radius	0.03		
curvature	-2.113619		
conic constant	0		
a1	0		
a2	17.8703449		
<		>	
Scale Fit	E	xport	z



Torus

Dot shape		
Torus	~	💾 Dot preview 🗖 🔲 🔀
Bump sign: Bum	p 🗸 🗹 Dot preview	Height = 0.00534 mm
Param	Value	
height	0.5	
major radius	2	
minor radius	0.5	
Scale	Export	Z



Enhanced Prism

)ot shape			
Enhanced prism		~	Dot preview
Bump sign: Bur	mp 🗸 🗹 Dot p	preview	Height = 0.00534 mm
Param	Value	^	
x width	2		
y width	4		
height	0.8		
x0 angle	45		
x1 angle	45	~	
<	1	>	
Scale		Export	Z



Polygon

ot shape			
Polygon		~	Dot preview
Bump sign: Bum	ip 🗸 🗹 Do	t preview	Height = 0.00534 mm
Param	Value	^	
radius	0.1		
height	0.05		
thickness	0.1		
no. of sides	6		
x rotate	0		
<		>	
Scale		Export	Z



Model

ILICITY	Partition		la cell		Databana	
					Model	
ctangle ~	Apply	Generate	Une-Centroid	✓ Generate	Model	
th: 25 Height:	25 Cells: 25				Bump sign: Bump	
er ID:					Param	Value
					Model name	NewDot
viewer			Mode		Origin	(0, 0, 0)
22.3999,13.75)		(22.399	9,13.75) Mode		Normal	(0, 0, 1)
					Up vector	(0, 1, 0)
			Partition Density map Dots Density tools		Scale	



Model





Model

ary	Partition	In-cell	Dot shape	
angle v Apply	Uniform V Generate	One-Centroid V Generate	Model	
: 25 Height: 25	Cells: 25		Bump sign: Bump	✓ □ Dot preview
ID:			Param	Value
			Model name	NewDot
ewer		Mode	Origin	(0, 0, 0)
.3999,13.75)	(22.399		Normal	(0, 0, 1)
			Up vector	(0, 1, 0)
	Method: Projection ✓ Origin: (0, 0, 0) ∪ Up: (0, 1, 0) ∪ Norm: (0, 0, 1) ∪	Surface name: Top Check Type: Planar Norm: (0.0,0.0,1.0) Projected origin: (0.0,0.0,10.0) Projected up: (0.0,1.0,0.0)	k Align surface n Offset: 0.0 Boolean None Object name:	orm















TracePro

TracePro model - • × [Model:[Webinar Light Guide.oml] 🖽 🗸 Target 🗄 🧹 Light Guide 🕀 🧹 LED Target Light Guide LED Model Source Luminance



TracePro model – Acrylic Light Guide with "Bottom" surface named





TracePro model – LED model with Surface Source Property

Light Guide LED Emitter Surface Property: <none></none>						0			
- Catalog - Cree Xlamp - Name - XP-E White 3700-5000K - 500000 rays - Plane	Apply Properties Bulk Scatter	· · · · · ·			Surface Source			• ×	
B-Surface 1 B-Surface 2 B-Surface 3 B-Surface 4 B-Surface 5 Entity 2 Block	Class and User Data Color Diffraction Exit Surface Fluorescence Gradient Index Importance Sampling Material Mueller Matrix Prescription Raytrace Flag RepTile Surface Saurce	Emission Type: Source Property Min Rays: 10 Catalog: Cree Xlamp Total Rays: 500000 Name: XP-E White 3700-500 V Scale: 1 Rays: All rays Color: 0 Up Vector X: 0 Y: 1 Z: 0 Wavelengths Image: Source Property Image: Sour							
	Temperature Temperature Distribution	From (µm)	To (µm)	# Inc.	Calc. Wavelength	Flux(W)	# Rays	^	
		0	0.4	0	0	0	0		
		0.4	0.75	10	0.427392	0.01999	9995		
					0.450542	0.137147	68573		
					0.487872	0.0514381	25719		
				1	0.524743	0.124628	62314		
					0.557944	0.181684	90842	~	
				A	pply	/iew Data			
	X X Z								



TracePro model – "Target" with "Receiver" surface named




TracePro model – Initial Illuminance Map – Log Scale









Texture Optimizer II - - -🖳 Dot generator File Import Export Action Partition Dot shape Boundary In-cell Sphere ✓ Generate One-Centroid ✓ Generate \checkmark Rectangle Uniform V Apply Dot preview Bump sign: Bump Width: 100 Cells: 100 Height: Param Value Layer ID: 0.5 Dot viewer height 0.5 Mode Display Boundary Partition Scale Export Density map Dots Density tools Generating partition...Done (0.703 sec) (-1.020833, 0.622913)



Select Surface for Boundary type and then enter "Bottom" for Face Name and "Light Guide" for Object Name. Click OK.

