



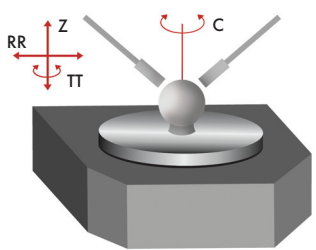
Dedicated to the Science of Motion

# Surface Measurement Motion Platform [SMP]

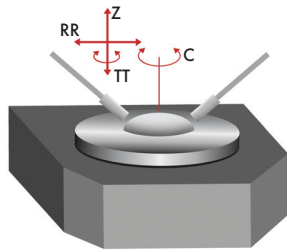
Ultra-High Precision Multi-Axis Motion Platform



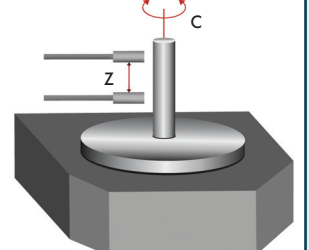
Spherical



Aspheric



Cylindrical



## Aerotech's Surface Measurement Platform

Advance to the next level of surface measurement technology by utilizing Aerotech's *Surface Measurement Motion Platform (SMP)*. The SMP is a complete multi-axis motion system that is specifically designed to provide an ideal motion platform for surface measurement applications. The SMP is optimized to provide more flexibility in 2D and 3D contouring, higher precision with nanometer resolution, significantly reduced processing time and minimal footprint.

### SMP Benefits

#### More Flexibility

- 2D and 3D contouring
  - Measurement of spherical, aspheric and cylindrical shapes (Application example: precision optical component measurement)
  - Scanning or point-to-point motion profiles
  - Available in multiple configurations
- Generic high-speed electrical interface between the motion and sensor controller
- Open architecture software to integrate a large variety of sensors such as white light or multi-wavelength interferometers, camera systems or capacitive probes
- Easy-to-use, advanced motion algorithms ease motion profile generation

#### Higher Precision

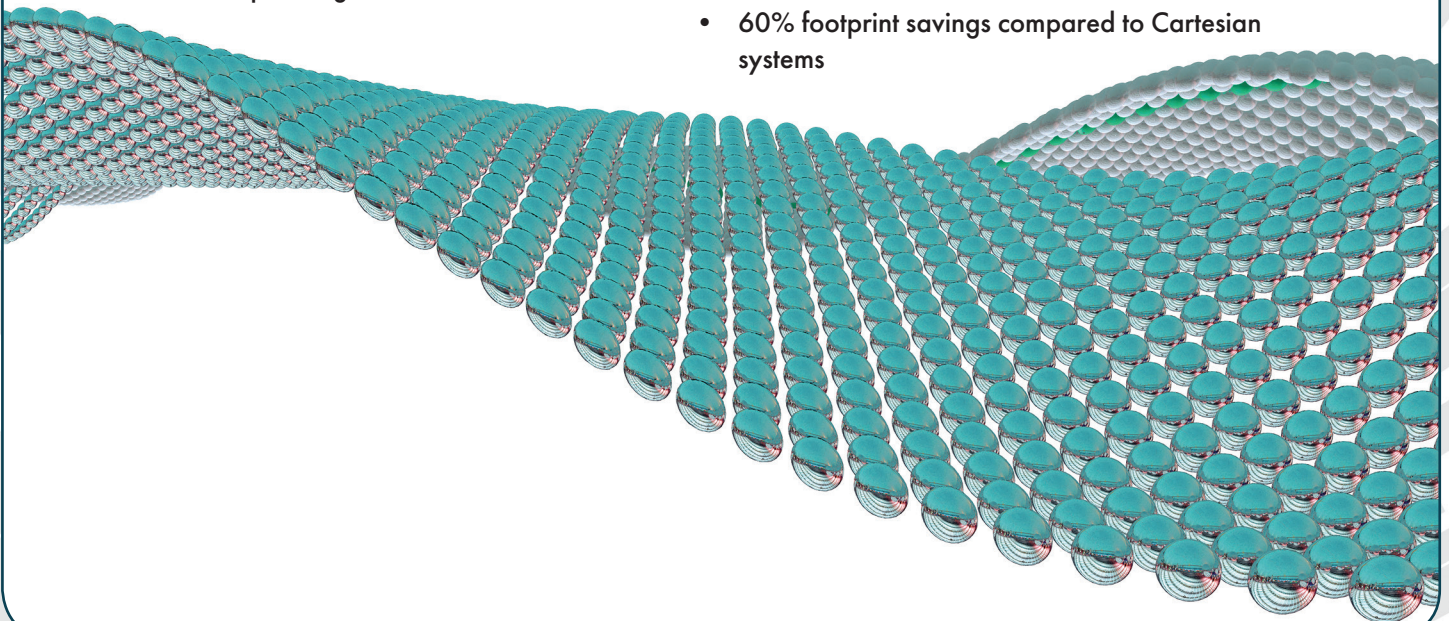
- Axis repeatability in the low nanometer range
- Nanometer-level minimum incremental motion (resolution)
- Ultra-smooth motion even at very low velocities

