



# Update Guide Release 2020.2

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Lambda Research Corporation  
25 Porter Road  
Littleton, MA 01460  
USA

[www.lambdares.com](http://www.lambdares.com)  
[support@lambdares.com](mailto:support@lambdares.com)



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# INTRODUCTION

This document serves as a guide for new features and changes in TracePro 2020.2. This release has enhancements in the Texture Optimizer and Interactive Optimizer, and a new Material Property catalog. This release also fixes several problems reported by TracePro users. See the [TracePro Revision History](#) at [www.lambdaires.com](http://www.lambdaires.com) for more details on problem resolutions.

## WHAT'S NEW IN TRACEPRO 2020.2?

Changes in TracePro 2020.2 are summarized as follows:

- Texture Optimizer new features: Random Dot distribution and Smooth Dots.
- Interactive Optimizer: new dialog for viewing the TracePro model.
- New Material Property Catalog: Dow Silastic moldable silicone.

## TEXTURE OPTIMIZER

The Texture Optimizer has two new features: Random Dot Distribution and Smooth Dots. There are two methods of creating random dot distributions. The Smooth Dots feature enables automatic adjustment of dot positions to guarantee that dots do not overlap each other.

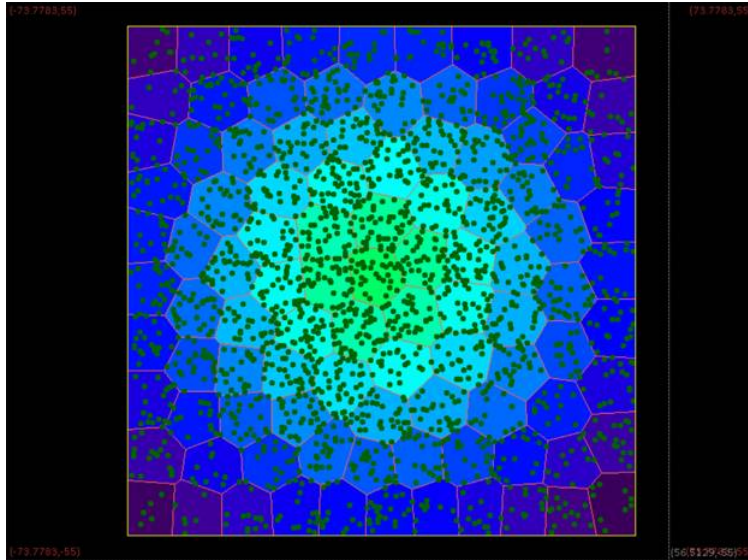
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### Random Dot Distribution

The Random Dot Distribution can be controlled in two different ways: using cell densities and using a density map.

#### *Using Cell Densities*

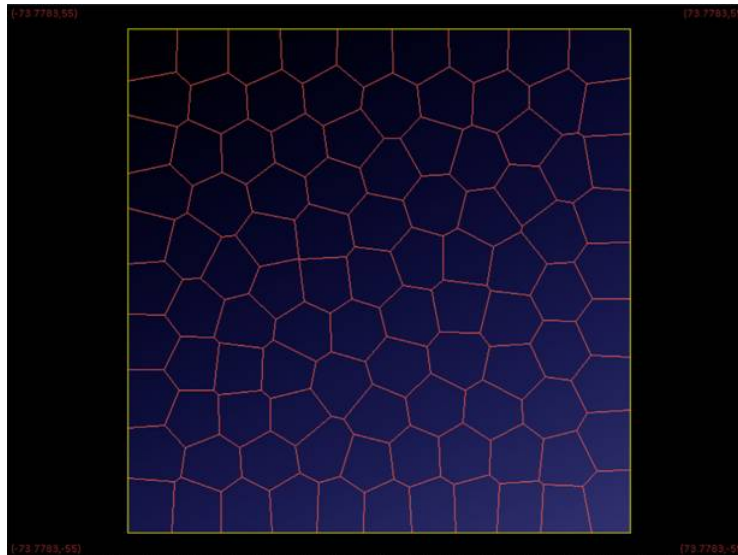
The number of dots can be randomly generated within the selected cells according to the density value of each cell. The distributed dots are not necessarily separated, and may overlap. However, the overall distribution of dots will follow the density distribution as shown in Figure 1.