ndary	artition		In-cell			Dot shape	
Surface> V Apply	Iniform	✓ Generate	One-Centroid	~	Generate	Sphere	
dth: 100 Height: 100	ells: 100					Bump sign: Bun	np 🗸 🗌 Dot preview
ver ID:						Param	Value
						radius	0.5
			Mode			height	0.5
		Face name	e: Bottom	Object nar	me: Light Guid	le Ch	eck
		Origin:	(0, 0, 0)	Type:	Unl	known	
	$\mathcal{Y}\mathcal{Y}\mathcal{Y}\mathcal{Y}$	Up vector:	(0, 1, 0)	Norm:	(0,	1, 0)	Export
		Norm:	(0, 1, 0)	Projecte	d origin: (0,	1, 0)	
		Vertex nun	nber: 200	Projecte	d up: (0,	1, 0)	
RH)			[OK Cano	zel
		>		linninia			
		(90.50	04-55)				



Bottom surface of the light guide is now used as the boundary





Select Uniform for Partition, enter 250 for Cells, and then click Generate





Select Sphere for Dot Shape, Hole for Bump Sign, and enter 0.05 for the Radius and Height. Units are mm.

🖶 Dot generator						
File Import Export Action Boundary Surface> Apply Width: 24.111944 Height: 39.730745 Layer ID:	Partition Uniform Cells: 250	Generate One-C	entroid V	Generate	Dot shape Sphere Bump sign: Hole Param	Dot preview Value
Dot viewer (-47.6545,21.8518)		(23.542 5(15.2614)) (23.542 <mark>5,-21.852</mark>)	Mode		radius height Scale	0.05 0.05 Export
Generating partitionDone (0.688 sec)						(15.761444 , 19.128409)



Select Assigned density-Uniform for the In-cell setting, enter 0.25 for the Density, and then click Generate

■ Dot generator		
File Import Export Action Boundary Partition (Surface> V Width: 24.111944 Height: 1 39.730745 Cells: Layer ID: Cells: 250	Generate Assigned density-Uniform V Generate Density: 0.25	ot shape Sphere V Sump sign: Hole V Dot preview Param Value
Dot viewer (-47.6545,21.8518)	(23.5425,21.3513) Mode Image: Second State Sta	radius 0.05 height 0.05
(-47.6545,-21.852) Generating 12672 dots done! (5.0 sec)	(23 5425,-21.852) (0.00%)	(22.76443 , -0.194645)



Click Dots to display the dots. The scroll wheel can be used to zoom in and out.

🖳 Dot generator			
File Import Export Action Boundary <a href="https://www.export-action-complexity-comple</th> <th>Partition Uniform V Generate Cells: 250</th> <th>In-cell Assigned density-Uniform V Generate Density: 0.25</th> <th>Dot shape Sphere Bump sign: Hole Dot preview Param Value</th>	Partition Uniform V Generate Cells: 250	In-cell Assigned density-Uniform V Generate Density: 0.25	Dot shape Sphere Bump sign: Hole Dot preview Param Value
Lojd 12.		7832) Mode Display Mode Display Mode Display Mode Display Mode Display Mode Display Mode Display Mode Display Display Density ma Dots Density tools Density tools Density tools Mode Density tools	radius 0.05 height 0.05
Generating 12672 dots done! (5.0 sec)		(0.00%)	(0.317033 , -0.053994)



Export the Texture File by going to Export->TracePro Texture and then saving the resulting .txt file

🚽 Dot generator					
File Import Export Action					
Boundary TracePro Texture	Furtition	In-cell		Dot shape	1
<surface> Position file</surface>	<mark>U</mark> niform → Ge	enerate Assigned density-Uniform ~	Generate	Sphere	~
Width: 24.11 Real geometries	Cells: 250	Density: 0.25		Bump sign: Hole	✓ □ Dot preview
Layer ID:	Evnort texture file	S	×	Param	Value
			~	radius	0.05
Dot viewer	Save in: 📙 Webinar Example	 S (\$ 10 minute) 	•	height	0.05
	Quick access Desktop Libraries This PC	No items match your search.	iype	Scale	Export
	Network		-		
(-8,7167,-3,0826	File name: Light	t Guide Texture	Save		
	Save as type: Text	ure file (*.txt) V	Cancel		
					(0.317032 -0.053004)
Senerating 12672 dots done! (5.0 sec)					(0.517055, -0.055554)

Save the Texture Optimizer II file by going to File->Save as.. The file extension is .dgf. This will save all of the settings defined in the texture optimizer for future use.

oundary		Partition		In-cell			Dot shape	
<surface></surface>	Save dot gen	erator file	ample V	G 🕸 📂 🖽 -	×	Generate	Sphere Bump sign: Hole	Dot preview
ayer ID: ot viewer (-47.6545,21.8518)	Quick access Desktop Libraries This PC	Name	^ ample.dgf	Date modified 9/15/2016 5:26 PM	Type DGF File		radius height Scale	0.05 0.05 Export
(-47 6545 -21 852)	Network	K File name: Save as type:	Dot generator file (*.dgf)	~ [Save Cancel			