#### Reduced Processing Time

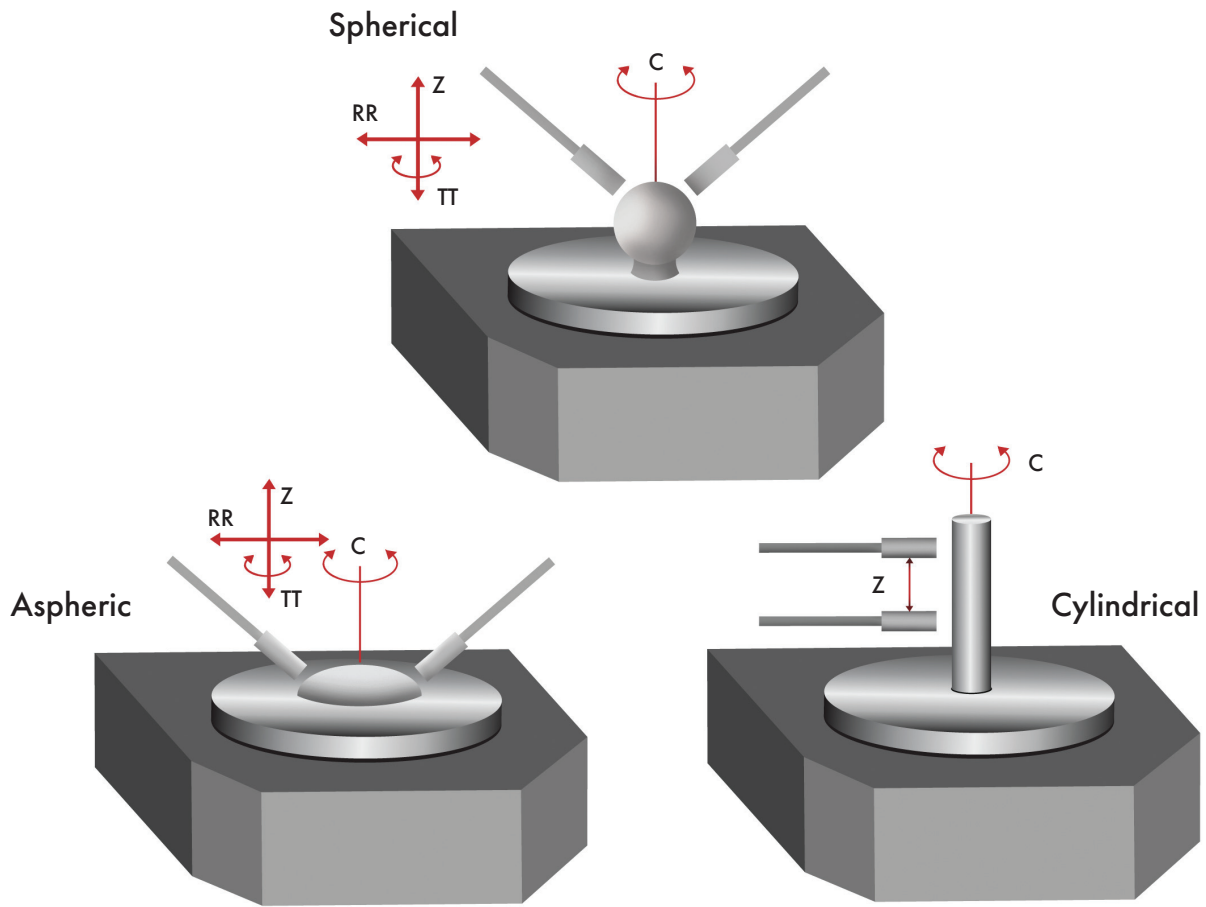
- Save up to 40% of measurement time compared with conventional Cartesian systems
- Real-time communication between motion and sensor controller provides synchronization of measurement and position data
- Fast data access during the measurement and intelligent data management

#### Minimal Footprint

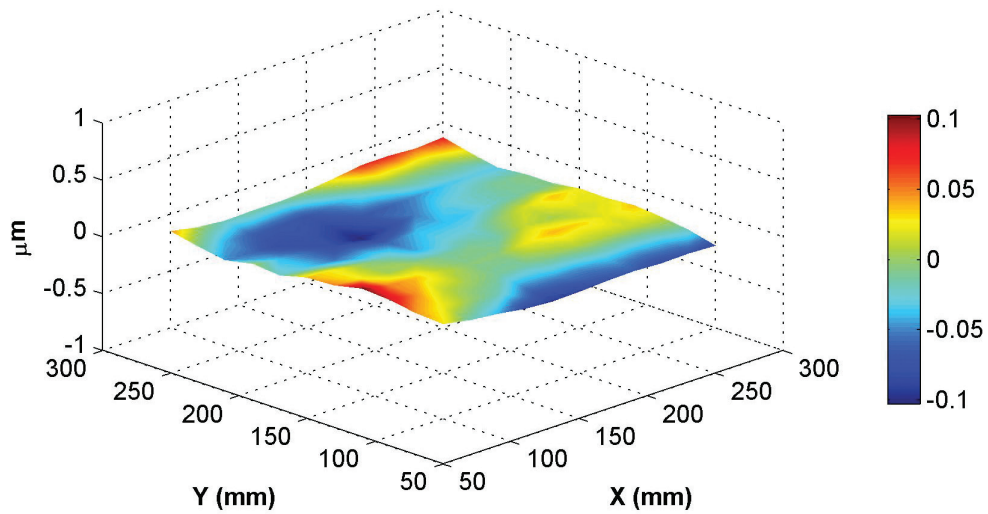
- 60% footprint savings compared to Cartesian systems