**Figure 1. Distribution of dots varying according to cell densities.**

### ***Using Density Map***

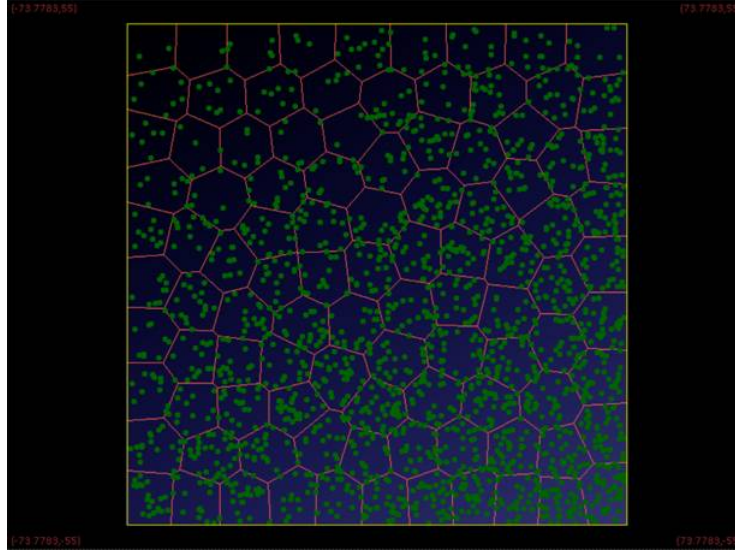
The purpose of the density map is to provide a continuous density distribution for generating the dots in order to have a more continuously varying dot pattern. For example, the density map can be as in Figure 2, a smooth gradient map.



**Figure 2. Continuously-varying density map with higher density in the lower right corner.**

Generating the random dots using the density map results in dots distributed more continuously than is available with the cell density method.





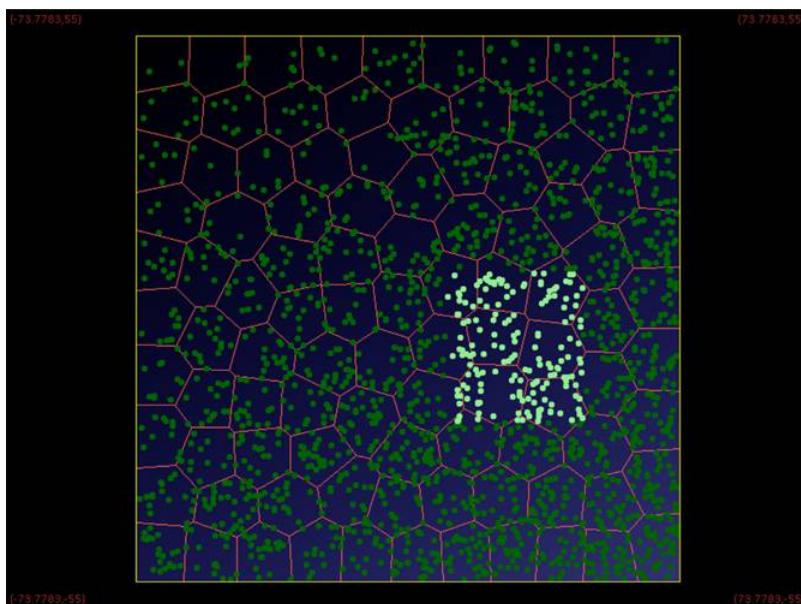
**Figure 3. Random dots generated using the density map in Figure 2.**

The random generation cannot guarantee the dots are uniformly distributed and not overlapping. To make the random dot pattern practical, a method of smoothing the dot pattern is available, as described in the next section.

