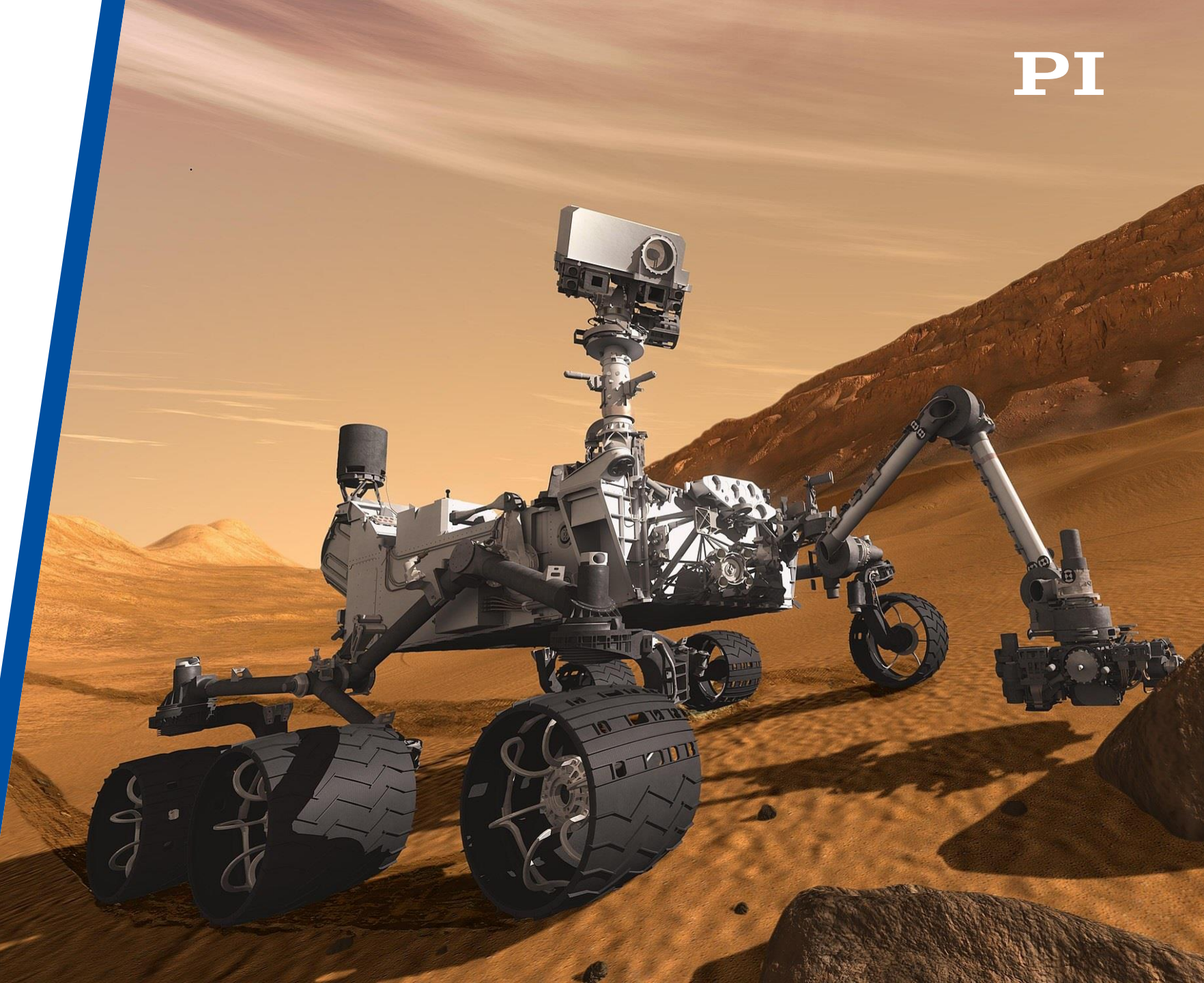PHYSIK INSTRUMENTE

Air Bearing Motion Systems
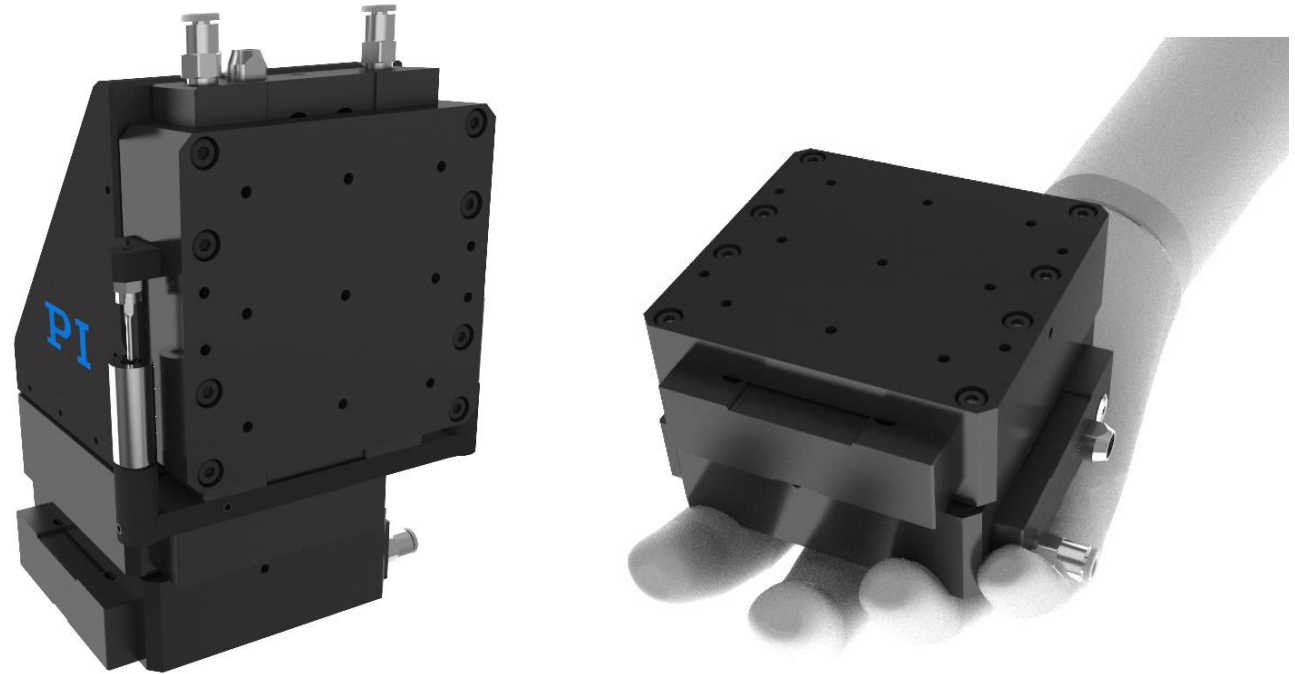## Displayed at Photonics West

PI USA
1.26.23

A-142 Series High Performance Air Bearing XYZ

**A Compact Modular Solution for FMPA**

A-142 Series High Performance Air Bearing XYZ

Compact, Modular and Cost Effective

The A-142 XYZ Air Bearing Motion System is a compact, high-performance, highly-dynamic, modular solution to Fast Multi-Channel Photonics Alignment configurable as XY, YZ, or XYZ. A high value solution for a range of alignment applications including Photonic Circuit surface coupling, fiber-to-fiber and fiber-to-waveguide applications.

