



## Press Release

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# Direct-Operated Dynamics in Three Axes

## Higher precision in 3D laser micro-machining

Basingstoke, U. K., March 1, 2021 – Aerotech, a leading provider of high-performance motion control and positioning systems, is launching the AGV3D, a new 3D beam deflection system for laser micro-machining. The thermally stable three-axis laser scanner is particularly suitable for high-precision manufacturing of complex components for the medical, microelectronics, and automotive sectors, including additive manufacturing. User-friendly functions simplify integration into a machine, system or subsystem.

3D laser scan heads are particularly suitable for applications where flat-field objectives (f- $\theta$  lenses) cannot be used or the contour of the workpiece requires focus tracking in the z-direction. Most 3D scanners available on the market to date employ a third rotary galvo motor with a tangential arm for tracking the focusing optics. However, these designs can become thermally unstable. This limits the dynamics and precision in continuous operation, which is becoming increasingly important in many markets and applications.

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"With our AGV3D, we offer a rapid, flexible and high-precision laser scanning solution featuring direct operation of dynamic linear tracking of the focusing optics with high-resolution feedback," explains Simon Smith, European Director at Aerotech.

Positioning errors can be significantly minimised due to the high rigidity and accuracy of the linear module. "As the only scanner on the market with a DFM (Dynamic Focusing Module) based on a linear focusing axis with a powerful direct drive, the AGV3D provides superior dynamic performance with smooth motion as well as high-resolution positional feedback for accurate and repeatable focusing," Simon Smith continues.

### **Versatility and efficiency during manufacturing**

With integrated water and air cooling, the new scanner also achieves maximum thermal stability. Temperature gradients within the AGV3D are avoided, reducing errors caused by thermal drift. This results in consistent performance over the entire processing cycle with high laser processing accuracy.

"In this way, the AGV3D achieves the greatest working volume of all currently available 3D scanners – and all that at a wide range of laser wavelengths," emphasises Simon Smith. "This enables versatility and efficiency in the manufacturing process and eliminates the need for manual focus adjustments when changing workpieces."

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The AGV3D quickly and conveniently keeps the laser focus constant over the entire working volume. Unlike designs that require tedious manual DFM adjustments when changing the usable working volume, the AGV3D offers two simple user-selectable configuration settings covering fields of view from 100x100 mm to 1000x1000 mm and above.

### **Optimised for industrial use**

Thanks to the AGV3D's large field of view, smaller, more efficient movement mechanisms can be used for positioning the workpiece. Depending on the process requirements, the three-axis scanner is available with different apertures for different beam diameters. Aerotech can supply the AGV3D as a fully configured scanning system including flat field optics. The use of the AGV3D is particularly relevant in applications where parts with variations in height or thickness are processed, or in multi-layer, additive processes. If, in addition to a constant focus diameter, the angle of incidence must be as close to vertical as possible, the AGV3D can of course also be operated with telecentric lenses.

### **Broad field of applications**

The AGV3D is well suited to applications where 3D volumes are processed, the working distance varies or a larger field of view has to be achieved compared with F-Theta lenses. This includes the manufacture of medical products, but also, in general, additive manufacturing as well as 3D laser sintering, cylinder and tube processing, deep engraving and 3D laser micro-machining and micro-structuring.

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"Like all Aerotech products, our AGV3D is designed for a long service life in production environments," explains Simon Smith.

The scanner housing is sealed and contains an air purge function to protect the optical components from contamination and reduce the risk of damage.

### **One controller for all movements**

Using an Aerotech controller makes it easy to synchronise and coordinate the movement of the AGV3D with other motion axes within the system, including servo and stepper motor stages, piezo nanopositioners, and hexapods. Since all devices are programmed and controlled via the same user interface, the user experience is seamless and intuitive.

By synchronising with other motion axes, the AGV3D also offers the unique feature of processing workpieces larger than its field of view, while maintaining high processing quality. The proven IFOV (Infinite Field of View) feature is available for improving structural accuracy and avoiding errors, for example in "classic" stitching. Linear or rotary axes are synchronised with the laser scanner, which theoretically increases the scanner's field of view to infinity.

Aerotech's PSO (Position Synchronised Output) feature also coordinates motion with an output that triggers lasers or data acquisition devices for rapid, high-quality process control. The programmed analytical speed is used as a tracking input to trigger the PSO output. Trigger errors due to acceleration, deceleration or other speed instabilities can therefore be avoided.

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((Images))



AGV3D

Caption: Precise laser micro-machining is particularly in demand in medical, microelectronics, and component manufacturing in the automotive industry. The AGV3D laser scanner is optimally designed for this, but is also used in additive processes.

Download: <http://pr-x.de/fileadmin/download/pictures/Aerotech/AGV3D.jpg>



Simon Smith

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Caption: Simon Smith, European Director Aerotech: "With the AGV3D, users from a wide range of markets can achieve the highest working volume of all currently available 3D scanners – and that with a large number of different laser wavelengths".

[http://www.pr-x.de/fileadmin/download/pictures/Aerotech/Simon\\_Smith\\_Direktor\\_Europa.jpg](http://www.pr-x.de/fileadmin/download/pictures/Aerotech/Simon_Smith_Direktor_Europa.jpg)

### ***Aerotech – Dedicated to the Science of Motion***

Aerotech Inc., based in Pittsburgh, USA, is a privately held, family-owned company founded in 1970 by Stephen J. Botos with the vision of advancing the science of motion control and positioning systems for customers in industry, science and research. As a family business, the owners continue to place great value on open and trusting relationships with customers, business partners and employees. In Germany, the mid-sized company is represented by its own subsidiary, Aerotech GmbH, based in Fürth. In addition to sales and service activities, the Fürth facility handles customised assembly of positioning systems for the European market. The company's innovative and high-precision motion solutions meet all critical requirements necessary for today's demanding applications. They are used wherever high throughput is required – including medical and life science applications, semiconductor and flat screen production, photonics, automotive, data storage, laser processing, aerospace and electronics manufacturing, as well as inspection, testing and assembly.

With advanced analysis and diagnostic capabilities, Aerotech provides world-class technical support and service. If a standard product is not suitable for an individual application, Aerotech can supply special motion components and systems based on its many years of expertise and experience. Manufacturing capacity for customer-specific applications is supplemented by experience in supplying systems for vacuum and clean room operation.

Aerotech has full-service subsidiaries in Germany (Fürth), United Kingdom (Ramsdell), China (Shanghai) and Taiwan (Taipei). Aerotech currently employs around 500 people worldwide. <http://www.aerotech.com>

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