# Common Surface Measurement Applications



Actual Surface Contour Plot



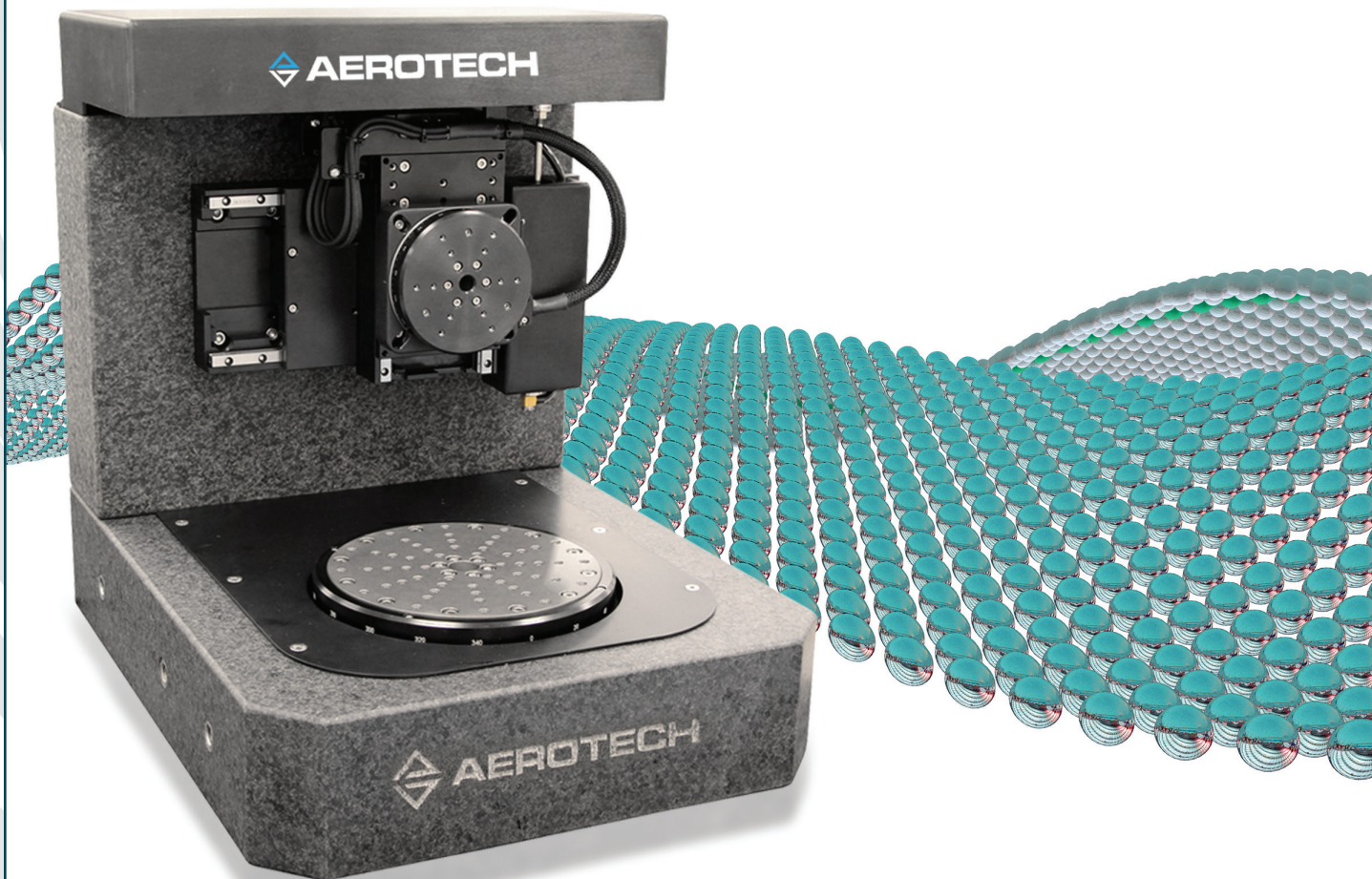
Aerotech's industry leading SMP platform was used to generate this state-of-the-art surface contour plot.

## SMP220 Individual Axis Specifications

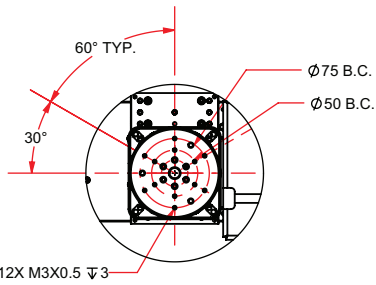
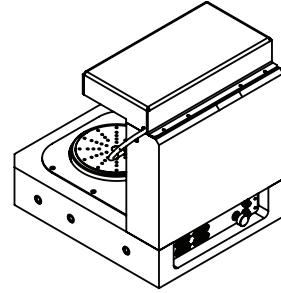
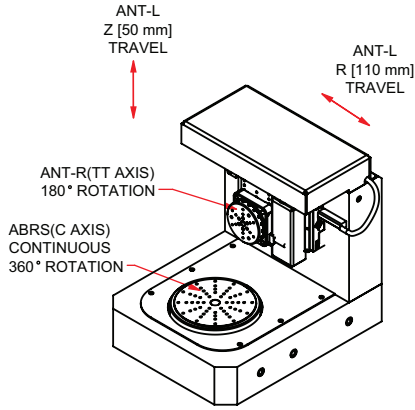
Axis	C	RR	Z (Optional)	TT (Optional)
Resolution	0.08 arc sec	1 nm	1 nm	0.01 arc sec
Accuracy	±2 arc sec	±0.3 μm	±0.5 μm	3 arc sec
Repeatability	<1 arc sec	±75 nm	±100 nm	1.5 arc sec
Straightness	///	±1.0 μm	±1 μm	///
Flatness	///	±1.0 μm	±1 μm	///
Axial Error	<100 nm	///	///	///
Radial Error	<250 nm	///	///	///
Tilt Error	<0.7 arc sec	///	///	///
Travel	360° continuous	110 mm	50 mm	180°
Maximum Speed	1800°/s	350 mm/s	200 mm/s	120°/s

## SMP220 System Details

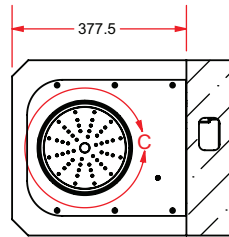
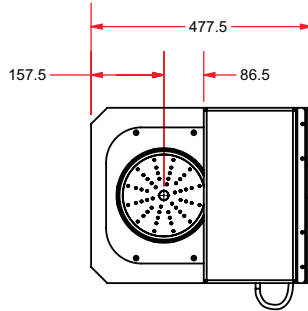
Maximum part size/ mass:	220 mm diameter; 31 kg
Maximum sensor mass:	1.5 kg
Sensor motion axes (RR, Z and TT axes):	All sensor axes are direct drive, brushless-motor-driven servo axes
Part motion axis (C axis):	360° continuous rotation, high-precision Aerotech rotary air-bearing