A-142 Series High Performance Air Bearing XYZ
Low Mass, Low Moving Mass and High Dynamics for Light Loads
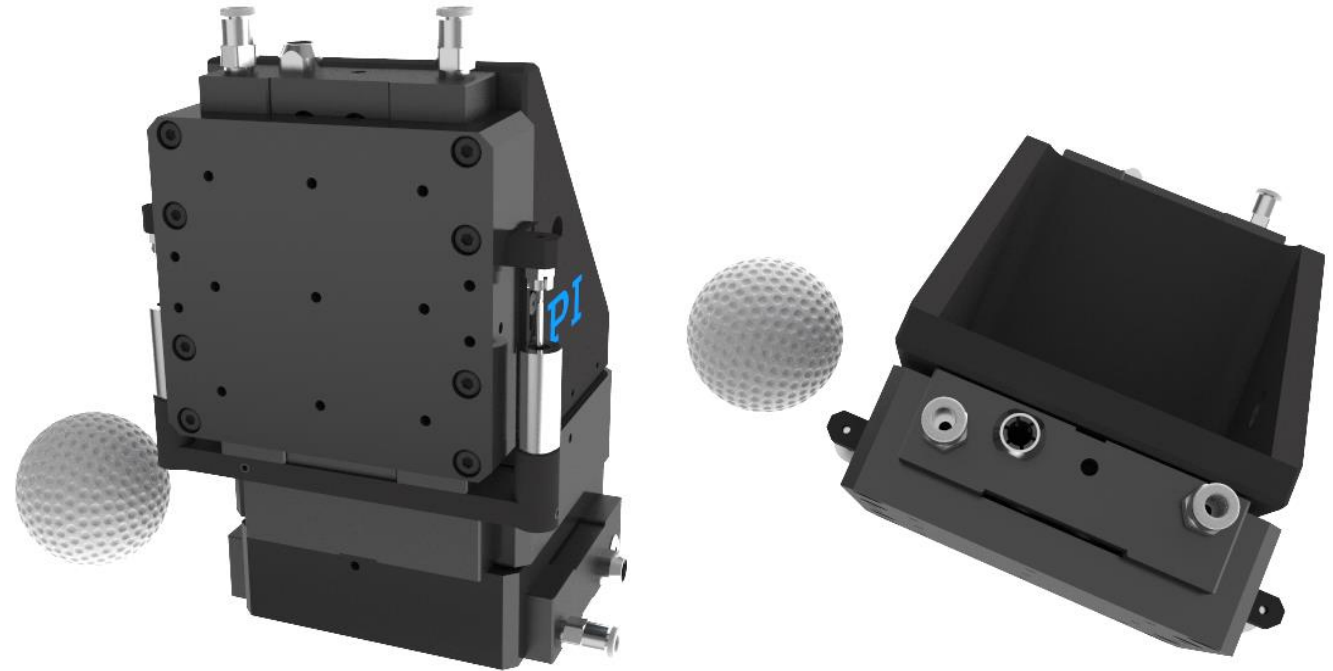
The extreme compactness of the XYZ Air Bearing System allows it to fit in confined spaces or to be combined with larger travel coarse motion systems easily. Here the A-142 is shown next to a standard golf ball for size comparison. The A-142 weighs only 600g, with a moving mass of only 250g.

A-142 Series High Performance Air Bearing XYZ

High Frequency Scanning Motion with high Servo Bandwidth
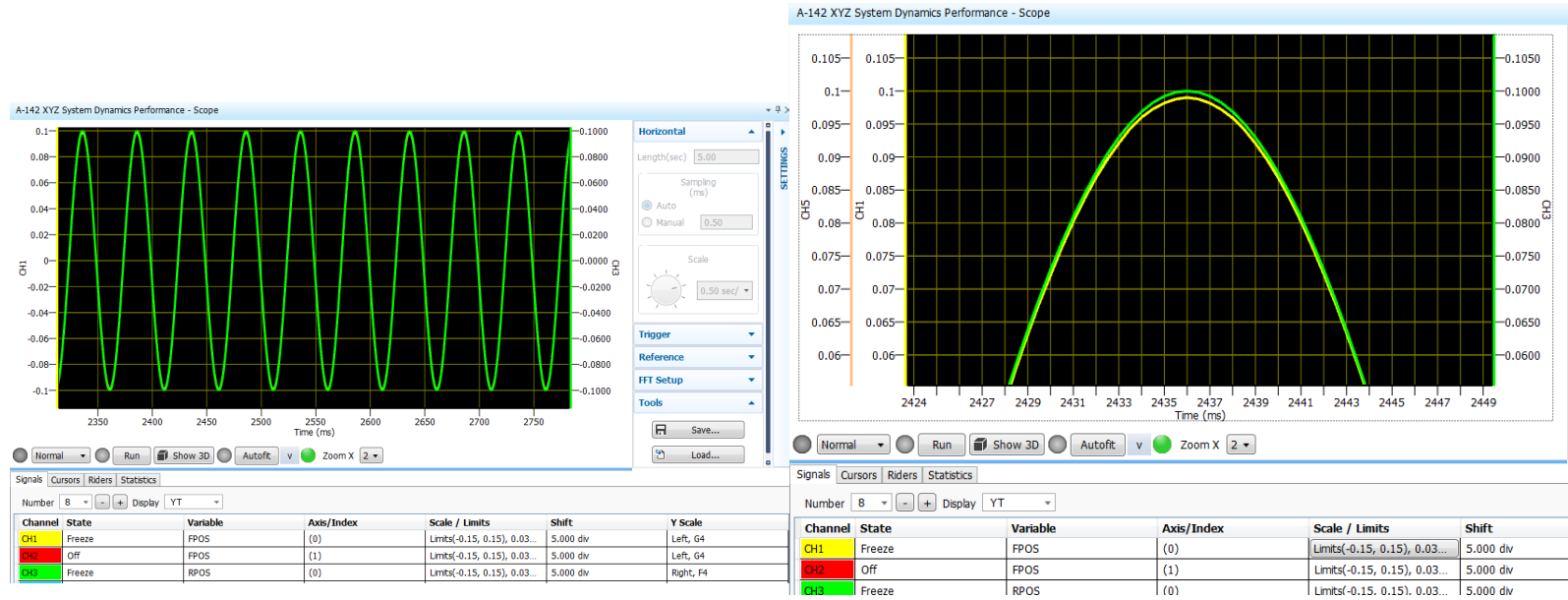
The A-142 Motion System offers very high dynamics under light load conditions typical to fiber array/fiber coupling applications where the moved part is a fixture with fiber holder. Here you can observe scan frequencies with good dynamic characteristics to 20 Hz (with small, repetitive alignment scanning motions).

