TECH REPORT

AREA MULTI FOCUS

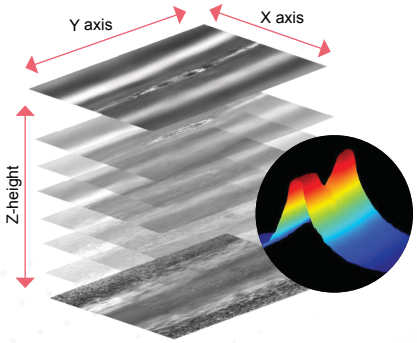
a High Throughput Alternative to Laser Surface Scanning

WHAT IS AREA MULTI-FOCUS (AMF™)

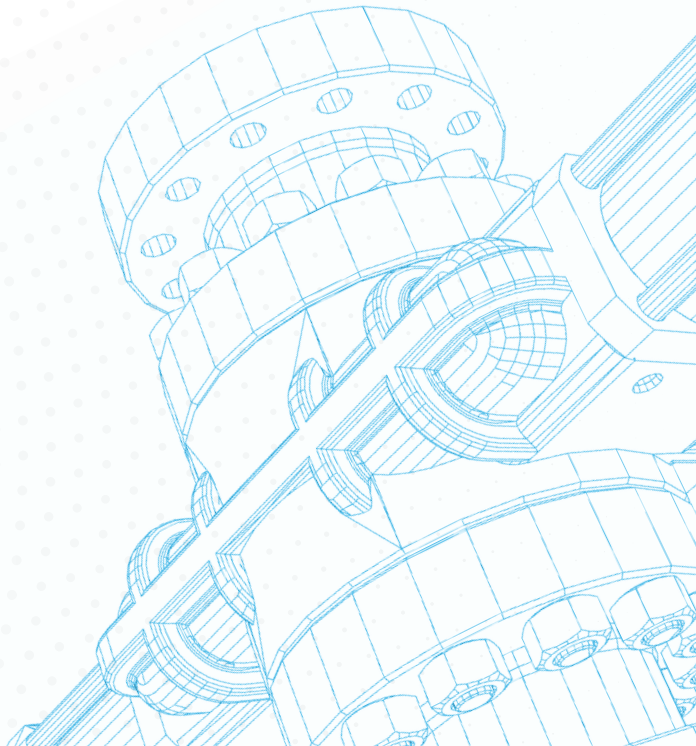
AMF is a special feature of VMS™, a 2½ D metrology software, with powerful parametric programming and built-in scripting for the creation of custom routines and user interfaces.

VMS is available on Benchmark™, Pinnacle™, and Summit™ systems, which are tailored for wafer, photomask, slider, MEMS, semiconductor package, HDD suspension, probe card, and micro-component process measurements. These systems, also known as Advanced Production Systems (APS), combine high-accuracy transport and optical technologies with VMS software and customized application support to satisfy the unique demands of process monitoring near the production line.

AMF technology creates high-resolution 3D images using machine optics. The technology works like autofocus but rather than finding a single XYZ point, AMF will create an entire 3D image. Below is a graphic of how Area Multi-Focus works. Multiple images are taken during a Z pass and the images are analyzed for focus. The most in-focus sections are taken from each image and put together to create a 3D image.



Visualization of the AMF process – AMF turns 2D images into a 3D surface.



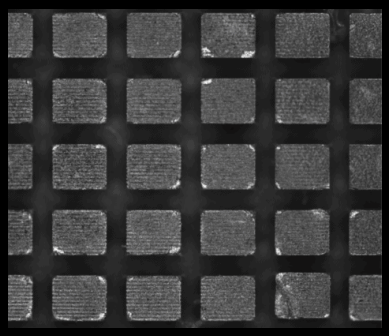
WHEN SHOULD AMF BE USED?

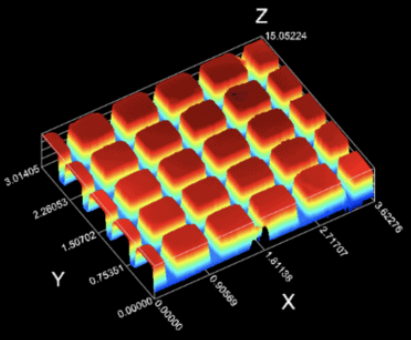
AMF offers a high-throughput alternative to single-point focus or laser surface scanning. The most common use for AMF is to measure multiple Z heights for features that fit in a single field of view (FOV). With AMF, all Z heights can be gathered in the amount of time it would take to do a single autofocus.