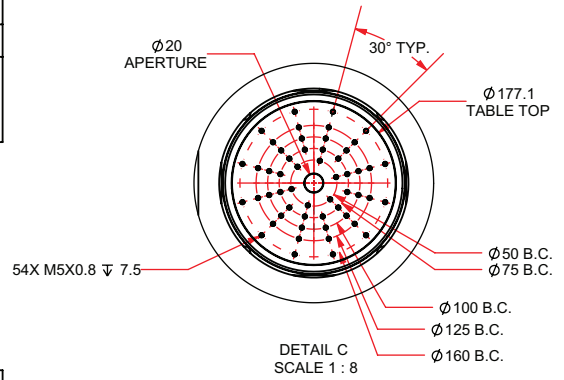
# SMP220 System Dimensions



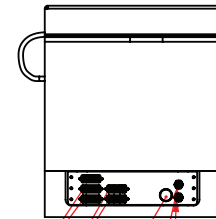
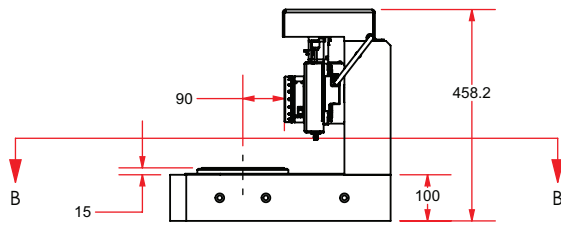
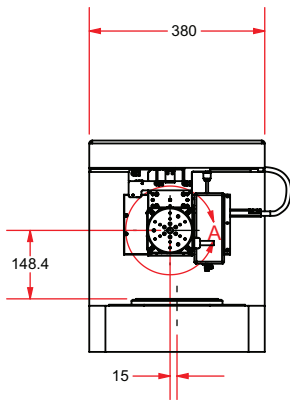
DETAIL A  
SCALE 1 : 8



