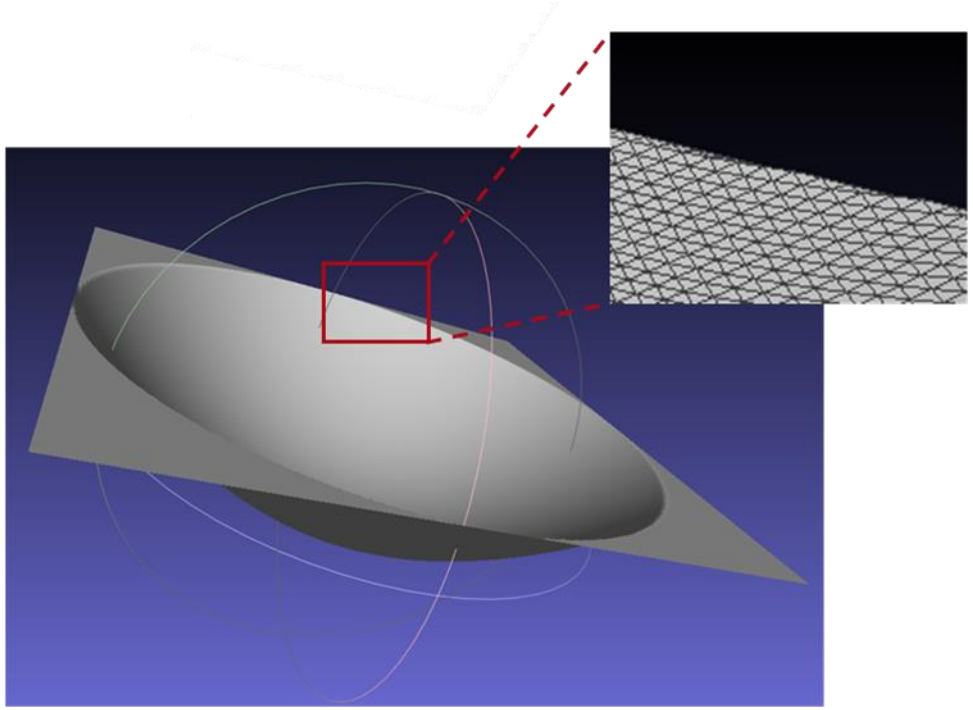
Export of Fabrication Data for Smooth Surfaces

Abstract



STL export of an aspherical interface
(illustrated by MeshLab)

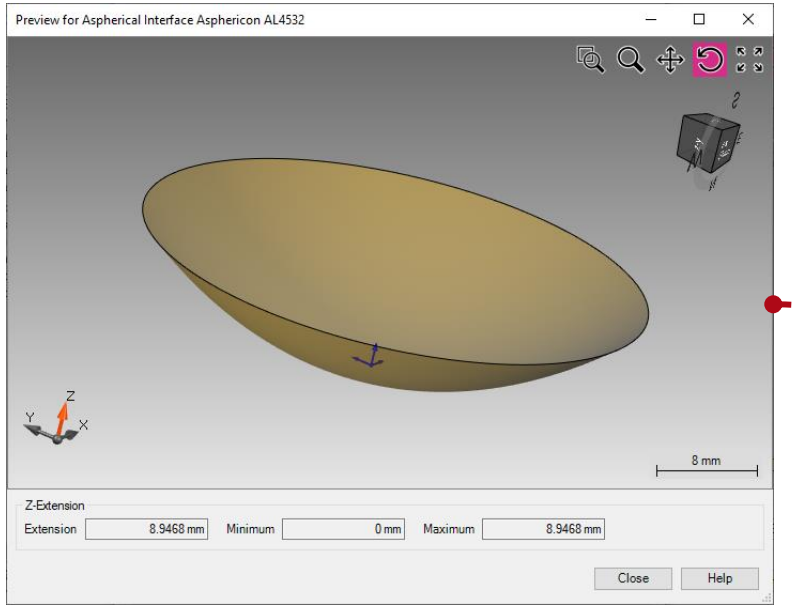
A good synergy between software design tools and the subsequent fabrication of components relies on the capability of the software to provide information about the designed structures which can be easily interpreted in the manufacturing process; in other words, being able to export the structure information in the data format used for fabrication. In this document, we demonstrate how to export the fabrication data of a smooth surface as an STL file and with other custom formats.