Make a new RepTile Property in TracePro by going to Define->Edit Property Data->RepTile Properties

File Edit View Geometry Define	Raytrace Optimize Analysis	Reports Tools Utilities Macros Window Help				
▐▎▆▘▙▏▟▖▝▙▕▙▎	Auto Importance Sampling					
୧୧୧୧୧୮	Apply Properties	Ζ ξ _{χ γ} ϔ ξ _γ ξξ τ ^ψ 🕢 Η 🕕 Η 🗀 Η 🕩 🖓 🖂				
E	dit Property Data >	Surface Properties				
C C	Generate Property Data >	Material Properties				
2	ource Editor	Bulk Scatter Properties Gradient Index Properties				
C	Grid Source	RepTile Properties				
S	Surface Source File Source	Fluorescence Properties Surface Source Properties				
E	ay rile wavelength Editor Bitmap Source	Thin Film Stacks BSDF Properties				
L	.uminance/Radiance					



Select a Catalog or make a new one using Add Catalog. Click Add Property. Give the property a Name and select Texture File for the Variation Type. Click OK.

Catalog Add Catalog	Catalog: Texture Optimizer II W Description:	/ebinar 💌 Name: <	None>	
Delete Catalog Add Property	RepTile Type	Tile Paramete	ers Enter New RepTile Property	×
Delete Property		Height:	Property Name:	
Copy Property	Tile Type: N/A	[]	Webinar Texture	
ata Points			Adding to Catalog: Texture Optimizer II V	Vebinar
Add			Variation Type: Texture File	-
			Geometry N/A	-
Delete,			Tile Type: N/A	•



Click the Browse icon next to File: and then browse to the Texture File that was previously saved and then click Open

RepTile Property Editor		
Catalog Catalog: Texture Optimizer II Webinar Nam Add Catalog Description:	Webinar Texture Bump Bump Image: Control of the second seco	
<u>A</u> dd	← → × ↑ , « Webinars > September 2016, Texture Optimizer II > Webinar Example v ♂ Search Webinar Example P	
Delete	Organize New folder	
	Desktop * Name Date modified Type Size	
	 Downloads Downloads Light Guide Texture.txt 9/15/2016 4:32 PM Text Document 501 KB Gizobsen BSDF Converter Example F Jena October 2016 Screenshots September 2016, Texture C Sorpopox OneDrive This PC Desktop Documents V 	
	File name: Light Guide Texture.txt v Texture File (*.txt) v	
>Table	Open Cancel	

IracePro

Select Hole and then enter 0.1 for Def Width and Def Height Tile Parameters. Click the disk icon to save the RepTile property.

RepTile Property	'Editor
🔁 🖬 🖬 🚺	
Catalog Add Catalog	Catalog: Texture Optimizer II Webinar Vame: Webinar Texture
Delete Catalog Add Property Delete Property Copy Property	RepTile Type Variation Type: Variation Type: Tile Parameters Def Width: 0.1 Def Height: 0.1 File: C:\Users\djacobsen\Documents\DaveJ Docl
Data Points	



Apply the RepTile to the Light Guide model in TracePro.





Select the surface named "Bottom" of the "Target" object, right click, choose Properties, and then choose RepTile

🔀 Model:[Webinar Light Guide.oml]		
B - ✓ Target □ ✓ Light Guide □ Inside Small Mount Hole □ Inside Small Mount Hole □ Inner Edge □ Inner Edge □ Inner Edge □ Outer Edge □ Outer Edge □ Segment 4 □ Segment 3	Apply Properties	
	Bulk Scatter Class and User Data	RepTile
Plane ⊕ Top Entity 3 Material from Plastic Material name Acrylic ⊕-√ LED	Color Diffraction Exit Surface Fluorescence Gradient Index Importance Sampling Material Mueller Matrix Prescription Raytrace Flag RepTile Surface Surface Surface Surface Surface Temperature Temperature Distribution	Property Data Catalog: Texture Optimizer II Webinar Name: Webinar Texture Texture File Surface Catalog: Default Surface Name: Flat white paint Boundary and Orientation Use Surface Bounds Boundary Center X: 0 Y: 0 Y: 0 Y: 0 Y: 1 Property Data Texture Optimizer II Webinar Texture File Boundary Up X: 0 Y: 0 Y: 1 Y: 1 Y: 1 Property Data Texture Optimizer II Webinar Texture File Depth: 1.05 Depth: 1.05 Depth: 1.05 Comparison Compari
	^~ ~	Z: 0 Z: 0 Ptxel Dimensions Width: 0.1 Hole Export Apply View Data
Model Source Luminance	-	