SECTION B-B  
SCALE 1 : 16



DETAIL C  
SCALE 1 : 8



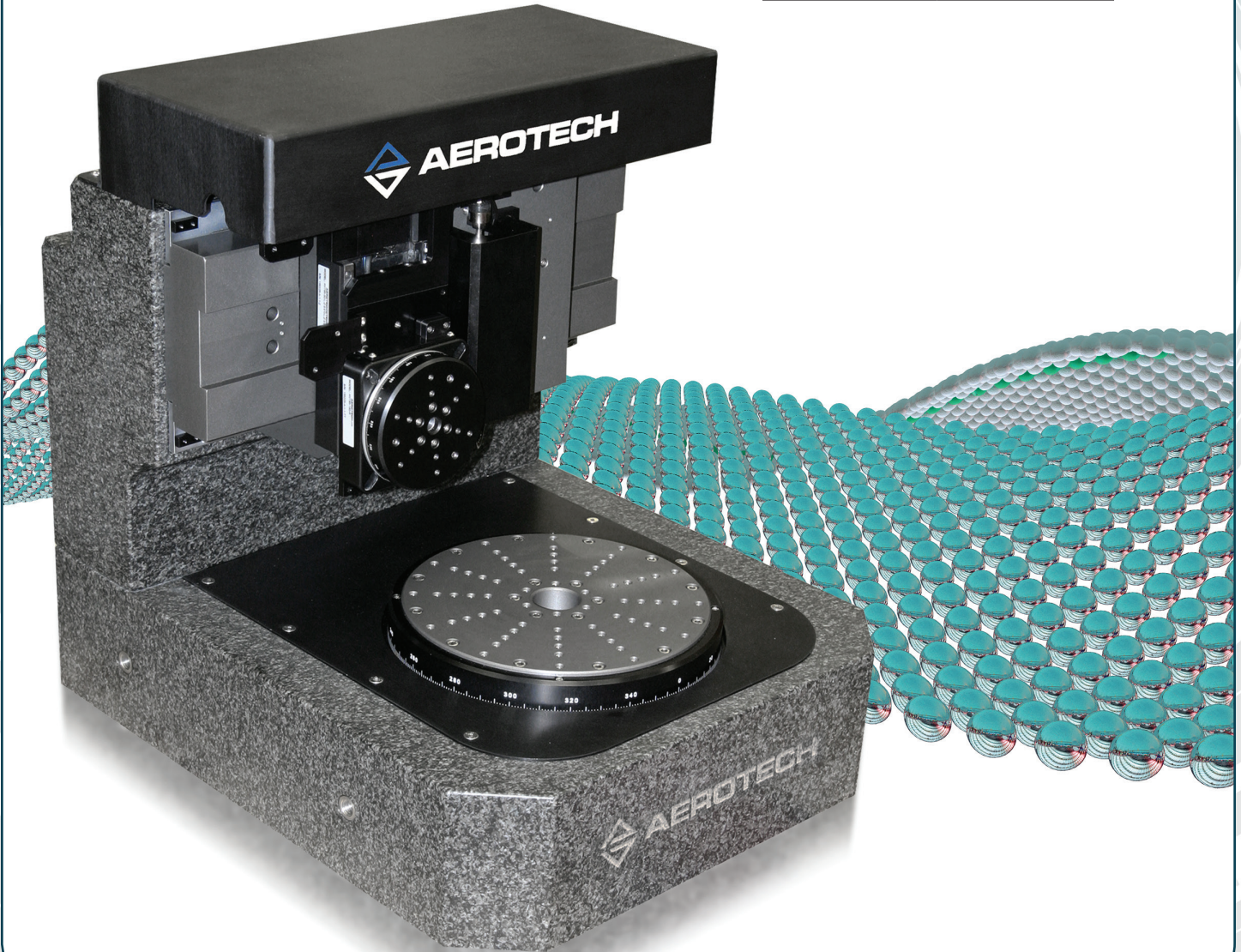
DIMENSIONS: MILLIMETERS  
LINEAR AXIS SHOWN AT THE CENTER OF TRAVEL

## SMP320 Individual Axis Specifications

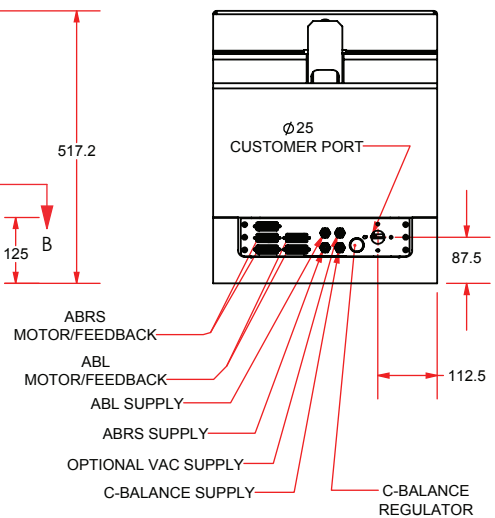
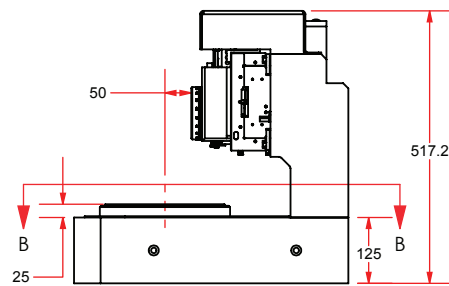
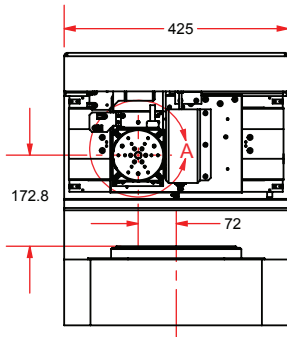
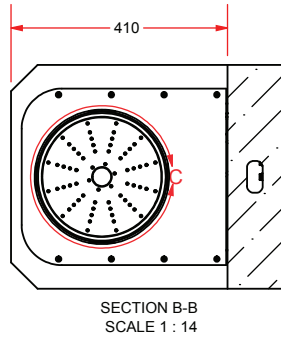
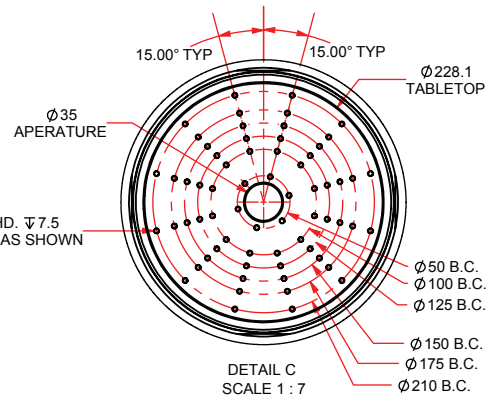
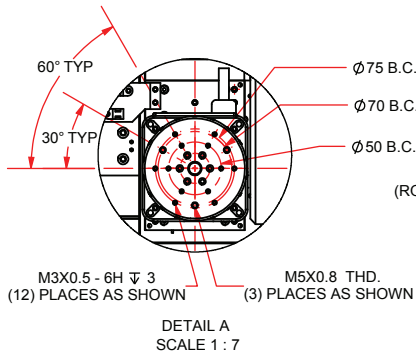
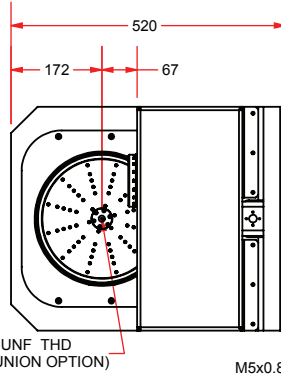
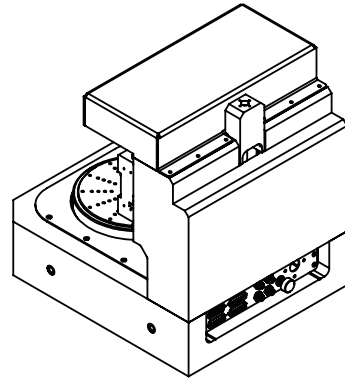
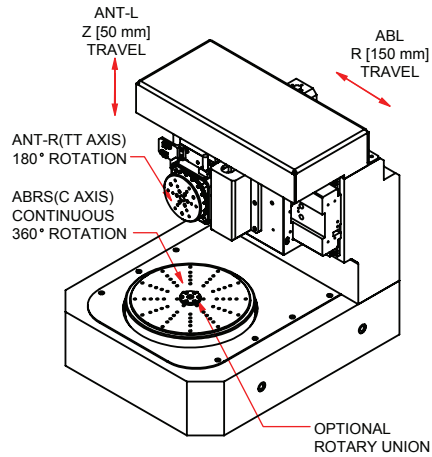
Axis	C	RR	Z (Optional)	TT (Optional)
Resolution	0.01 arc sec	1 nm	1 nm	0.01 arc sec
Accuracy	±2 arc sec	±0.5 μm	±0.5 μm	3 arc sec
Repeatability	1 arc sec	±100 nm	±100 nm	1.5 arc sec
Straightness		±0.5 μm	±1 μm	
Flatness		±0.5 μm	±1 μm	
Axial Error	<100 nm			
Radial Error	<250 nm			
Tilt Error	<0.5 arc sec			
Travel	360° continuous	150 mm	50 mm	180°
Maximum Speed	3000°/s	300 mm/s	200 mm/s	120°/s

## SMP320 System Details

Maximum part size/ mass:	320 mm diameter; 66 kg
Maximum sensor mass:	1.5 kg
Sensor motion axes (RR, Z and TT axes):	All sensor axes are direct drive, brushless-motor-driven servo axes
Part motion axis (C axis):	360° continuous rotation, high-precision Aerotech rotary air-bearing