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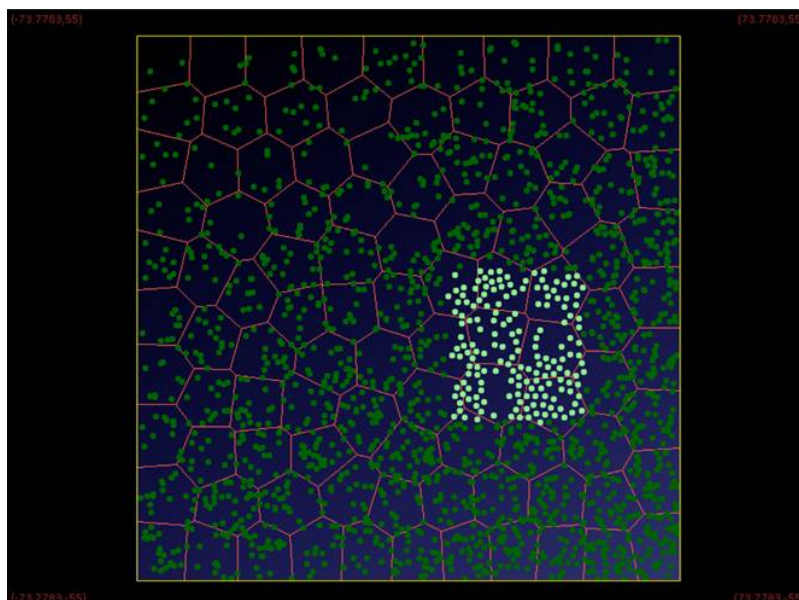
## Smooth Dots

The Smooth Dots function utilizes the Molecular Dynamics Simulation approach to move each dot by a repulsive force from its neighbors. All existing dots will provide a force depending on the density value at that location. Higher density offers lower repulsive force and shorter range. This feature can apply to dots in selected cells or to a selection of dots. The calculation is done with all dots whether they are movable or fixed. For example, in Figure 4 the highlighted dots are selected to be smoothed, but all the darker green dots are fixed and will stay at their positions.



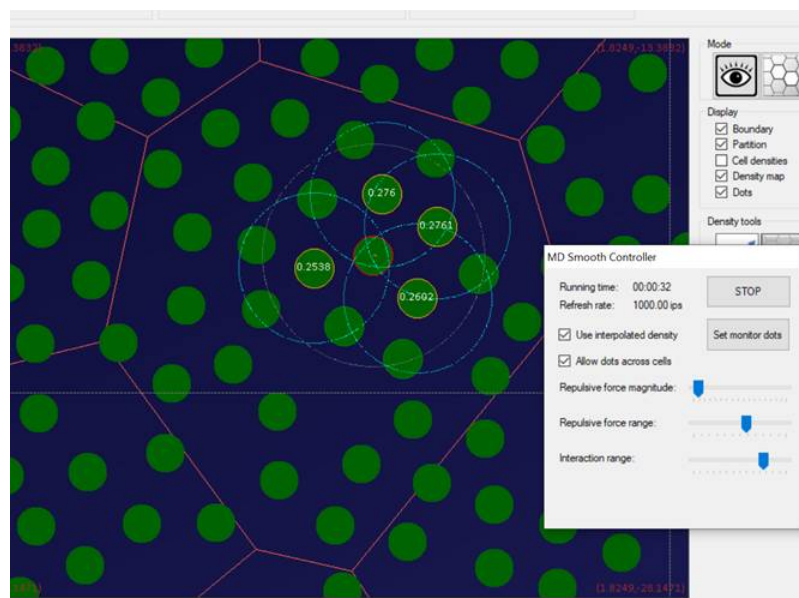
**Figure 4. A group of dots selected for smoothing.**

After smoothing, the dot pattern in Figure 4 changes to the pattern shown in Figure 5, with the dot positions adjusted so they are no longer overlapping each other or any of the green dots.



**Figure 5. The smoothing function adjusts the dot positions so they no longer overlap.**

During the smoothing operation, a controller is provided for tuning parameters in real time as shown in Figure 6. It also allows you to set monitoring dots for examining the interaction distance, repulsive range, and the resulting force.



