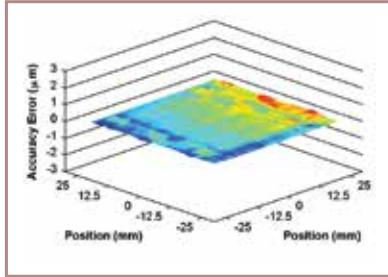
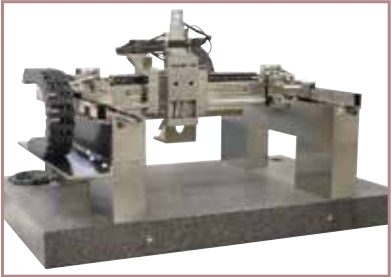
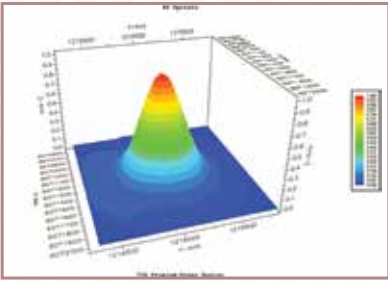
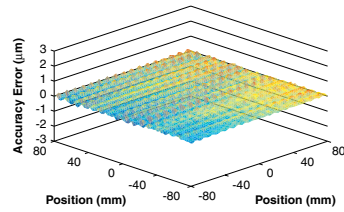


Precision Motion Control for Fiber Optic Device Manufacturing



Aerotech Overview

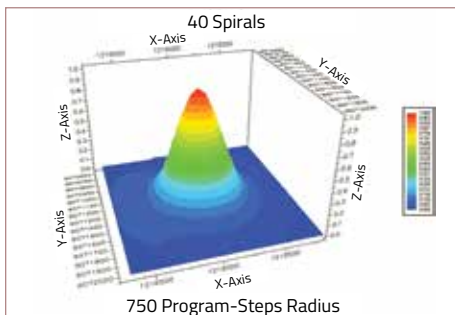
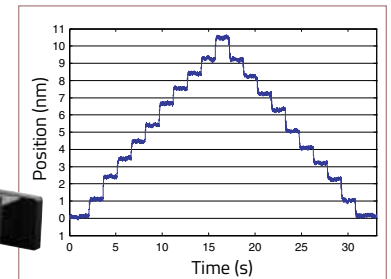


Single-source supplier for precision mechanics, controls and drives, advanced software, and complete motion subsystems for precision manufacturing.

Solutions for the Fiber-Optics Industry

Best-In-Class Mechanics

Our precision mechanics offer hundreds of millimeters of travel with SINGLE NANOMETER linear steps and SUB-ARC-SECOND rotary steps for unmatched alignment capabilities.



State of the Art Controllers

Maximize your return on investment with Aerotech's industry leading controllers. Utilize our suite of fiber-optic manufacturing control features, and seamless interfacing with Aerotech mechanics.

Customized Motion Subsystems

Aerotech's engineers ensure that your motion subsystem is tailored to fit your application. In addition to our extensive standard product offering, we also can customize motion control solutions to optimize your process.



Unparalleled Start-Up and Support

Aerotech motion products come to you as a fully functional system so you can focus on the process. Enjoy the convenience of a single-source, global support team.