Select the Catalog and Name for the RepTile property that was previously saved

🔀 Model:[Webinar Light Guide.oml]			• E
Target T			
⊕- Segment 3 ⊕- Segment 5	Apply Properties	- · ×	
Surface Property: <none> Plane ⊕-Top Entity 3 Material from Plastic Material name Acrylic ⊕- ✓ LED</none>	Class and User Data Color Diffraction Exit Surface Fluorescence Gradient Index Importance Sampling Material Mueller Matrix Prescription Raytrace Flag RepTile Surface Surface Surface Source Temperature Distribution	Property Data Catalog: Texture Optimizer II Webinar Name: Webinar Texture Surface Catalog: Default Surface Name: Flat white paint Boundary and Orientation Depth: Use Surface Bounds Depth: Boundary Center Texture Up Y: 0 Y: 0 Y: 0 Y: 1 Z: 0 Y: 1 Y: 1 Y: 1 Y: 0 Y: 0 Y: 0 Y: 1 Y: 1 Y: 0 Y: 0 Y: 0 Y: 1 Y: 1 Pixel Dimensions Width: 0.1 Height: 0.1 Hole	
Model Source Luminance			



Select Default for the Surface Catalog and Flat white paint for the Surface Name. This will apply the flat white paint property to the RepTile features.

🐻 Model:[Webinar Light Guide.oml]		
⊕-√ Target ⊡-√ Light Guide ⊕-Inside Small Mount Hole ⊕-Inside Large Mount Hole ⊕-Inner Edge ⊕-Inner Edge ⊕-Inner Edge ⊕-Outer Edge ⊕-Outer Edge ⊕-Segment 4 ⊕-Segment 3	Apply Properties	
B)-Segment 3 Groutsom Plane B-Top Entity 3 Material from Plastic Material name Acrylic B-V LED	Bulk Scatter Class and User Data Color Diffraction Exit Surface Fluorescence Gradient Index Importance Sampling Material Mueller Matrix Prescription Raytrace Flag RepTile Surface Surface Source Temperature Temperature Distribution	RepTile Property Data Catalog: Texture Optimizer II Webinar Name: Webinar Texture Vame: Vame: Surface Catalog: Default Surface Rame: Flat white paint Boundary and Orientation Depth: Juse Surface Bounds Depth: Boundary Center Texture Origin Y: 0 Y:
Model Source Luminance	-	



Enter 0.05 for the Depth and choose Use Surface Bounds for the Boundary and Orientation. Click Apply to apply the RepTile property.

Model:[Webinar Light Guide.oml]		
	Apply Properties	x
B - Seyment 3 B Sufface Property: <none> Plane B - Top - Entity 3 - Material from Plastic - Material name Acrylic B - ✓ LED</none>	Bulk Scatter RepTile Class and User Data Color Diffraction Exit Surface Fluorescence Gradient Index Importance Sampling Material Mueller Matrix Prescription Raytrace Flag RepTile Surface Source Texture Origin Temperature Texture Origin Temperature Distribution X: 0 Y: 0 Y: 0 Y: 0 Y: 1 Z: 0 Z: 0 Pixel Dimensions Width: 0,1 Width: 0,1 Height: 0,1	▼ ▼ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■
Model Source Luminance		



Display the RepTile by going to View->Display RepTiles->RepTiles & Boundary





Display the RepTile by going to View->Display RepTiles->RepTiles & Boundary





Display the Illuminance Map for the "Receiver" surface of the "Target"





Adjust the Normal and Up Vectors for the Irradiance/Illuminance Map so that the plot matches the orientation in the Texture Optimizer II





We are now ready to start the optimization process









The texture optimization process



Open the optimization window by going to Action->Optimization





Texture Optimizer II Optimization window

- Optimization		
Start Result viewer		
Algorithm Target type	Setup	
Cell partitioned	Distribution: Random distribution ~ Opt. option:	~
Target		
Target name: Uniformity only V	Texture file:	
📈 💽 U		
	Initial mode: Start as initial density V Initial density:	0.1
	Max density: 0.6 Check Null flux Say	ed items
	Dot shape	
	Sphere V Dot preview	i l
	Bump sign: Hole V Scale	
	Param Value X axis rever	se
	radius 0.05 Yaxis rever	se
	height 0.05	
	(0.16142.0.12160)	



Enter "Receiver" for the Target Name. Clicking the green checkmark will verify that the surface exists

Start Result viewer	
Al-al-	
Algorithm Target type	Setup
Cell partitioned	Distribution: Random distribution V Opt. option:
Target Target name: Receiver	Export target: Texture file
	Texture file:
Surface Found	X I density → Initial density: 0.1
	Check Null flux Saved items
The specified	target surface exists.
	Dot shape
	Sphere V Dot preview
	Bump sign: Hole V Scale
	Param Value X axis reverse
	radius 0.05 Yaxis reverse
	height 0.05
	(0.96575, 1.03728)