# SMP320 System Dimensions



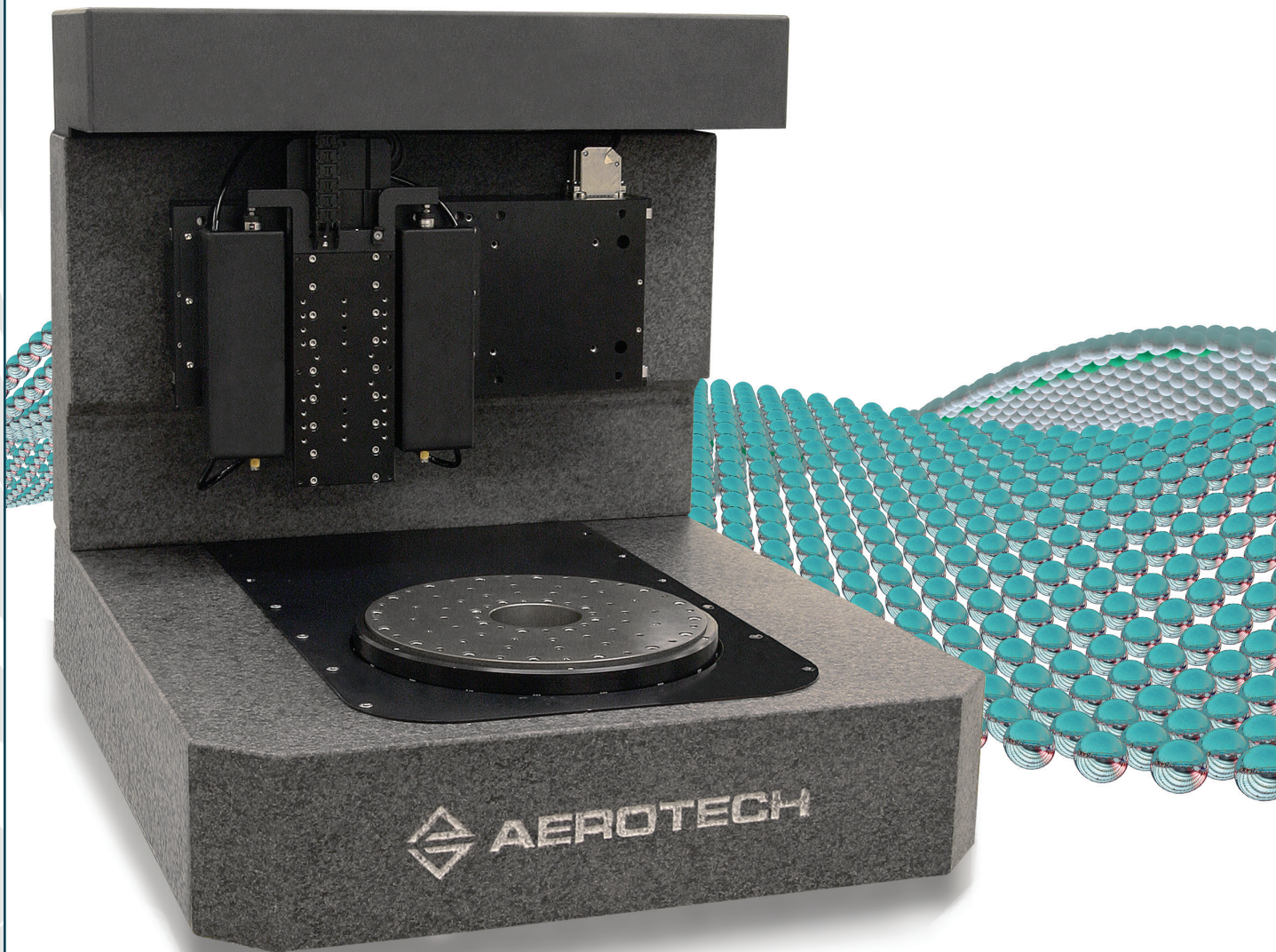
DIMENSIONS: MILLIMETERS  
 LINEAR AXIS SHOWN AT THE CENTER OF TRAVEL

## SMP420 Individual Axis Specifications

Axis	C	RR	Z (Optional)	TT (Optional)
Resolution	0.005 arc sec	1 nm	1 nm	0.01 arc sec
Accuracy	±2 arc sec	±200 nm	±0.5 μm	3 arc sec
Repeatability	<1 arc sec	±125 nm	±100 nm	1.5 arc sec
Straightness	/	±1.5 μm	±2.5 μm	/
Flatness	/	±1.5 μm	±2.5 μm	/
Axial Error	<100 nm	/	/	/
Radial Error	<250 nm	/	/	/
Tilt Error	<0.5 arc sec	/	/	/
Travel	360° continuous	260 mm	100 mm	180°
Maximum Speed	3000°/s	500 mm/s	200 mm/s	120°/s

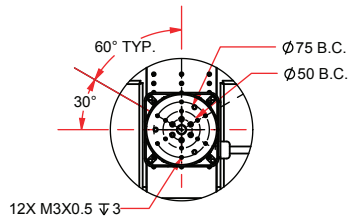
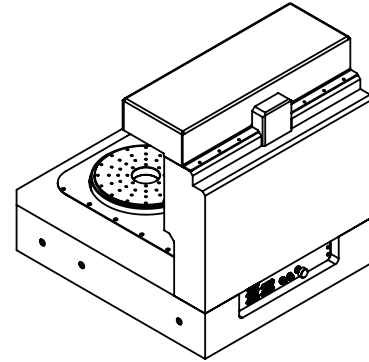
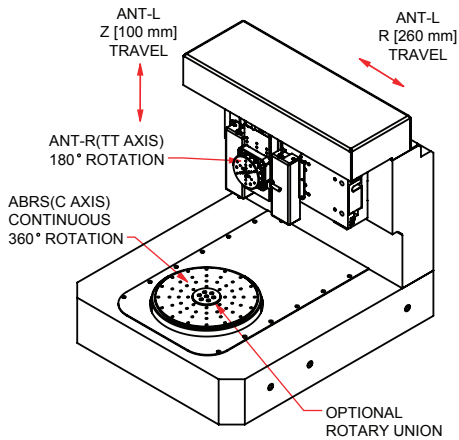
## SMP420 System Details

Maximum part size/ mass:	420 mm diameter; 97 kg
Maximum sensor mass:	1.5 kg
Sensor motion axes (RR, Z and TT axes):	All sensor axes are direct drive, brushless-motor-driven servo axes
Part motion axis (C axis):	360° continuous rotation, high-precision Aerotech rotary air-bearing

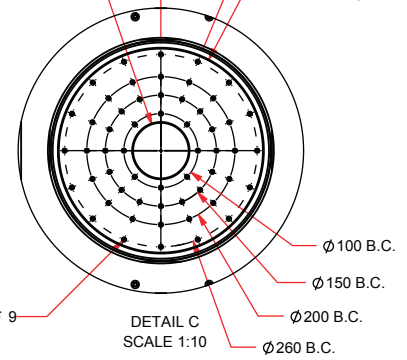
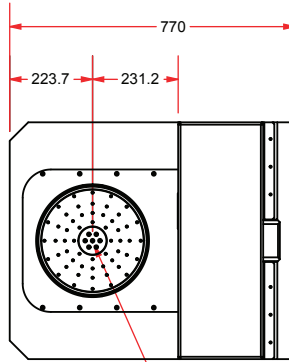