Fiber-Optic Motion Solutions at Every Step

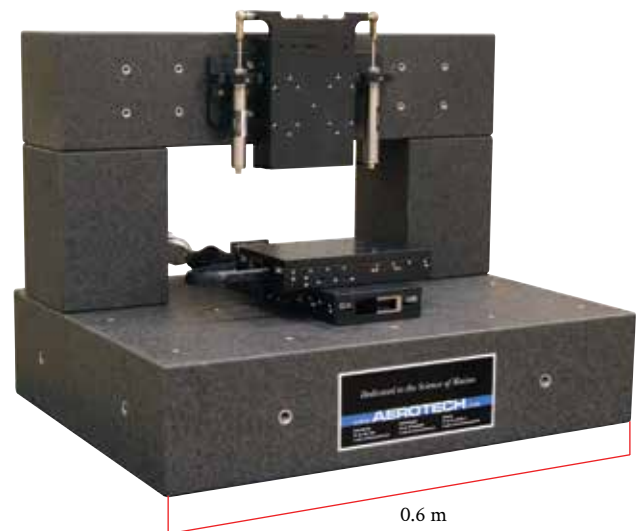
Fiber-Optic Alignment

- Flexible design for fiber-to-fiber and fiber-to-chip alignment.
- Utilize our fiber-optic controller routines to quickly deploy active alignment processes.
- Easily incorporate vision and leverage single nanometer step sizes.
- Our unparalleled precision provides the most repeatable, reliable device assembly.



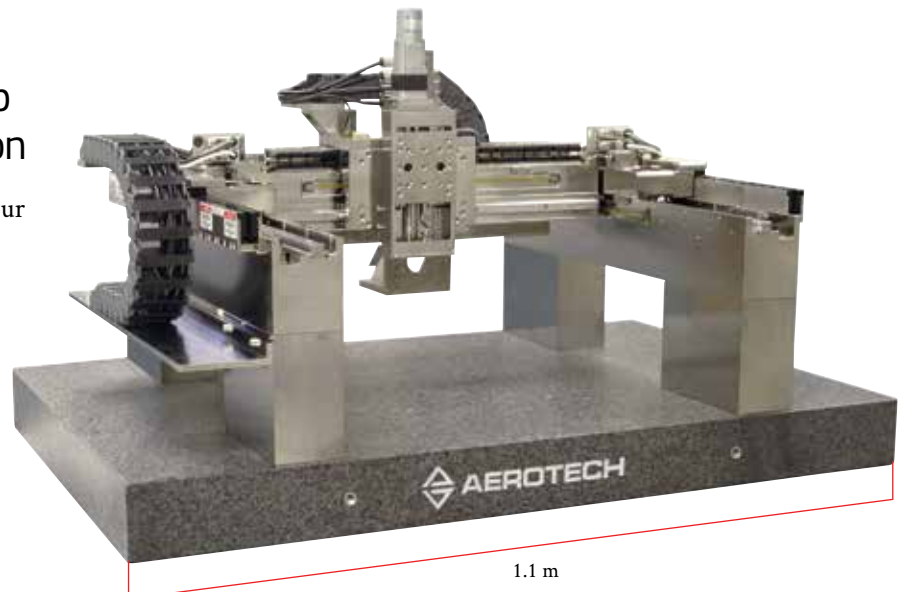
Bonding and Laser Welding

We understand the challenges involved with welding and bonding processes. Aerotech's nanopositioner family is the ideal modular solution to fit any welding or bonding process.



Pick and Place Assembly with up to 32 Coordinated Axes of Motion

Aerotech has the optimal motion solution for your assembly processes. We will tailor your motion subsystem to your process with the perfect drive technology, degrees of freedom and controls integration.



Fiber Alignment Systems

Aerotech's FAe series high-performance photonics aligning systems incorporate best-in-class direct-drive and state-of-the-art axis control technology. Their modular design permits the selection of the number of axes, the distance to be travelled and the amount of payload, all at high-speed, resolution and accuracy.

- 3- to 6-axis fiber and photonics alignment
- Raster, spiral or power-peaking algorithms
- 1 nm resolution linear motion
- Turnkey drive and control electronics
- Noncontact direct-drive linear and rotary axes
- Interface to industry-standard power meters
- Crossed-roller mechanical or air-bearing solutions