A-142 Series High Performance Air Bearing XYZ

## No Wear, No Maintenance with Results in Seconds
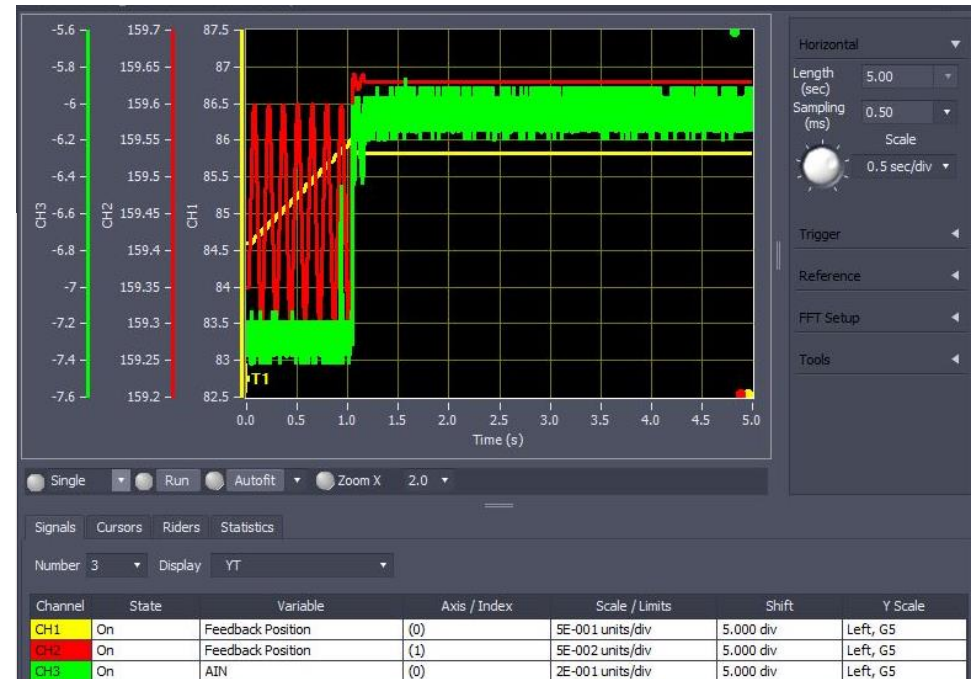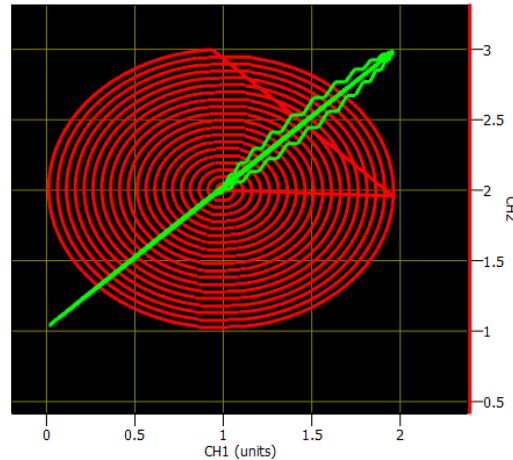
Optimized alignment applications typically involve small repetitive motions with high accel and jerk. It's in this repetitive small motions that mechanical bearings suffer wear that can limit operating life. The A-142 avoids wear and tear and requires no maintenance. Using PI Proprietary onboard FMPA Algorithms shown above, alignments that take minutes with other approaches, take less than 2 seconds.