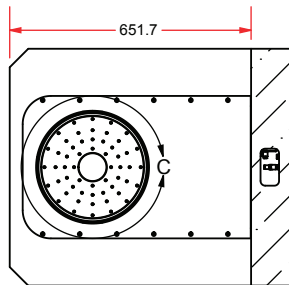
# SMP420 System Dimensions



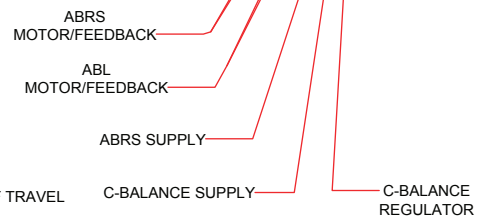
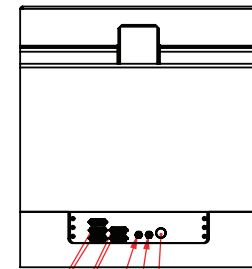
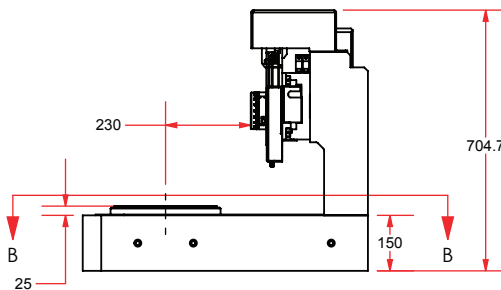
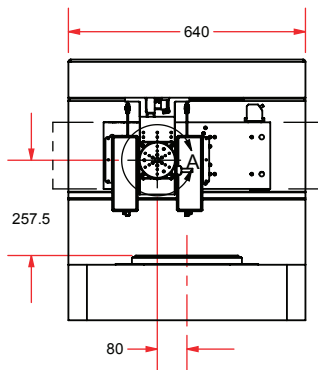
DETAIL A  
SCALE 1:10



DETAIL C  
SCALE 1:10

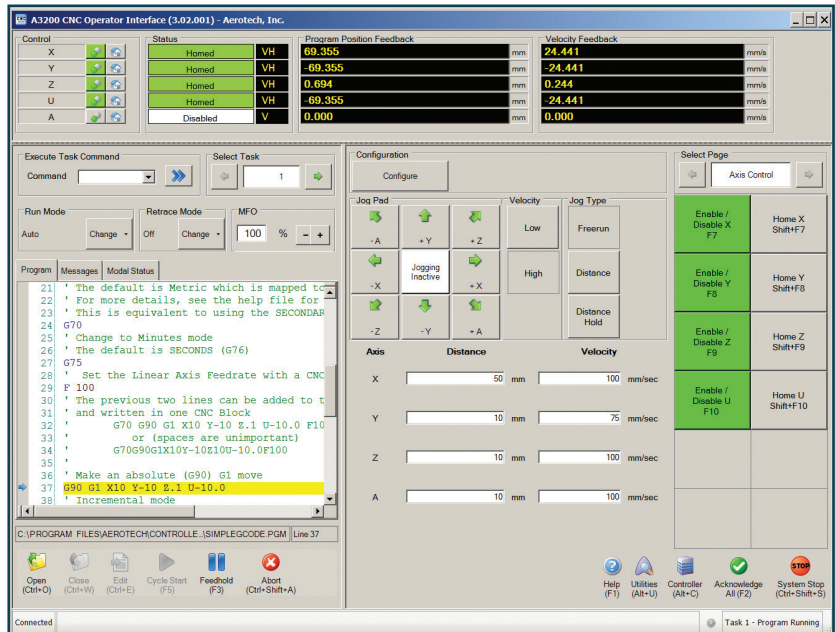


SECTION B-B  
SCALE 1:20

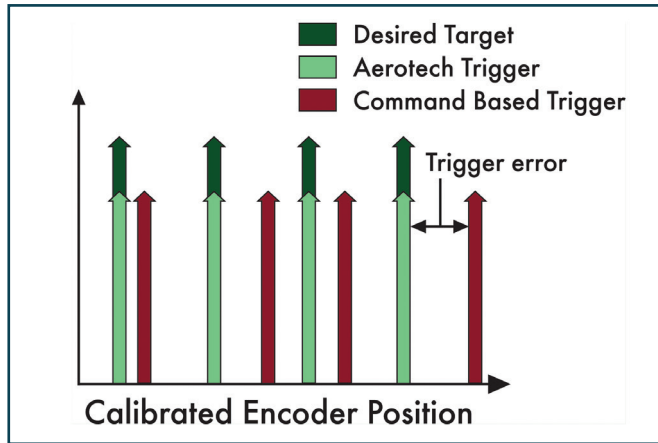


DIMENSIONS: MILLIMETERS  
LINEAR AXIS SHOWN AT THE CENTER OF TRAVEL

**Aerotech Operator Interface**  
 Aerotech's Operator Interface can be customized to suit any measurement application. This allows fast and efficient deployment of a custom solution.



**Position Synchronized Output (PSO)**  
 Aerotech's Position Synchronized Output (PSO) functionality provides a digital output based on real-time position feedback on up to three axes, providing precise sensor data capture.