**Figure 6. Using the Molecular Dynamics smoothing controller.**

Finally, when selecting only two dots, the distance between them is displayed, as shown in Figure 7.

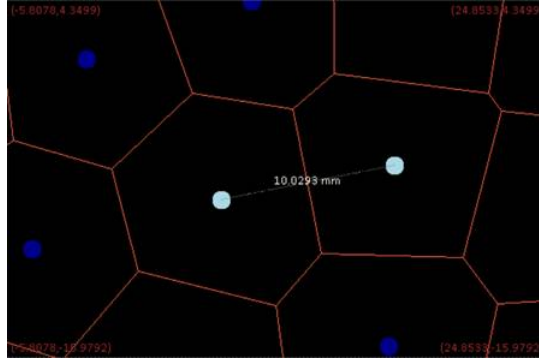


Figure 7. When only two dots are selected for smoothing, the distance between them is displayed.

## INTERACTIVE OPTIMIZER

The Interactive Optimizer has a new feature with the 2020.2 release: a new dialog for viewing the TracePro model. This new dialog does more than simply viewing the TracePro model. It can locate the position, normal and uv coordinates in an existing model. The position, normal or uv coordinates are further used in generating features on a curved object, for example a light guide as shown in Figure 8.

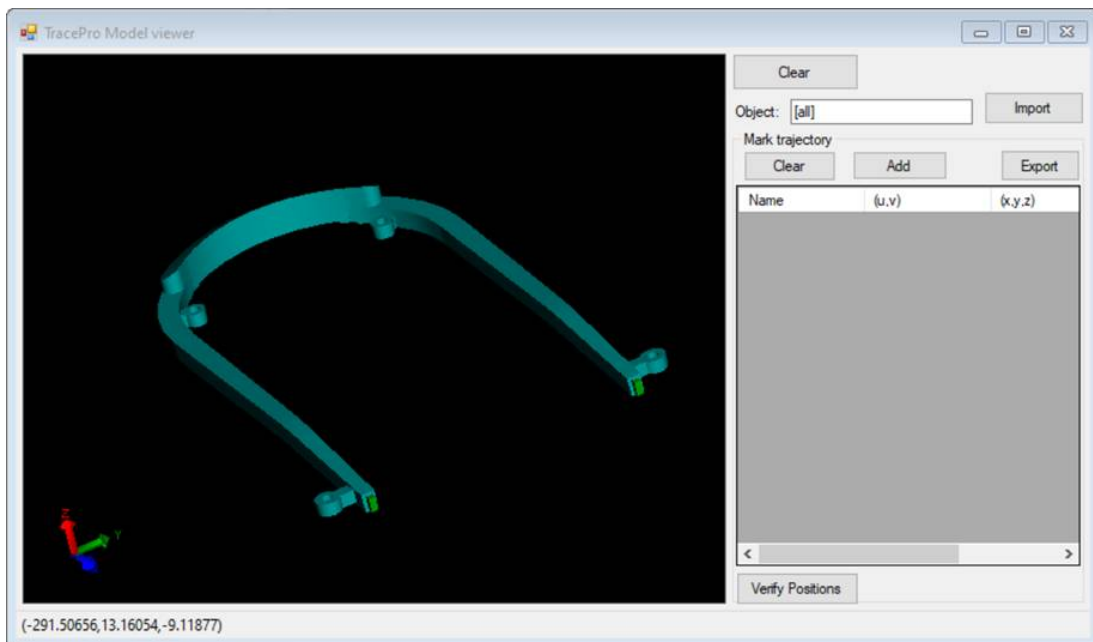


Figure 8. Viewing objects with the TracePro Model Viewer. The [all] object selection is shown.

In the TracePro Model Viewer window, type in the object names to be viewed, separated by commas. Enter [all] to view all objects in the current TracePro model as shown in Figure 8.

When you hover the mouse on a surface, the position, uv coordinates, object name, and surface name are displayed in the status bar as shown in Figure 9.