Task Description

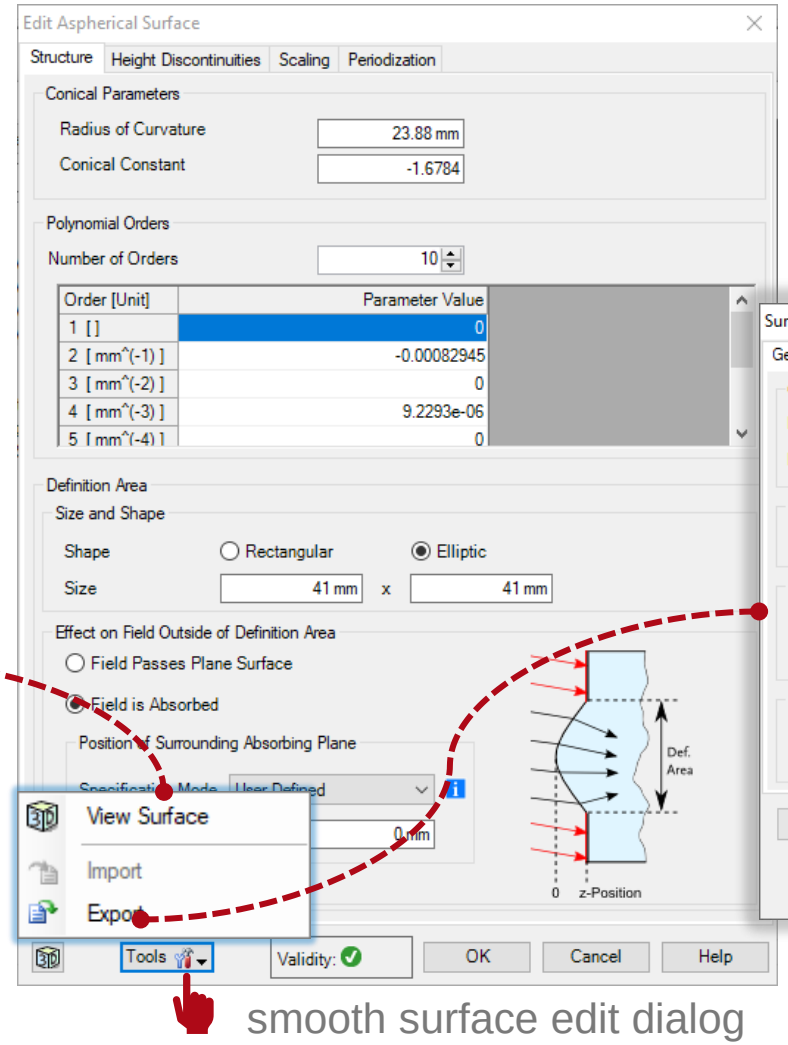
Display and flexible export of smooth surfaces

a) in various file formats;