# Aerotech at a Glance



Corporate Headquarters • Pittsburgh, PA • USA



Aerotech UK



Aerotech Germany



Aerotech Japan



Aerotech China



Aerotech Taiwan

## High Volume Manufacturing



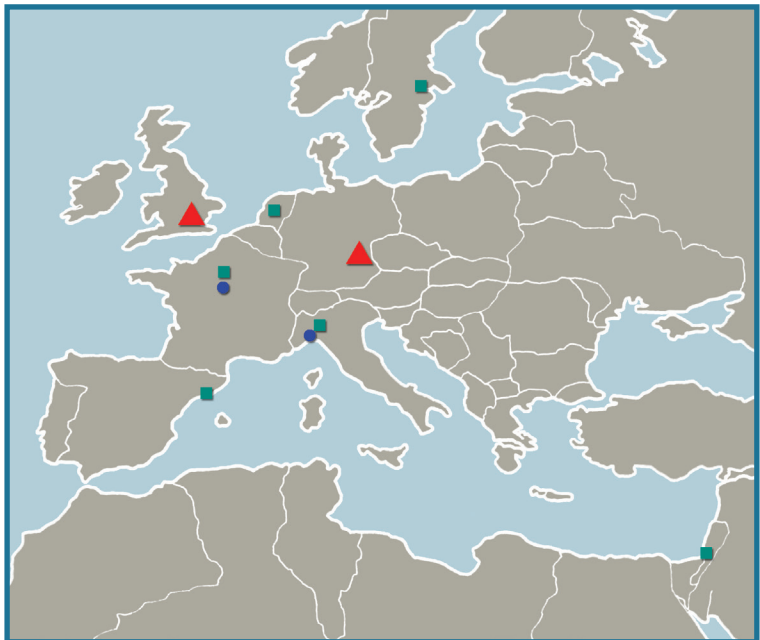
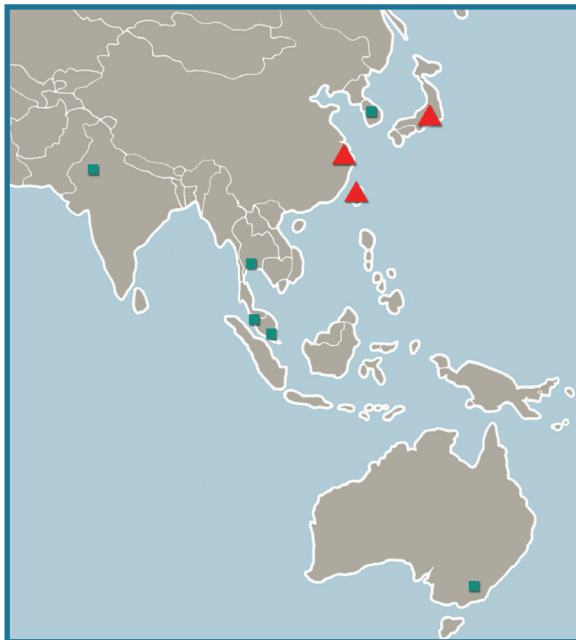
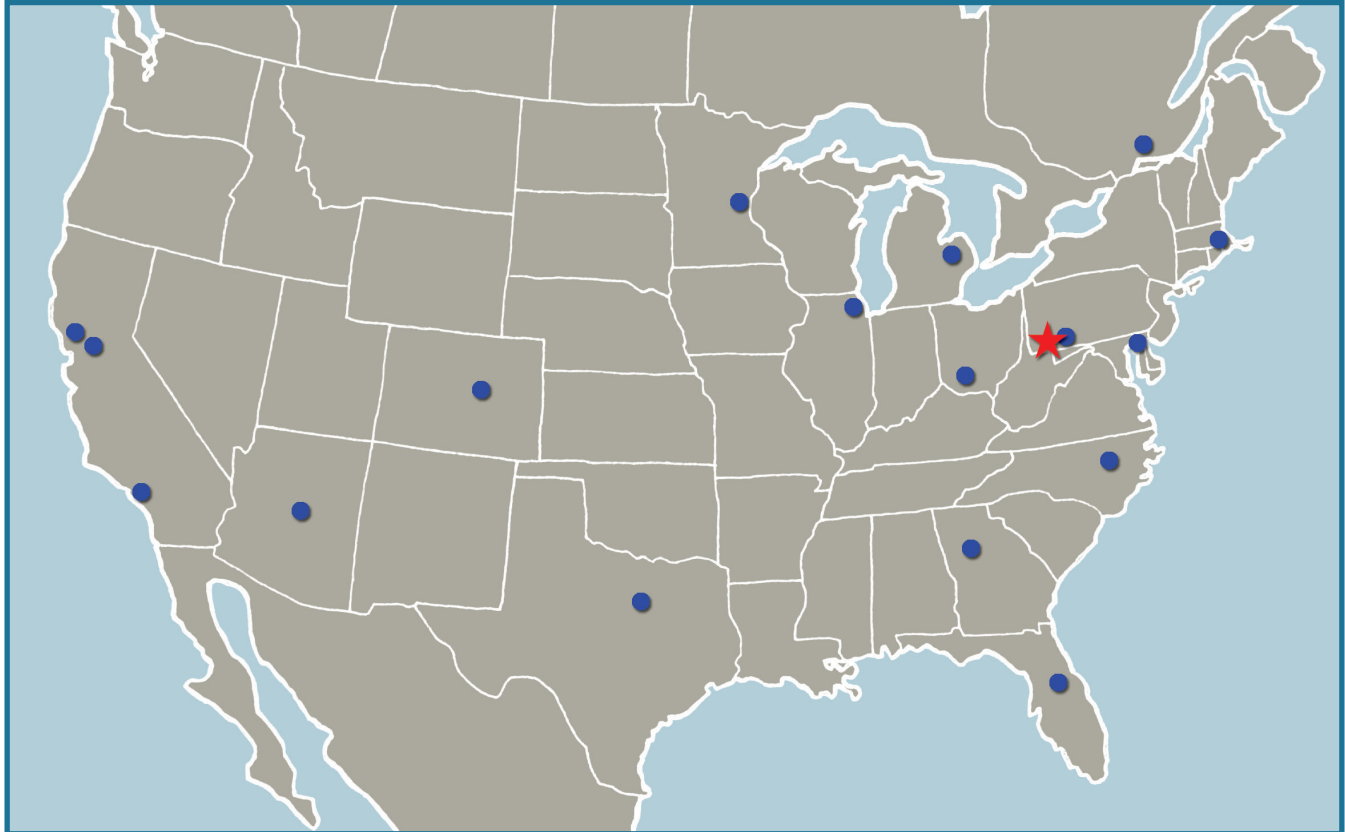
## Worldwide Service and Support



Fully equipped on-site training facilities



# Aerotech's Worldwide Sales and Service Locations



★ - Aerotech Headquarters   ● - Direct Field Sales Office   ▲ - Aerotech Subsidiary   ■ - Representative

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