Choose Random distribution for Distribution. This option will optimize the texture pattern by varying the texture density in each cell.

art Result viewer Algorithm	Tarriet type	Setup		
Cell partitioned	✓ Irradiance map	Distribution:	Random distribution ~	Opt. option:
Target Target name: Receiver	Uniformity only V	Export target: Texture file:	Texture file V	
		Initial mode: Max density: Result folder:	Start as initial density 0.6 Check Null fl	Initial density: 0.1 UX Saved items Prefix:
		Dot shape Sphere	Bump sign: Hole	Dot preview Scale
225		Param	Value	X axis reverse
		radius	0.05	Y axis reverse
		height	0.05	



Select Texture file for the Export Target and then browse to the location of the saved Texture File

tart Result viewer				
Algorithm	Target type	Setup		
Cell partitioned \checkmark	Irradiance map 🗸 🗸	Distribution:	Random distribution V Opt.	option: V
Target		Export target:	Texture file	
Target name: Receiver	Uniformity only V	Texture file:	C:\Users\djacobsen\Documents\Dave	J Documents\Webinars\]
		Initial mode:	Start as initial density ~	Initial density: 0.1
		Max density:	0.6 Check Null flux	Saved items
3803		Result folder:		Prefix:
		Dot shape Sphere	Rumo sino: Uala	Dot preview
		Param	Value	X axis reverse
		radius	0.05	Y axis reverse
BEE				
		height	0.05	
		height	0.05	



Set the Initial Mode to Start as initial density. Set the Initial Density to 0.1 and the Max. Density to 0.75.

Optimization				
Start Result viewer Algorithm	Taroet type	Setup		
Cell partitioned ~	Irradiance map	 Distribution: 	Random distribution \sim	Opt. option:
Target Target name: Receiver	Uniformity only	Export target: Texture file:	Texture file C:\Users\djacobsen\Documents\D	DaveJ Documents\Webinars\] 🚞
		Initial mode: Max density: Result folder: Dot shape	Start as initial density 0.75 Check Null flux C:\Texture Optimizer II\Webinar	Initial density: 0.1 Saved items Prefix: Webinar
		Sphere	Bump sign: Hole	 ✓ Scale
BSE		Param	Value	X axis reverse
		radius	0.05	Y axis reverse
		height	0.05	



Browse to a location to for the Results Folder. This is where the results will be saved. Define a Prefix that will be used for each file.

Optimization					
Start Result viewer					
Algorithm	Target type	Setup			
Cell partitioned V	Irradiance map	Distribution:	Random distribution	 ✓ Opt. op 	otion: 🗸 🗸
Target		Evport target:	Texture file		
Target name: Receiver	Uniformity only ~	Texture file:		× Dava I	
	✓	U	C. (Osers (djacobseri (Di	ocuments (Daves	
	·····	Initial mode:	Start as initial density	~	Initial density: 0.1
		Max density:	0.75 Che	ck Null flux	Saved items
		Result felder		Wahinga Co	Profess Wahingd
		Hesuit foider.	C. (Texture Optimizer II)		ricitx. Webinai
		Dot shape			
		Dot shape Sphere		~	Dot preview
		Dot shape Sphere	Bump sign: Hole	~	Dot preview Scale
		Dot shape Sphere Param	Bump sign: Hole	~	Dot preview Scale X axis reverse
		Dot shape Sphere Param radius	Bump sign: Hole Value 0.05	~ ~	Dot preview Scale X axis reverse Y axis reverse
		Dot shape Sphere Param radius height	Bump sign: Hole Value 0.05 0.05	~	Dot preview Scale X axis reverse Y axis reverse
		Dot shape Sphere Param radius height	Bump sign: Hole Value 0.05 0.05	~	Dot preview Scale X axis reverse Y axis reverse
		Dot shape Sphere Param radius height	Bump sign: Hole Value 0.05 0.05	~ ~	Dot preview Scale X axis reverse Y axis reverse
		Dot shape Sphere Param radius height	Bump sign: Hole Value 0.05 0.05	~ ~	Dot preview Scale X axis reverse Y axis reverse
		Dot shape Sphere Param radius height	Bump sign: Hole Value 0.05 0.05	~	Dot preview Scale X axis reverse Y axis reverse