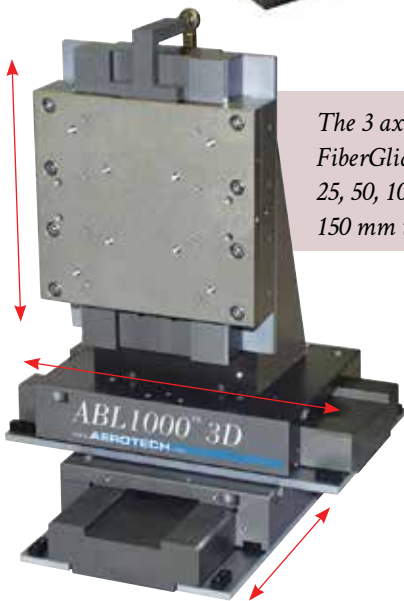
6 axis
FA130e fiber
alignment
system



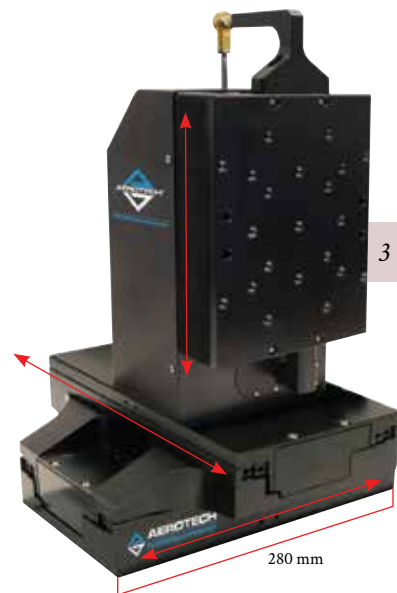
3 axis FA95e



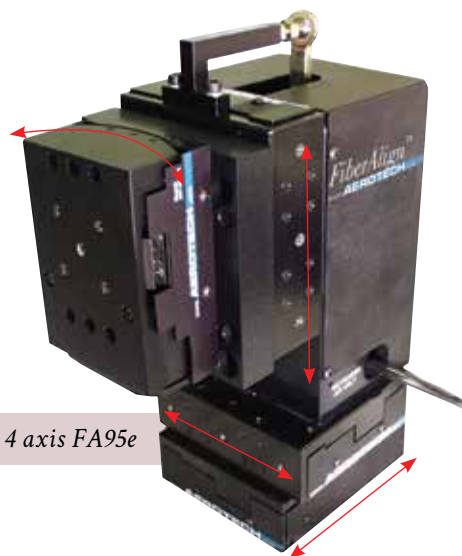
The 3 axis air-bearing
FiberGlide 3D offers
25, 50, 100 and
150 mm travels.



3 axis FA130e



4 axis FA95e



Cartesian Robots

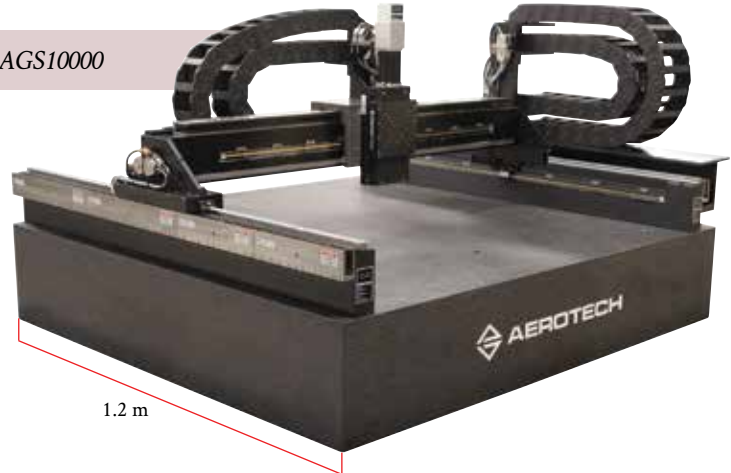
Maximize Your Application Throughput

Minimal Tracking Error • Flexible Design • Lowest Cost of Ownership • Highly Configurable

High-Performance Gantry

- Linear motors allow up to 3 g acceleration and 3 m/s velocity, minimizing process time
- Components designed for minimal maintenance ensure reliable operation in 24/7 environments
- Cable management terminations provided at the workpiece simplify integration
- Applications for multi-axis alignment, high-speed component pick-and-place, component inspection and assembly