See the example below of a part with multiple features of height in the FOV. A single AMF produces all the Z data needed to measure the heights of the features. See the example below of apart with multiple features of height in the FOV. A single AMF produces all the Z data needed to measure the heights of the features. VMS utilizes image processing tools for feature segmentation, feature extraction, and height calculation.

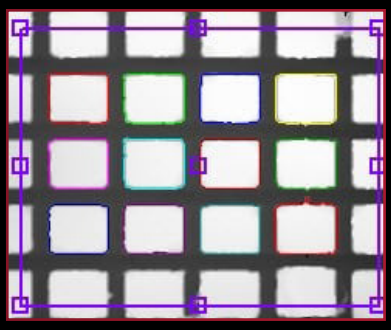
Feature segmentation in VMS is accomplished by first displaying the 3D dataset as a 2D grayscale height map and then using standard 2D tools to define feature areas of interest (AOI). This technique can also be useful for locating features when traditional edge finding is insufficient. This is all done in a few seconds using a single Area Multi-Focus.

On the right is a 2D height map of the previous 3D dataset with Blob Finder results showing the AOIs being located. The data for each AOI is then extracted and processed separately to determine heights.

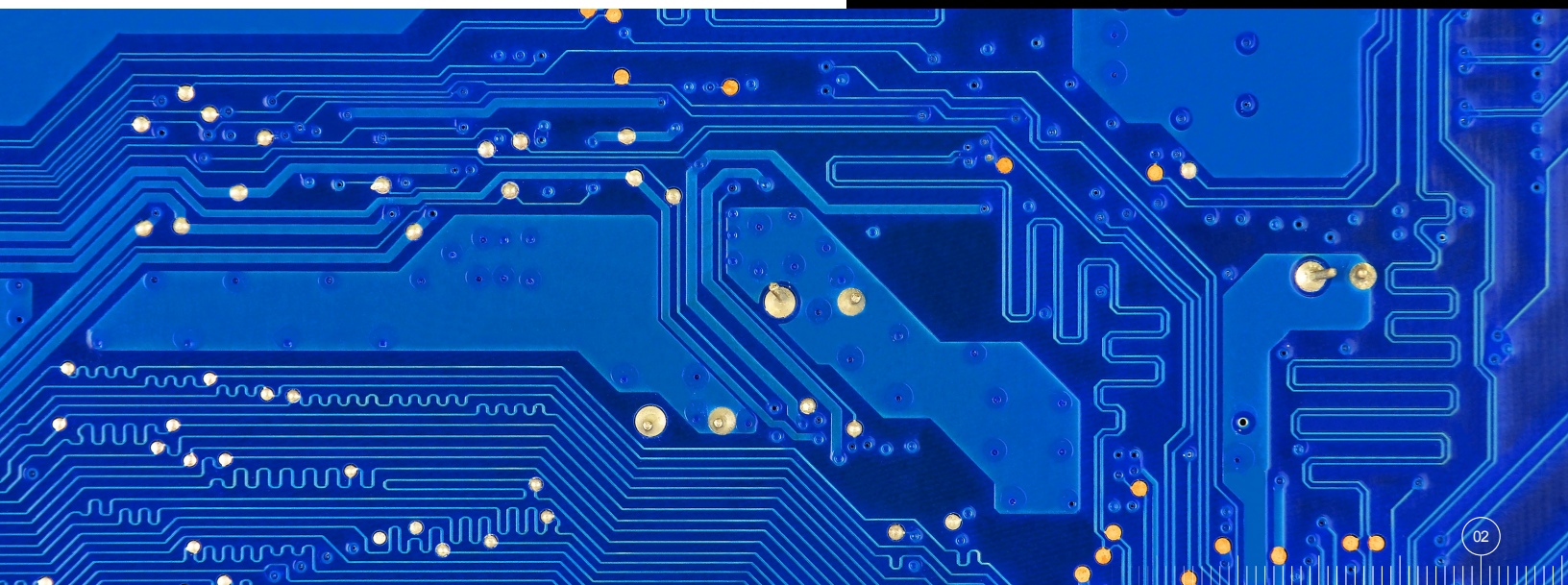


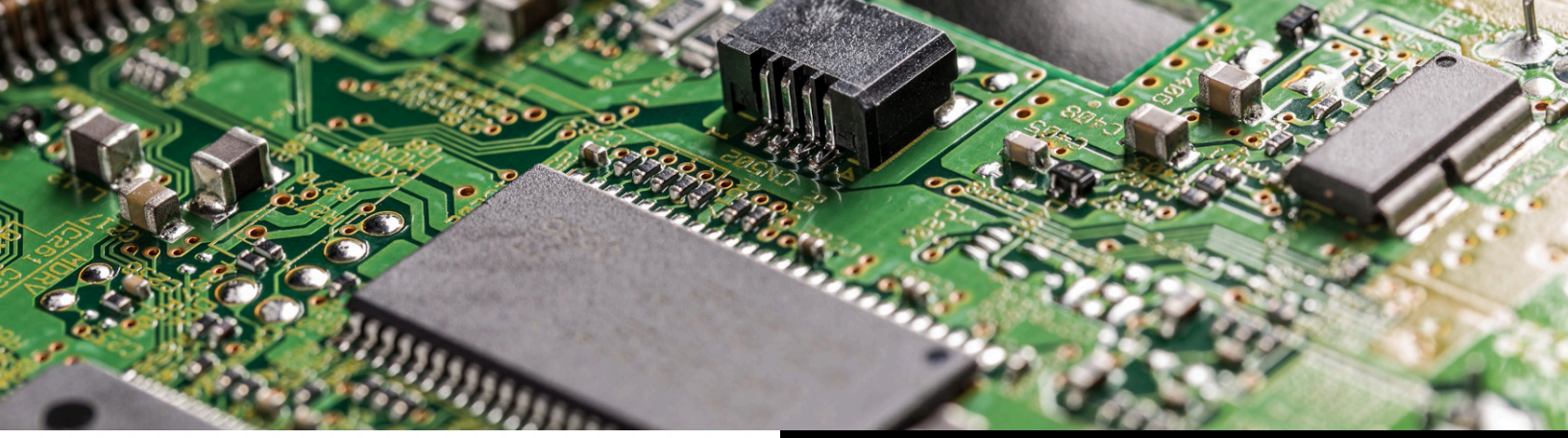


Standard image and its corresponding AMF.



2D height map of AMF with blob finder.

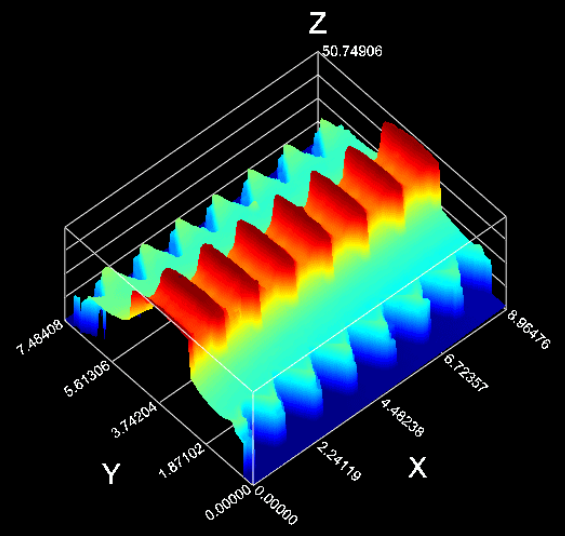




OTHER USES

AMF is used for true 3D measurements such as plane angles or spherical radii. AMF can be used in lieu of a touch probe or laser to make these measurements for high-contrast surfaces. The ability of AMF to take thousands of points in a single pass allows it to make certain 3D measurements much faster than other types of sensors.

To the right is an example of a screw tap measured using AMF. A large portion of the tap can be measured in a single pass, and from that image, the teeth angle and pitch can be calculated. In just a few seconds a wealth of information can be gathered on a part of this type using AMF.



Learn more about OGP Measurement Systems at **ogpnet.com**

OGP (Optical Gaging Products) is a division of Quality Vision International Inc (QVI®), a world leading manufacturer of precision multisensor metrology systems for industrial Quality Control. Our metrology systems focus on measurement technologies that help manufacturers monitor dimensional compliance to design specifications. First introduced in 1992, the famous OGP SmartScope® product family has become one of the world's most popular and versatile dimensional measurement systems. SmartScope systems are designed and produced at QVI corporate headquarters in Rochester, NY, USA. Flash branded systems are sold in North America while Flash CNC and CNC systems are found outside North America.

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