Verify the Dot Shape parameters

Optimization				
tart Result viewer				
Algorithm	Target type	Setup		
Cell partitioned ~	Irradiance map	Distribution:	Random distribution	V Opt. option:
Target		E-most torrest.	Teature file	
Target name: Receiver	Vniformity only V	Export target.		<u></u>
	× 💽	U lexture file:	C:\Users\djacobsen\Documer	nts\DaveJ Documents\Webinars\]
		Initial mode:	Start as initial density	✓ Initial density: 0.1
		Max density:	0.75 Check Null	flux Saved items
		Max density.		
	69888	Result folder:	C:\Texture Optimizer II\Webina	ar Prefix: Webinar
		Dot shape		
		Oot shape Sphere		Dot preview
		Oot shape Sphere	Bump sign: Hole	Dot preview Scale
		Oot shape Sphere Param	Bump sign: Hole	
		Oot shape Sphere Param radius	Bump sign: Hole Value 0.05	
		Oot shape Sphere Param radius height	Bump sign: Hole Value 0.05 0.05	
		Oot shape Sphere Param radius height	Bump sign: Hole Value 0.05 0.05	 ✓ Dot preview ✓ Scale X axis reverse Y axis reverse
		Oot shape Sphere Param radius height	Bump sign: Hole Value 0.05 0.05	
		Dot shape Sphere Param radius height	Bump sign: Hole Value 0.05 0.05	
		Dot shape Sphere Param radius height	Bump sign: Hole Value 0.05 0.05	 ✓ Dot preview ✓ Scale ☐ X axis reverse ☐ Y axis reverse



Click Start to start the optimization process

¹² Optimization	
Start Result viewer	
Algorithm Target type	Setup
Cell partitioned	Distribution: Random distribution V Opt. option: V
Target	Evnot tarnet Taxture file
Target name: Receiver Vinformity only V	Texture file: C\\ lem\disekter\Desuments\Desuments\Webinem\]
📈 🚔 U	
	Initial mode: Start as initial density V Initial density: 0.1
	Man develue 0.75 Cheele Null flue
	Max density: 0.75 Check Null flux Saved items
	Result folder: C:\Texture Optimizer II\Webinar Prefix: Webinar
	Dot shape
	Sohere V Dot preview
	Bump sign: Hole V Scale
	Param Value X axis reverse
	radius 0.05 Yaxis reverse
	height 0.05
	(1.0002.0.000001)
	(1.0802,0.86561)



Optimization Log – Best result was the 5th iteration

Result view		×
Log file	Auto update	
Optimization start at : 9/19/2016 11:54:47 AM Bapsed : 00H:42M:03S Total numbed iteration : 25 Minimum err : 0.41928 / Total flux : 25.14885 @ 5 iteration	Irradiance	;
teration: 5 Dots generated 13801 used 3.172 seconds Dots exported as C:\Users\djacobsen\Documents\DaveJ Documents \Webinars\September 2016, Texture Optimizer II\Webinar Example \Light Guide Texture.tbt used 0.734 seconds Running Simulation used 92.75 seconds cell flux:250 0.0930361796206454,0.0858346268773179,0.0707193602552299,0.0 863294462803528,0.0900871997061287,0.0924724803262814,0.103		
0.7684 0.7 Flux 0.55 Flux	Error Value	÷
6.5716 0.49 0.4193 0.0 0.4193 0.0 0.4193 0.0 0.4193 0.0 0.4193 0.0 0.4193 0.0 0.4193 0.0 0.4193 0.0 18.0 19.0 18.0 19	i ser di i	
	(-20.9798, 15.6738) - Value(233) = 54872.9129	94 .:


Dot_pattern.txt for best result in Results folder

🚽 📝 📮 Webinar					
File Home Share	View				
Pin to Quick access Copy Paste Clipboard	X Cut ™ Copy path Paste shortcut	Move to v Copy to v Copy to v Copy to v Copy to v Copy to v Copy to v Copy	New item •	Properties	Select all Select none Invert selection Select
$\leftarrow \rightarrow \vee \uparrow \square \rightarrow Th$	nis PC → Local Disk	: (C:) > Texture Optimizer II > Wel	pinar		
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		Webinar_1_Density_map.txt	9/19/2016 11:56 AM	A Text Document	6 KB
Desktop	1	Webinar_1_Dot_pattern.txt	9/19/2016 11:54 AM	A Text Document	201 KB
Downloads	*	Webinar_1_Irr_data.bmp	9/19/2016 11:56 AM	A BMP File	530 KB
🔮 Documents	*	Webinar_1_Irr_data.txt	9/19/2016 11:56 AM	A Text Document	134 KB
E Pictures	*	Webinar_2_Density_map.txt	9/19/2016 11:57 AM	A Text Document	6 KB
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		Webinar_3_Density_map.txt	9/19/2016 11:59 AM	A Text Document	6 KB
Screenshots		Webinar_3_Dot_pattern.txt	9/19/2016 11:57 AM	A Text Document	514 KB
Webinar Example		Webinar_3_Irr_data.bmp	9/19/2016 11:59 AM	A BMP File	530 KB
😂 Dropbox		Webinar_3_Irr_data.txt	9/19/2016 11:59 AM	A Text Document	132 KB
		Webinar_4_Density_map.txt	9/19/2016 12:01 PM	1 Text Document	6 KB
a OneDrive		Webinar_4_Dot_pattern.txt	9/19/2016 11:59 AM	A Text Document	537 KB
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Desktop		Webinar_4_Irr_data.txt	9/19/2016 12:01 PM	1 Text Document	131 KB
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Music		Webinar_5_Irr_data.txt	9/19/2016 12:02 PM	1 Text Document	132 KB
Pictures		Webinar_6_Density_map.txt	9/19/2016 12:04 PN	1 Text Document	6 KB
📲 Videos		Webinar_6_Dot_pattern.txt	9/19/2016 12:02 PM	1 Text Document	553 KB
Local Disk (C:)		Webinar_6_Irr_data.bmp	9/19/2016 12:04 PN	A BMP File	530 KB
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Update TracePro RepTile property using the best result Dot_pattern.txt file