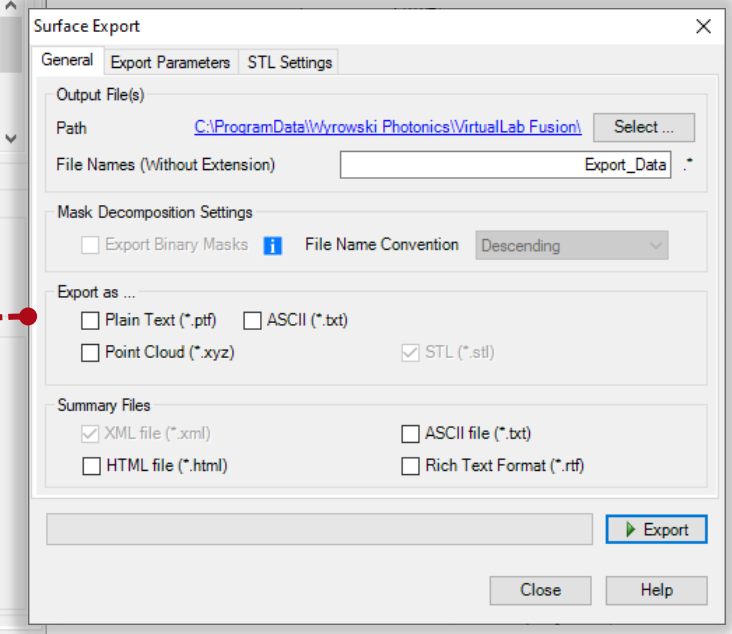
b) export of 1D cut through the lens and/or 2D height profile