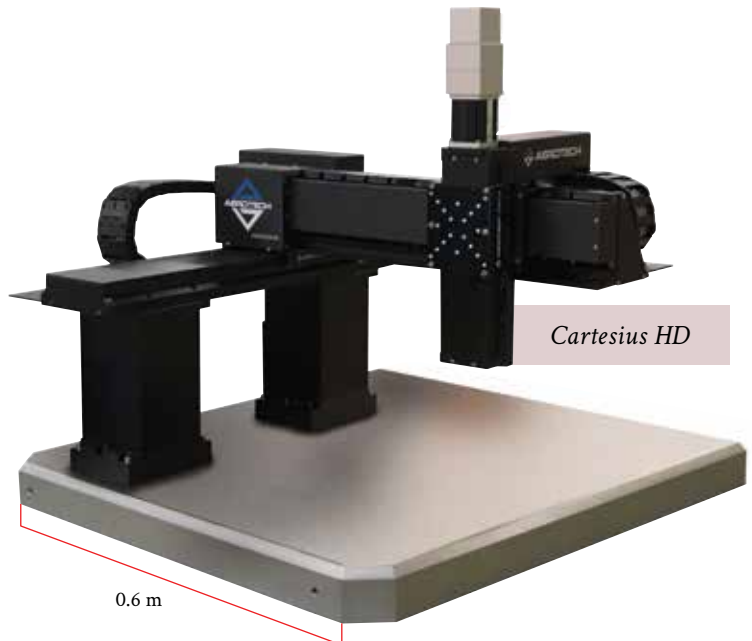
AGS10000



"T" Style Cartesian Robots

- High speed (up to 1.4 m/s with ball screw and 2 m/s with linear motor) ensures high throughput
- Multiple configurations maximize application flexibility (XY, XYZ, XYZ Θ)
- Economical T-style robot for most cost-effective performance
- Applications for component assembly and component inspection

Cartesius HD



Nanopositioners

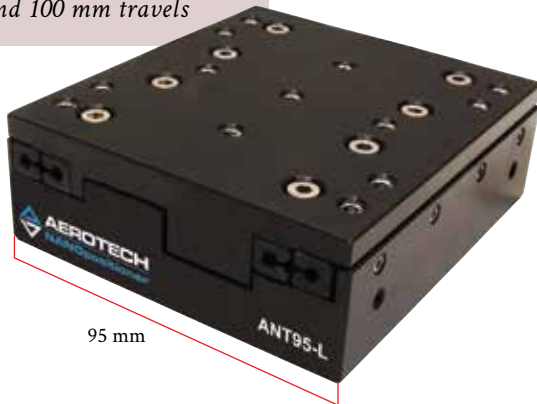
- Noncontact, non-cogging, frictionless direct-drive motion
- 1 nm resolution
- 250 nm accuracy

- 75 nm repeatability
- Sub-nanometer in-position stability
- High dynamic performance
- Low profile