A-142 Series High Performance Air Bearing XYZ

Easy Software Integration
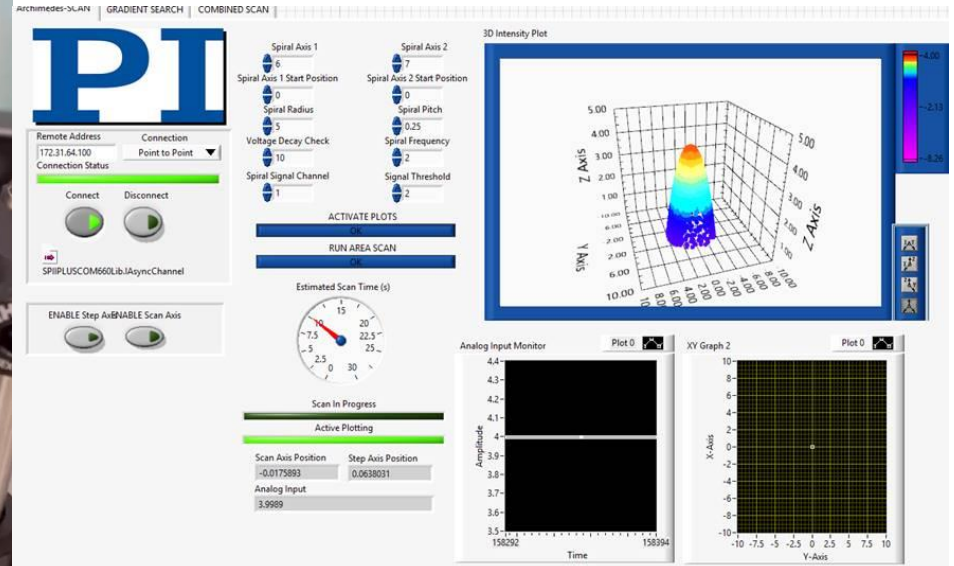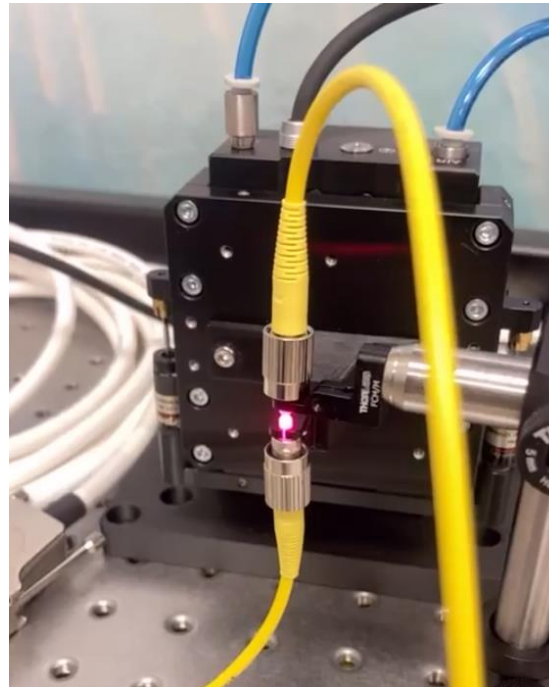
Onboard PI Proprietary FMPA Algorithms along with open-source demonstration code in major languages such as: LabVIEW, Python, C#, and Visual Basic guarantee alignment system can be integrated quickly and perform optimally.