3D view of smooth surface



smooth surface edit dialog



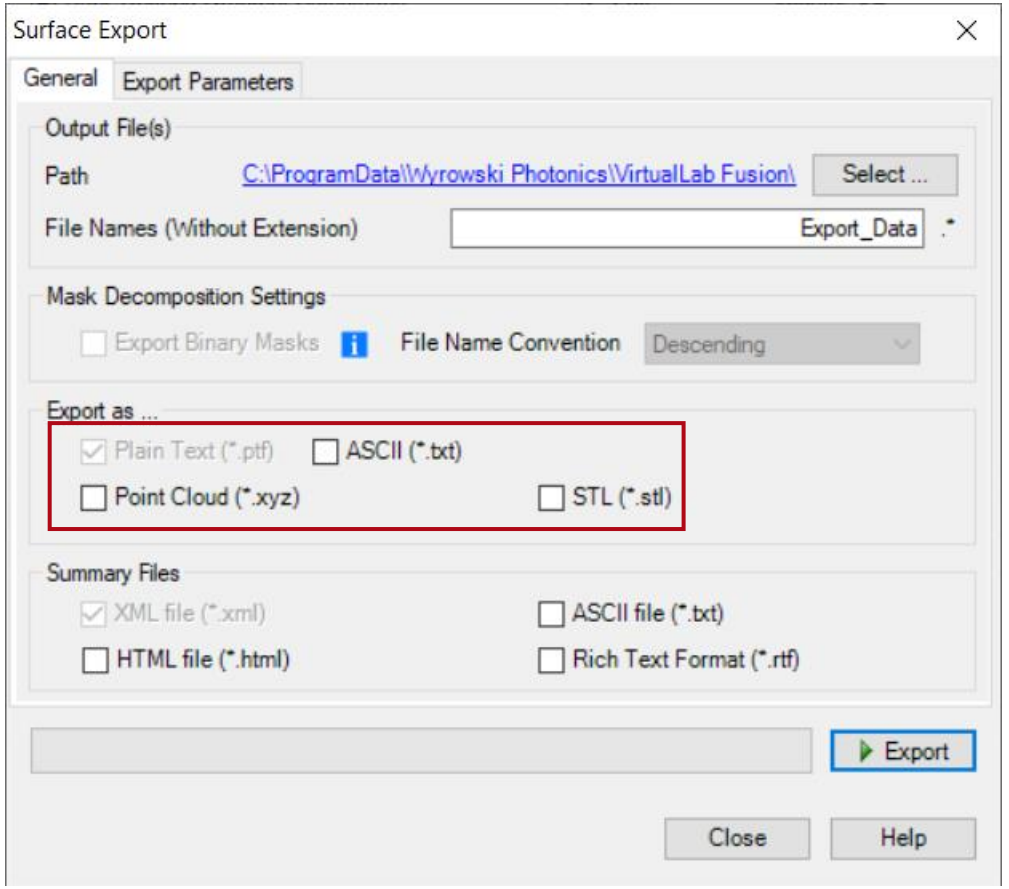
surface export dialog

Supported File Formats of Fabrication Data

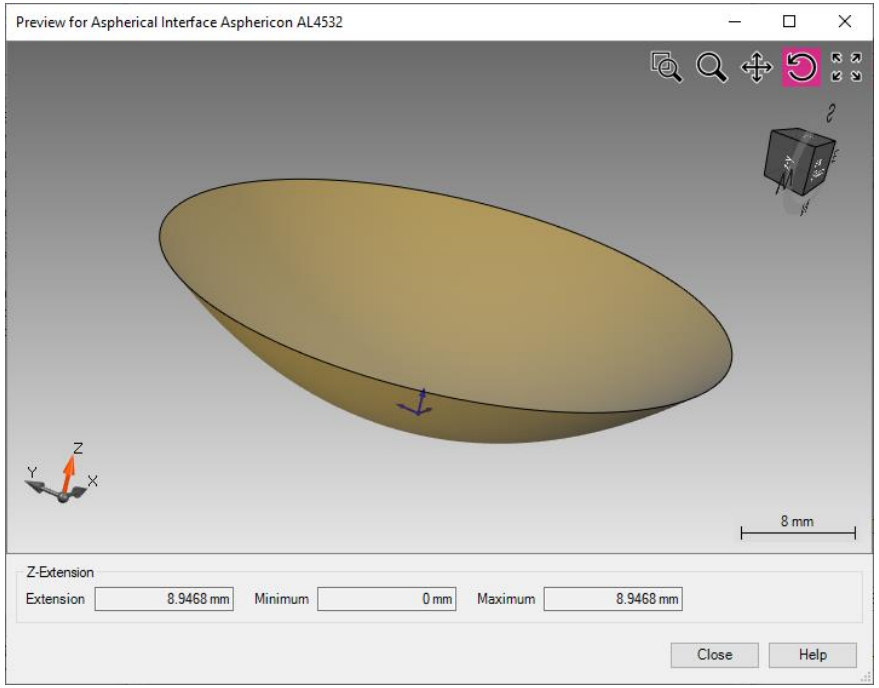
supported file formats

- plain text
- ASCII
- point cloud
- CAD formats (e.g., STL, IGES)
- CIF
- GDSII
- Other customized export file formats

In this use case, we provide a module for customized 1D and 2D height profile export for reference, if other formats are needed, please contact support@lighttrans.com!