Single-Axis Linear

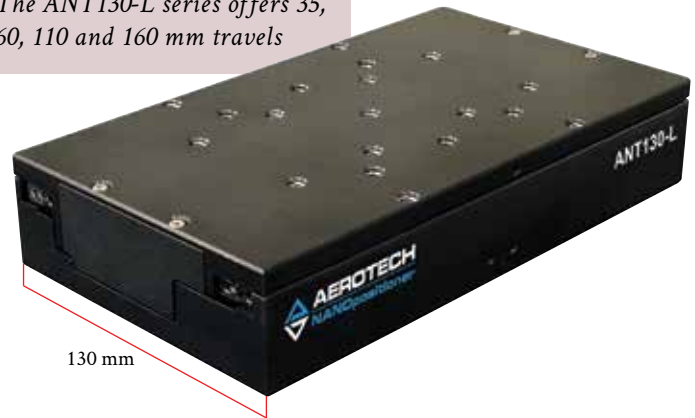
ANT95-L Single-Axis Linear Stage

The ANT95-L series offers 25, 50, 75 and 100 mm travels



ANT130-L Single-Axis Linear Stage

The ANT130-L series offers 35, 60, 110 and 160 mm travels



Integrated XY

ANT95-XY Dual-Axis Linear Stage

The ANT95-XY series offers 25 x 25 mm or 50 x 50 mm travels



ANT130-XY Dual-Axis Linear Stage

The ANT130-XY series offers 60 x 60, 110 x 110 or 160 x 160 mm travels



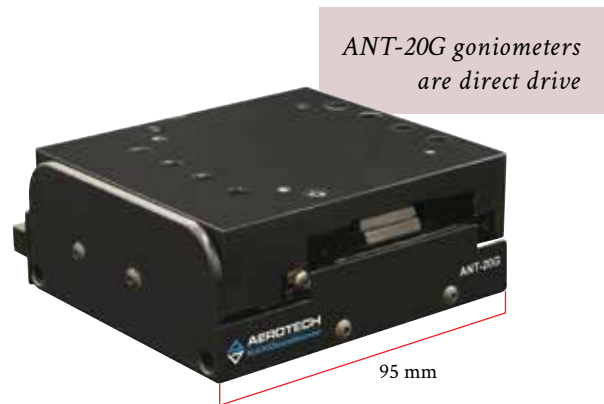
Rotary and Goniometers

ANT95-R and ANT130-R Rotary Stage



- 3 arc-second accuracy
- 1.5 arc-second bidirectional repeatability
- 0.005 arc-second in-position stability

ANT-20G Goniometers



- Large angular range up to 20 degrees of travel
- Multi-axis configurations
- Compact design

Vertical and Lift

ANT95-L-Z and ANT130-L-Z



- Nanometer performance in a large travel format
- High resolution (2 nm), repeatability (75 nm) and accuracy (300 nm)
- In-position stability of <2 nm

ANT95-3-V and ANT130-5-V



- Nanometer performance with either 3 or 5 mm travel
- In-position stability of <1 nm
- 200 nm accuracy

Q-Series Piezo Nanopositioners

Aerotech's Q-series piezo stages offer sub-nanometer positioning resolution and nanometer-level accuracy (linearity). Open- and closed-loop feedback is available on all Q-series nanopositioners. The closed-loop capacitive sensor feedback allows for direct measurement of the positioning carriage. Also, the Q-series piezos can be effortlessly integrated into a system with servo axes to allow integrated coarse and fine motion control. Vacuum preparation is available.

QNP-L Single-Axis Linear Stages

- Travels include 100 μm , 250 μm , and 500 μm
- Linearity is to 0.007% of travel
- High stiffness permits the devices to achieve high throughputs
- Large resonant frequencies, up to 1300 Hz for the 100 μm QNP-L, allows for fast closed-loop responses
- Excellent geometric flexure performance allows for nanometer-level straightness/flatness
- Load capacity up to 1 kg



QNP-XY Two-Axis Linear Stages

- XY travels include 100 μm , 250 μm , and 500 μm
- Compact multi-axis design
- Assembled using high-precision metrology equipment to ensure outstanding orthogonality between the lower and upper axes
- Load capacity up to 1 kg



QNP-Z Single-Axis Lift Stages

- Vertical travels include 100 μm , 250 μm , 500 μm
- Mounts effortlessly with the linear stage models
- Load capacity up to 1 kg



Q-Series Piezo Controllers

The Q-series piezo controllers offer exceptional flexibility and performance. QLAB can control 1-4 axes of piezo nanopositioning stages in open or closed-loop operation. The QDe allows the piezo axes to be networked effortlessly with servo axes using Aerotech's powerful controller platform. This integrated programming environment and the ability to synchronize piezo and servo motion significantly reduces system and programming complexity. Additionally, advanced features are available for both piezo and servo axes, configurable with a simple and easy-to-use interface.



QDe Stand-Alone Controller

- Available in Ensemble and A3200 versions
- Desktop and panel-mount versions
- Networkable

QLAB Controller

- Controls up to 4 axes
- -30 to +150 V semi-bipolar output
- 20-bit capacitive sensors for high resolution
- Ethernet and USB 2.0 communication
- Intuitive design and touch-screen panel for ease of use

Advanced Control Features

Position Synchronized Output (PSO)

- Prompt a tool to fire based on actual position feedback
- Uses the capacitive probe for direct measurement of the actual carriage position

Learning Control

- Allows for repeating move sequences to be learned and optimized
- Reduces following error
- Increases dynamic accuracy
- Increases throughput and production rates