RepTile Property	Fritor							
Catalog	Catalog: Texture Optimizer II Webinar 👻	Name: Webinar Texture						
Add Catalog	Description:	Hole V						
Delete Catalog		Tile Parameters						
Add Property			_					
Delete Property	Variation Type: Texture	Der width: 0.1						
Copy Property	Geometry Type: N/A	Def Height: 0.1						
	Tile Type: N/A	File: C: \Users \djacobsen \Documents \Dave J Docu]					
Data Points								
ndd 1		Upen 🚺					×	
Maarr		$\leftarrow \rightarrow \checkmark \uparrow \square \rightarrow$ This PC :	> Local Disk (C:) > Texture Optimizer II > Webinar		ٽ v	Search Webinar	٩	
Delete								
	-	Organize 👻 New folder				E		
		Desktop '	^ Name	Date modified	Туре	Size	^	
		Documents	Webinar_2_irr_data.txt	9/19/2016 11:57 AIV	Text Document	I32 KB		
		🕹 Downloads	Webinar 3 Dot nattern tot	9/19/2016 11:57 AM	Text Document	514 KB		
		J Music	Webinar 3 Irr data.txt	9/19/2016 11:59 AM	Text Document	132 KB		
		E Pictures	Webinar 4 Density map.txt	9/19/2016 12:01 PM	Text Document	6 KB		
		Videos	Webinar_4_Dot_pattern.txt	9/19/2016 11:59 AM	Text Document	537 KB		
		Local Disk (C:)	Webinar_4_Irr_data.txt	9/19/2016 12:01 PM	Text Document	131 KB		
		System Reserved (D:)	Webinar_5_Density_map.txt	9/19/2016 12:02 PM	Text Document	6 KB		
		Local Disk (E:)	Webinar_5_Dot_pattern.txt	9/19/2016 12:01 PM	Text Document	547 KB		
		share (\\franklin) (St)					· ·	
		ACT (\\franklin) (/)	Webinar_6_Density_map.txt	9/19/2016 12:04 PM	Text Document	6 KB		
			Webinar_6_Dot_pattern.txt	9/19/2016 12:02 PM	Text Document	553 KB		
		sriare (\\tranklin) (2:)	Webinar_6_Irr_data.txt	9/19/2016 12:04 PM	Text Document	131 KB		
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			Webinar_/_Dot_pattern.txt	9/19/2016 12:04 PM	Text Document	555 KB	~	
	File name: Webinar_5_Dot_pattern.txt V					Texture File (*.tx	t) ~	
						Open	Cancel	
< >	Table							



Initial vs. Optimized RepTile Texture Pattern



Initial RepTile Texture Pattern

Optimized RepTile Texture Pattern



Re-run the raytrace to check the results – Illuminance Map





Optimized Illuminance Map



Initial Illuminance Map

Re-run the raytrace to check the results – 3D Illuminance Map



Initial 3D Illuminance Map

Optimized 3D Illuminance Map







Applying texture to a curved surface



Applying Texture to a Curved Surface with the Texture Optimizer II

- The Texture Optimizer II allows the user to apply a texture to a curved surface
- The texture is applied as a real geometry and not a RepTile property
- The boundary, partitions, dot shape, and cell densities can be defined in the Texture Optimizer II
- Boolean subtract and unite options are available for making holes or bumps
- Because the texture is modeled as real, 3D geometry, there can be a limit to the number of texture features applied. More texture features will take more time.



Curved Light Guide model in TracePro





The texture will be applied to the "Bottom" surface of the Light Guide





Select Surface(uv) for the Boundary, enter the name of the Surface in the dialog box, and then click OK

andary	Taration		In-cell		Dot shape	
Surface(uv)> ~	Uniform	Generate	One-Centroid ~	Generate	Sphere	~
Surface na	me to load	X			Bump sign: Bun	np 🗸 🗌 Dot preview
yer ID: Please inn	wit the surface name of interest to load				Param	Value
from Trace	ePro	ок			radius	0.01
viewer		Cancel			height	0.01
89.5994,-55)		(89.599/	Display Solution Density map Dots Density tools Density tools Density tools Density tools		Scale	Export



Select Surface(uv) for the Boundary, enter the name of the Surface in the dialog box, and then click OK





Select the Partition type and number of Cells. Example below is Uniform partition with 100 cells.