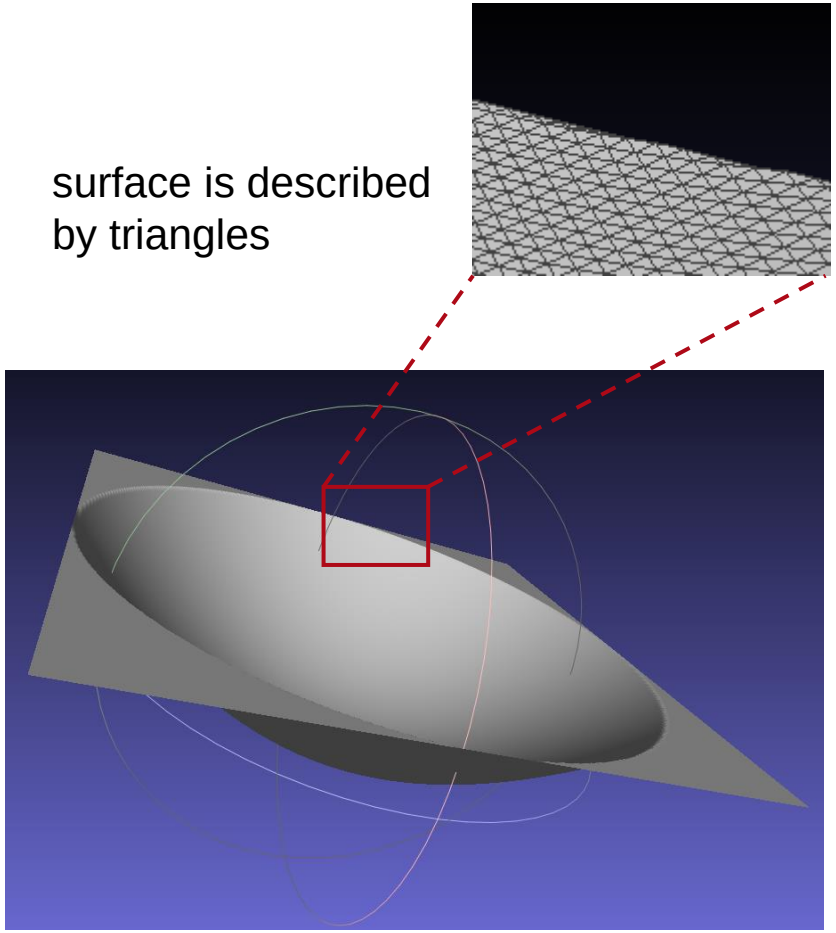


STL Export of Smooth Surfaces (e.g. Asphere)



3D view of an aspherical interface in VirtualLab

surface is described by triangles

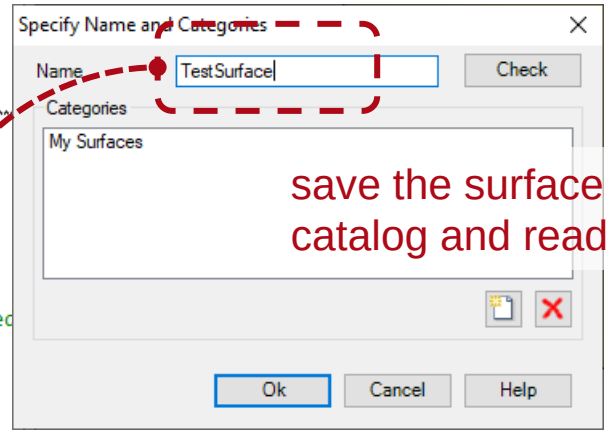


STL export of an aspherical surface (illustrated by MeshLab)

STL file format is widely used for rapid prototyping, 3D printing, and computer-aided manufacturing.

Module for Customized 1D Height Profile Export

```
20  namespace OwnCode {
21      /// <summary>
22      /// this module can be used to visualize a surface selected from the user defined catalog
23      /// the user can select whether to visualize the interface as 2D or 1D data array
24      /// </summary>
25      public class VLModule : IVLModule {
26          /// <summary>
27          /// the name of the interface within the user defined catalog which shall be visualized
28          /// </summary>
29          string surfaceNameInUserDefinedInterfaceCatalog = "TestSurface";
30
31          /// <summary>
32          /// boolean flag whether the surface should be visualized by a 1D line profile
33          /// </summary>
34          bool generateLineProfileOutput = true;
35
36          /// <summary>
37          /// the start position for the line profile
38          /// </summary>
39          VectorD startCoordinateLineProfile = new VectorD(-50e-6, 0);
40
41          /// <summary>
42          /// the start position for the line profile
43          /// </summary>
44          VectorD endCoordinateLineProfile = new VectorD(50e-6, 0);
45
46          /// <summary>
47          /// the number of data points along the line profile
48          /// </summary>
49          int numberOfPointForLineProfile = 10001;
50
```



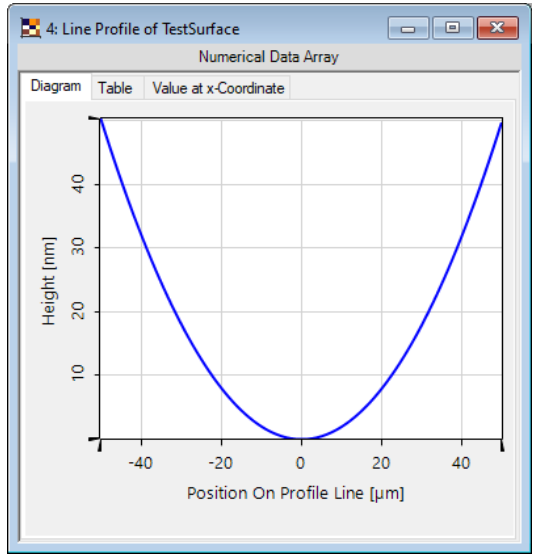
save the surface to user defined catalog and read it from the module