Harmonic Cancellation

- Reduces position error in the presence of periodic disturbances
- Adapts to the magnitude and frequency of the error source

Command Shaping

- Reduces vibration in point-to-point moves
- Allows for faster settling time at the work point

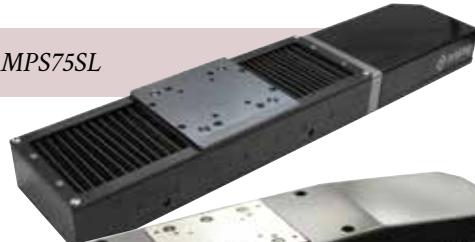
MPS - Micro Positioning Stages

Aerotech's MPS linear, rotary and lift stages offer a high-precision and cost-effective solution for single- and multi-axis motion. The MPS series are easily configured into multi-axis motion systems for assembly, alignment and other processes. The precision ground ball-screw or lead-screw provides exceptional accuracy, repeatability and ultra-fine positioning resolution capability to 0.1 micron. The DC servomotor is equipped with a rotary encoder. The crossed-roller linear bearings provide smooth travel and excellent payload characteristics.

Linear and Lift

- Precision ground ball-screw or lead-screw drive
- DC servo or stepper motor
- Anti-creep crossed-roller bearings
- High resolution ($0.05 \mu\text{m} - 0.1 \mu\text{m}$), repeatability ($\pm 0.75 \mu\text{m}$) and accuracy ($\pm 1 \mu\text{m}$)
- Available with direct-encoder

MPS75SL



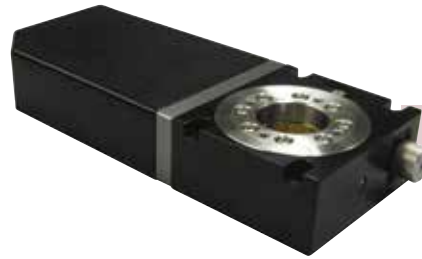
MPS-SV



Rotary

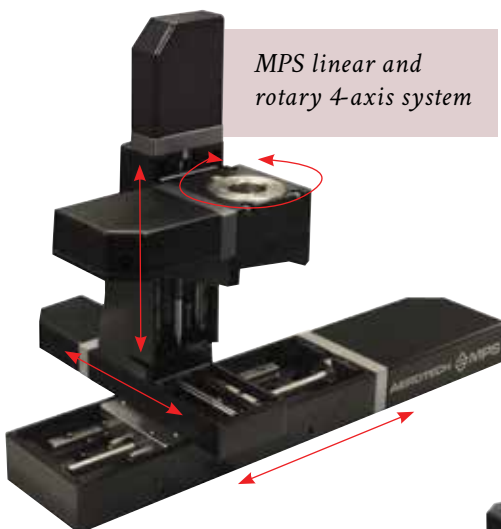
- Precision worm-gear drive
- Low profile, compact design with aperture
- Continuous 360° rotary positioning
- High resolution (1 arc sec), repeatability (6 arc sec) and accuracy (80 arc sec)

MPS-GR



MPS - Multi-Axis Configurations

MPS linear and rotary 4-axis system



The MPS stages are highly configurable for numerous multi-axis applications

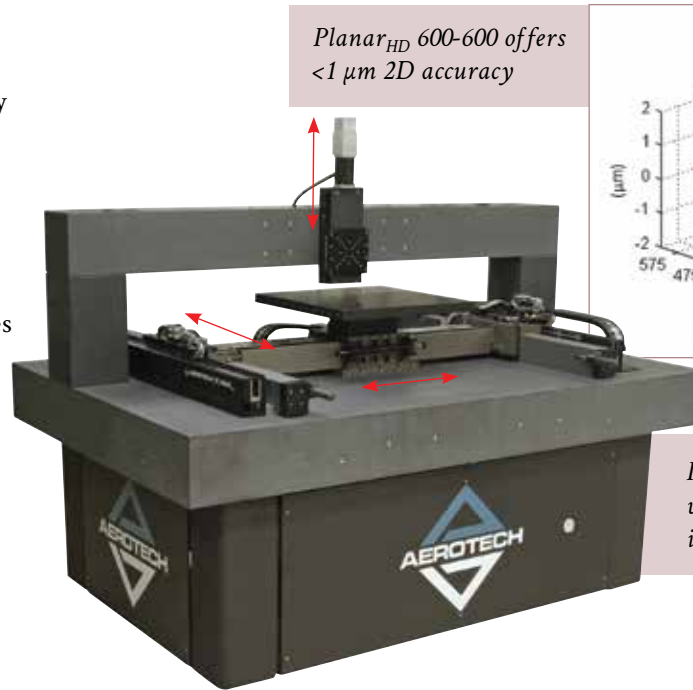
The MPS50SL XYZ can be configured with 25 and 50 mm travels for each axis