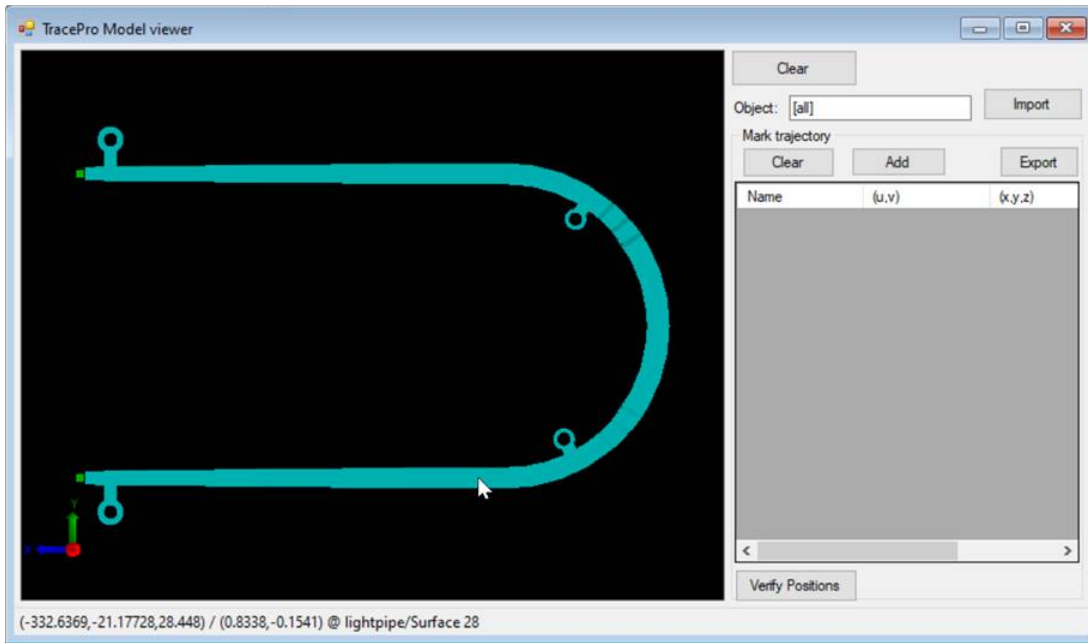


Figure 9. TracePro Model Viewer showing position, uv coordinates, object and surface names in the status bar.

To mark a trajectory, click *Add* to enable the Add Control Point mode. Then click on the object surface and a new control point will be added. Figure 10 shows several control points added on Surface 28.

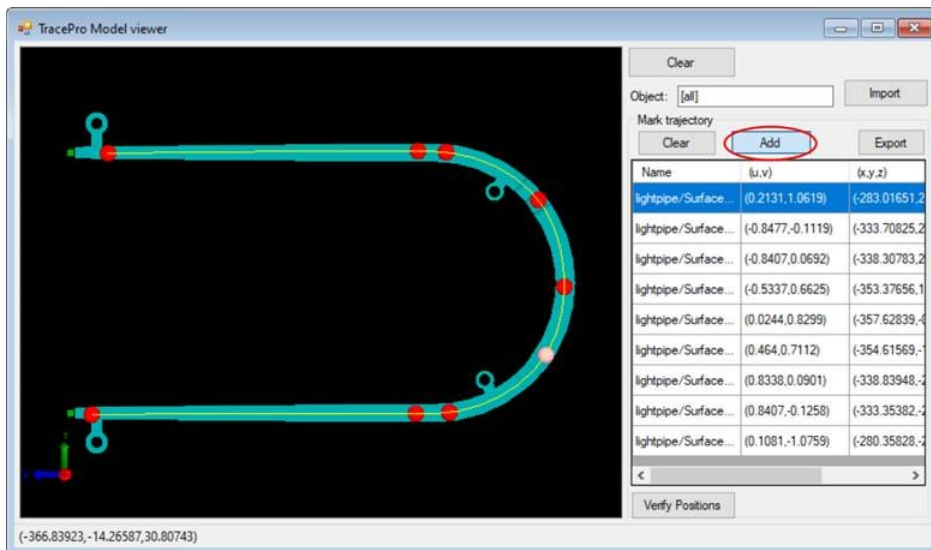
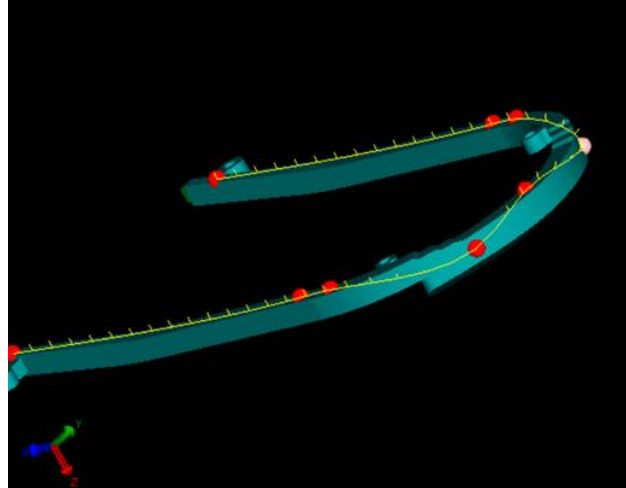