activate line profile output to generate 1D height profile

Define the start and end coordinate of the 1D profile

set number of sampling points

1D height profile



Module for Customized 2D Height Profile Export

```
25  public class VLModule : IVLModule {
26      /// <summary>
27      /// the name of the interface within the user defined catalog which shall be visualized
28      /// </summary>
29      string surfaceNameInUserDefinedInterfaceCatalog = "TestSurface";
30
31      /// <summary>
32      /// boolean flag whether the surface should be visualized by a 1D line profile
33      /// </summary>
34      bool generateLineProfileOutput = false;
35
36      /// <summary>
        position for the line profile
```

deactivate line profile output to generate 2D height profile

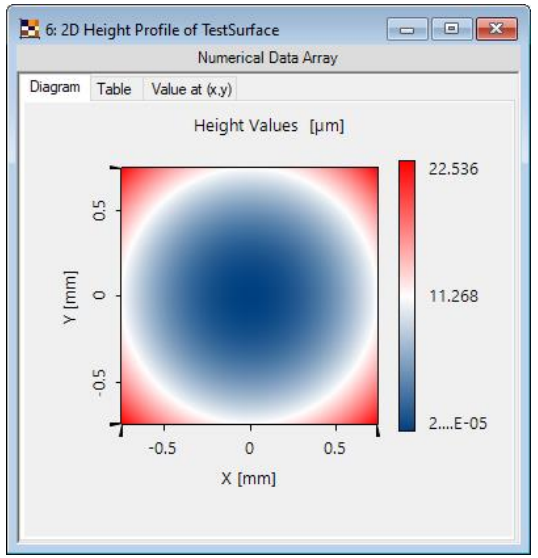
... ...

```
51      /// <summary>
52      /// the size of the rectangle which shall be used for rectangular (2D) evaluation
53      /// </summary>
54      VectorD sizeForRectangleEvaluation = new VectorD(1.5e-3, 1.5e-3);
55
56      /// <summary>
57      /// the center position of the rectangle which shall be used for rectangular (2D) evaluation
58      /// </summary>
59      VectorD centerPositionRectangleEvaluation = new VectorD(0, 0);
60
61      /// <summary>
62      /// the number of sampling points which shall be used for rectangular (2D) evaluation
63      /// </summary>
64      Vector numberSamplingPointRectangleEvaluation = new Vector(501, 501);
65
```

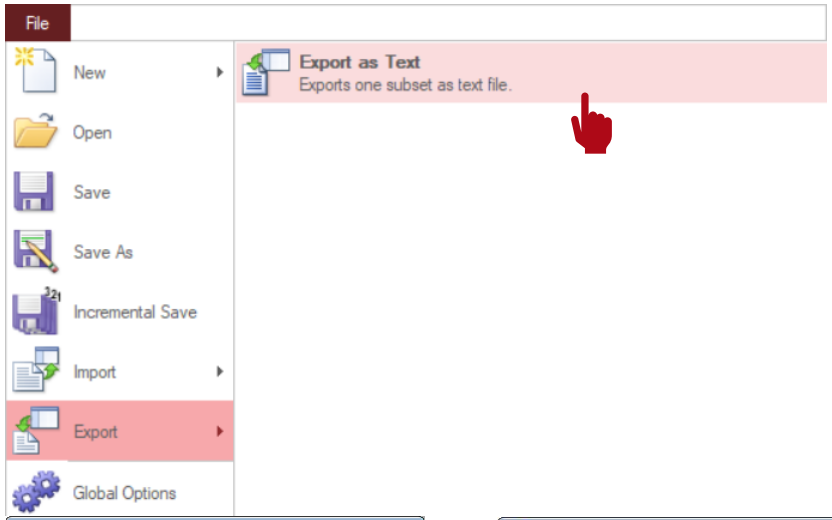
Define size and center position for the 2D profile