🖳 Dot generator			
Dot generator File Import Export Action Boundary <surface(uv)> \vee Layer ID: Dot viewer (-0.396,1.05)</surface(uv)>	Partition Uniform Cells: 100	In-cell One-Centroid Generate Generate	Dot shape Sphere Bump sign: Bump Param Value radius 0.01 height 0.01 Scale Export
(-0.396,-0.05) Generating partitionDone (0.469 sec)	(1.396,	-0. <mark>05)</mark>	(1.317656 , 0.43635)



Define the Dot Shape. Example below is a Flatted cone, 0.5mm high with an end radius of 0.5mm and a 45-degree cone angle.

🖳 Dot generator				
File Import Export Action				
Boundary	Partition	In-cell	Dot shape	
<surface(uv)> v</surface(uv)>	Uniform V Gener	one-Centroid ~ G	enerate Flattened cone	
	Cells: 100		Bump sign: Hole	✓ Dot preview
Layer ID:			Param	Value
			height	0.5
Lot viewer		Mode	end radius	0.5
(-0.596,1.05)			cone angle	45
			peak radius	0.01
		🖳 Dot preview	trough radius	0.01
		Projected radius = 1 00414 mm	36 	
			Scale	Export
	XXXX			
$ \uparrow\uparrow\uparrow\uparrow$				
(-0.396,-0.05)				
Generating partitionDone (0.469 sec)				(1.317656 , 0.43635)



Choose the In-cell method and the density. Click Generate to generate the dots. Turn on Dots to see the dots. The example below uses Assigned density-Uniform for the In-cell method and 0.25 for the Density.

🖳 Dot generator				
File Import Export Action Boundary Surface(uv)> Layer ID: Dot viewer	Partition Uniform Generate Cells: 100	In-cell Assigned density-Uniform V Generate Density: 0.25	Dot shape Rattened cone Bump sign: Hole Param height end radius	Value 0.5 0.5
$\left(\begin{array}{c} 0.396, 1.05 \right) \\ \oplus \ \oplus$		(1.3) Hode Display Boundary Partition □ Density map ☑ Dots (1.3) Density tools	cone angle peak radius trough radius Scale	45 0.01 0.01 Export
(-0.396,-0.05) Generating 318 dots done! (0.063 sec)		(0.00%)		(1.317656 , 0.43635)



Select Export->Real geometries

🖳 Dot generation				
File Import Export Action				
Boundary TracePro Texture Pa	itition	In-cell	Dot shape	
<surface file="" position="" th="" ur<="" uv):=""><th>niform V Generate</th><th>Assigned density-Uniform V Generate</th><th>Flattened cone</th><th>~</th></surface>	niform V Generate	Assigned density-Uniform V Generate	Flattened cone	~
Real geometries Ce	ilis: 100	Density: 0.25	Bump sign: Hole	✓ □ Dot preview
Layer ID:			Param	Value
			height	0.5
Dot viewer	N	Mada	end radius	0.5
	(1.396,) ⊕ ⊕ ⊕⊕ ⊕ ⊕ ⊕		cone angle	45
			peak radius	0.01
			trough radius	0.01
	$\Phi \oplus \Phi \oplus$	Display		
		Partition	Scale	Export
		Density map		
		Dots		
		Density tools		
$(-0.396 - 0.05) \qquad \qquad$		0.05)		
	(2000)			
Generating 318 dots done! (0.063 sec)	(0	0.00%)		(0.739911 , 1.027151)



Enter the Surface Name, Object Name, and Boolean type and then click Export.

🖳 Dot generator					
File Import Expo Boundary Surface(uv)> Layer ID: Dot viewer (-0.396,1.05) 	rt Action	Partition Uniform V Gene Cells: 100 metries Surface name: Bottom Type: Unknown Nom: (0, 1, 0) Projected origin: (0, 1, 0)	erate In-cell Assigned density-Uniform V Density: 0.25 Check Align surface norm Offset: 0.0 Boolean Subtract Object name: Light Guid	Generate Dot shape Flattened cone Bump sign: Ho Param height end radius cone angle peak radius trough radius	Value 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
(-0.396,-0.05) Generating 318 dots done	$\begin{array}{c} \bullet \\ \bullet $		(0.00%)	ort	Export (1.333976 , 0.97819)



Results in TracePro





Results in TracePro









Summary and Questions



The TracePro RepTile property and Texture Optimizer II allows:

- A fast, accurate, and efficient way to model repetitive microstructures on light guides and backlights
- ✓ Numerous options for feature types
- Quick and easy optimization of RepTile texture patterns on light guide and backlights for improved uniformity
- ✓ The ability to add texture features to curved surfaces as real geometry

For more information or to sign up for our free 30-day trial please visit us at:

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