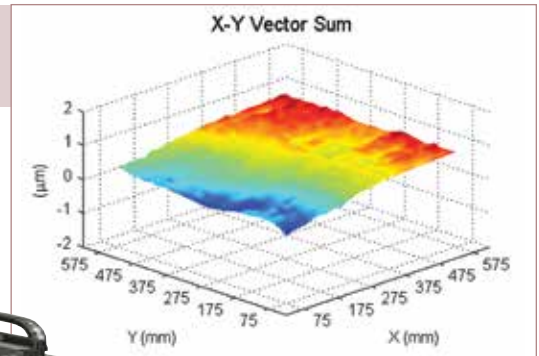
Direct-Writing of Waveguides

Waveguides are structures that guide waves such as optical, electromagnetic or sound waves. Manufacturing of waveguides often involves using a laser to micromachine the surface and bulk of transparent materials. Since absorption of the laser energy is often nonlinear, structural changes can be localized in the bulk of the material, enabling the creation of 3D microstructures. These 3D structures permit fabrication of a wide range of passive and active optical devices for the telecommunications industry. Aerotech's motion platforms are ideally suited to provide exceptional 2D accuracy and minimal

- Maximize throughput with 2 m/s scan velocity and 5 g acceleration
- <1 micron 2D accuracy capable
- Faster turnaround and minimized settling times
- Active yaw control
- Travel to 1.2 m x 1.2 m



Planar_{HD} 600-600 offers <1 μm 2D accuracy



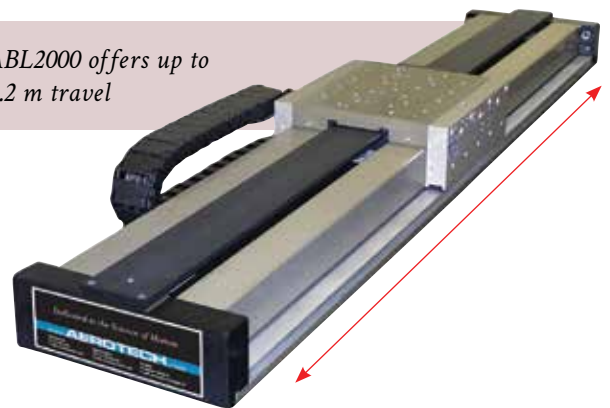
Planar_{HD} 600-600 with weldment and integrated electronics

Fiber Bragg Grating Solutions

Aerotech's ABL2000 air-bearing linear stage is specifically optimized for the manufacture of fiber Bragg gratings. A flexible workspace allows the system to be optimized for the unique needs of each manufacturer.

- Linear encoder with optional laser interferometer feedback
- Fully preloaded air-bearing with travels up to 1200 mm
- Excellent pitch, roll and yaw characteristics and unsurpassed velocity control provide the precise positioning required to ensure wavelength filtering consistency
- Complete noncontact design
- Ultra-precise velocity control

ABL2000 offers up to 1.2 m travel



Position Synchronized Output

- Aerotech's Position Synchronized Output (PSO) function triggers the laser in real time as a function of the encoder position, further enhancing the accuracy of the Bragg grating.
- Multiple operation modes allow the user to easily configure laser firing windows and number of laser pulses, simplifying process development.

Aerotech Worldwide

United States ▪ France ▪ Germany ▪ United Kingdom
China ▪ Japan ▪ Taiwan