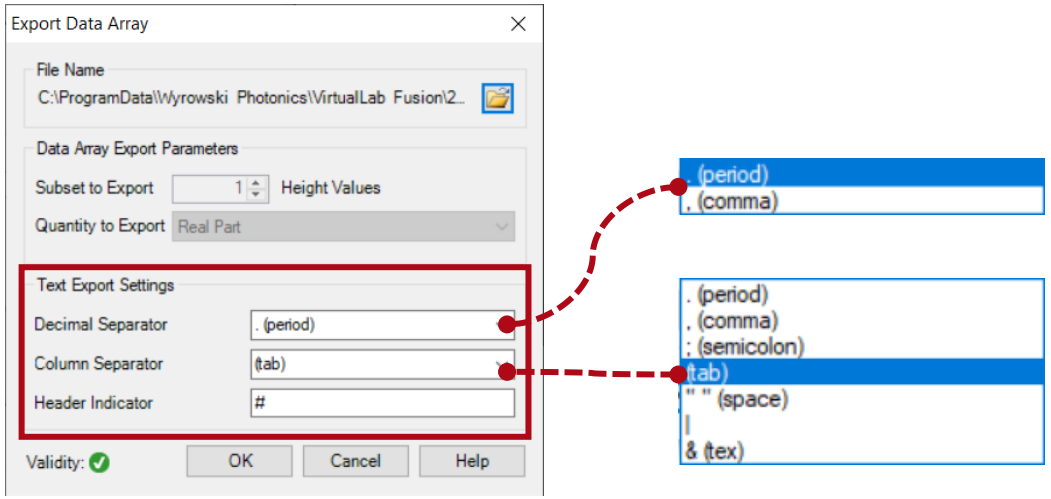
set number of sampling points

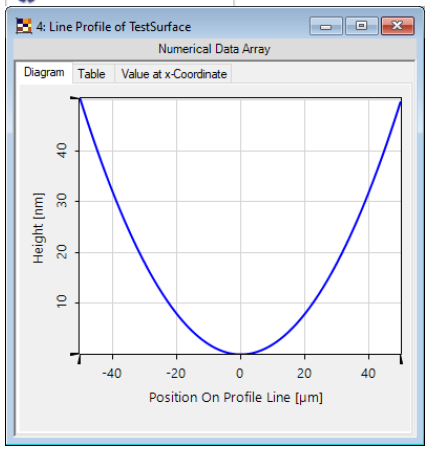
2D height profile

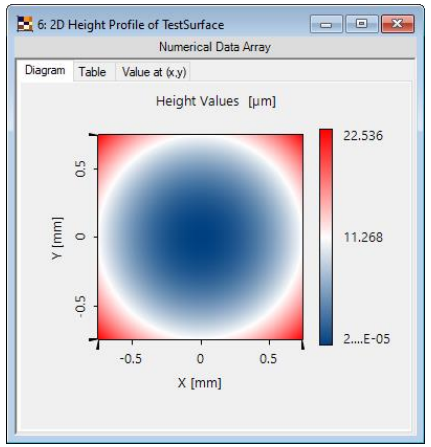


Data Array Export of 1D and 2D Height Profile









1D & 2D height profile data array

A VirtualLab Fusion Data Array can be exported to a text file in ASCII format. And it is flexible to

- choose either period or comma as decimal separator, or enter another, arbitrary character.
- choose one of the various predefined column separators or enter an arbitrary character.
- export additional information of the data array. This information (including sampling distance and number of sampling points) is shown at the beginning of the resulting text file in lines starting with the specified Header Indicator.

Document Information

title	Export of Fabrication Data for Smooth Surfaces
document code	
version	1.0
edition	VirtualLab Fusion Basic
software version	2020.2 (Build 2.22)
category	Feature Use Case
further reading	- Export of the Holographic Optical Element Fabrication Data