Figure 10. The TracePro Model Viewer with several control points added on Surface 28.

To insert a control point, move the mouse on the generated curve (the curve will be highlighted), right-click to open a pop-up menu, and select *Add*. The position of the control point to be added must be on a solid surface. If the resulting spline curve is out of the body, insert a new control point on the object and move the point to bend the curve to the shape expected. Figure 11 shows a spline curve not on the object, and a control point inserted to allow correcting the curve. When you orbit the view, the branches on the curve indicate the normal directions. The normal direction will be correctly computed even if the spline curve is twisted.



**Figure 11. Example of a control point not on the object.**

Use the Verify Positions button to ask TracePro to report the positions from the assigned uv values. This enables you to verify that the positions obtained in the utility are still correct in TracePro. The verified positions and normal vectors are displayed in red, as shown in Figure 12.

	(x,y,z)	(nx,ny,nz)
31,1.0619)	(-283.0175,21.17...	(-0.07975,0.0,-0....
77,-0.11119)	(-333.70774,21.5...	(0.0,0.0,-1.0)
07,0.0692)	(-338.30768,21.3...	(0.0,0.0,-1.0)
03,-2.454)	(-354.21566,14.5...	(-0.77278,0.6346...
14,0.8299)	(-357.62946,-0.6...	(0.0,0.0,-1.0)
22,2.6512)	(-356.70705,-10....	(-0.90559,-0.424...
38,0.0901)	(-338.83854,-21....	(0.0,0.0,-1.0)
07,-0.1258)	(-333.35468,-21....	(0.0,0.0,-1.0)
31,-1.0759)	(-280.359,-21.53...	(-0.07975,0.0,-0....

**Figure 12. The Verify Positions window showing the global position and normal vectors in red.**

The marked trajectory can be exported as a code snippet for further use in After-scheme. There are three types of template for exporting:

1. Code of trajectory (p,n) : use this to generate a trajectory using the specified position and normal vector when the trajectory is lying on the target surface.
2. Code of trajectory (uv on face): use this to generate a trajectory using the uv coordinates when all features are to be put on a single face.
3. Code of trajectory (proj on body): use this to generate a trajectory with the rays for projecting on the desired body when the target faces are split.

# DOW SILASTIC MATERIAL PROPERTY CATALOG

A new Material Property Catalog is available in TracePro: Dow Silastic moldable silicone. The new catalog contains the following property data for DOWSIL silicone, as provided by Dow.

- MS-1002
- MS-1003
- MS-4002
- MS-4007
- MS-4022

The data includes index of refraction and absorption coefficient versus wavelength and temperature.

**Note:** To obtain the new catalog, you must open TracePro and select **Help|Update Property Data**. When you are prompted to select whether to overwrite existing properties, select *Yes to all*. TracePro will then download the new catalog and add it to your property database. It will not overwrite, modify, or delete any of your custom properties.