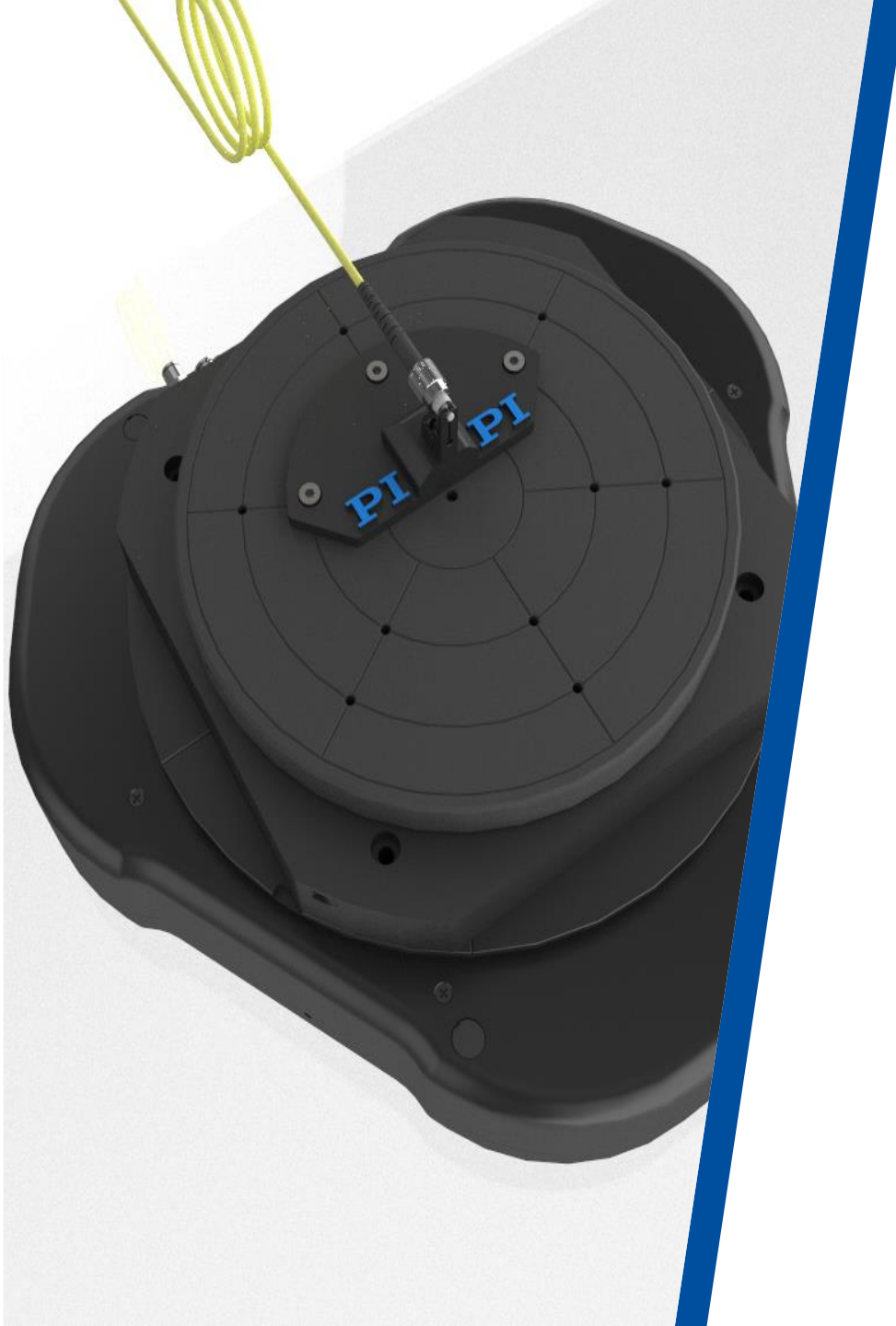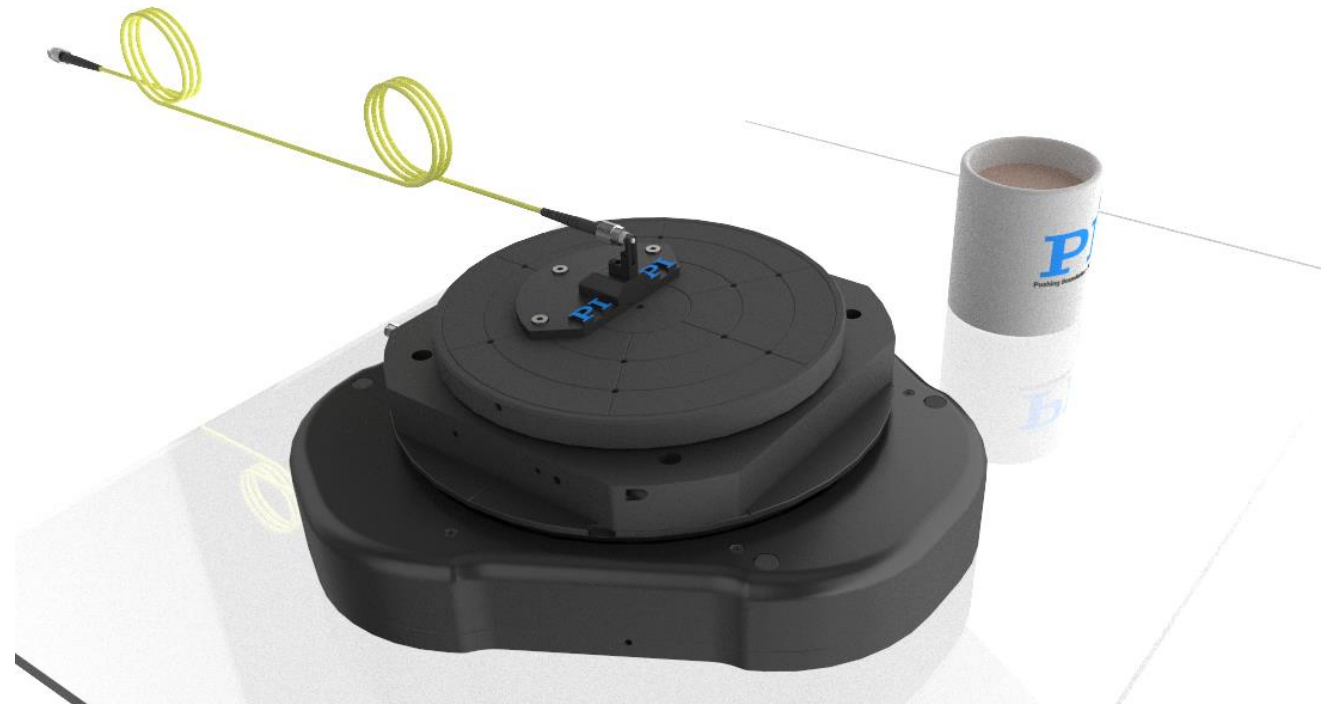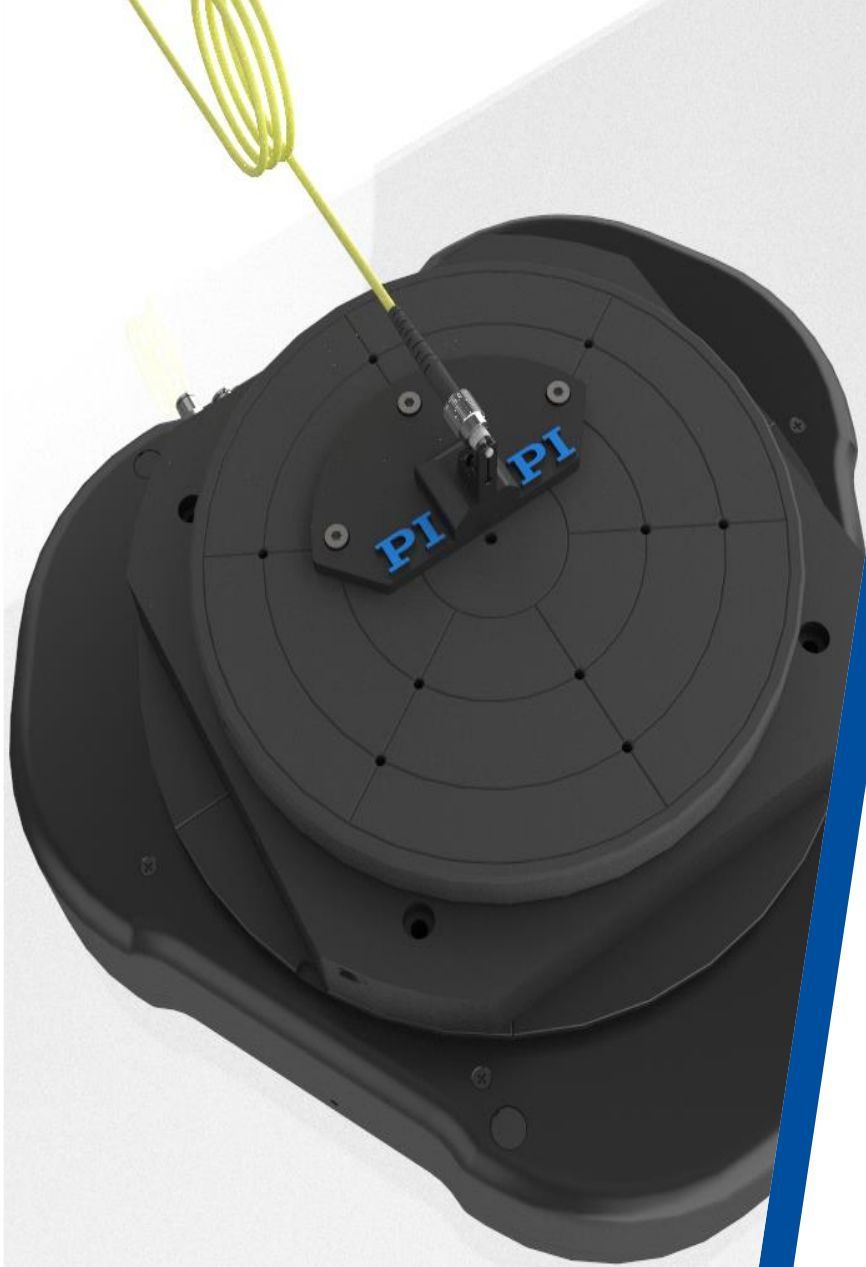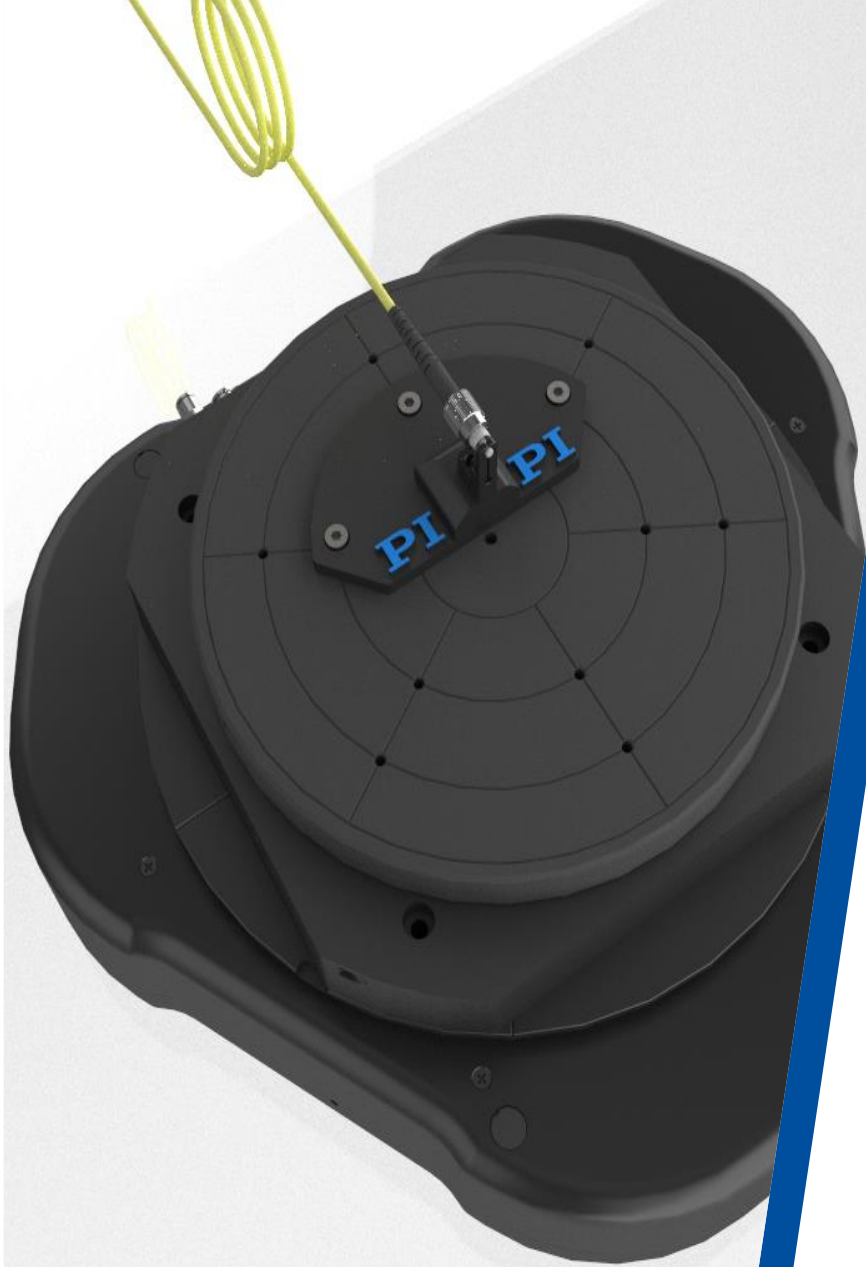
6-DOF Integrated Air Bearing Motion System

High Performance FMPA Motion Solution

6-DOF Integrated Air Bearing Motion System
High Performance Motion Solution for FMPA

The 6-DOF Integrated Air Bearing Motion System is a high-precision, highly-dynamic, non-wearing, maintenance free solution ideal for Fast Multi-Channel Photonics Alignment (FMPA) involving fiber arrays, silicon photonics circuits and wafer level short range metrology applications.

6-DOF Integrated Air Bearing Motion System
## High Dynamics with Optimized Low-Profile Design

The 6-DOF Air Bearing System is extremely low-profile at approximately 100mm, from top-to-bottom. This wide base, low-profile enhances both guiding performance as well as top-line dynamics and servo-bandwidth while being easily integrated with minimal vertical space requirement in the tool/setup.

6-DOF Integrated Air Bearing Motion System

Virtual Pivot

Default System Pivot
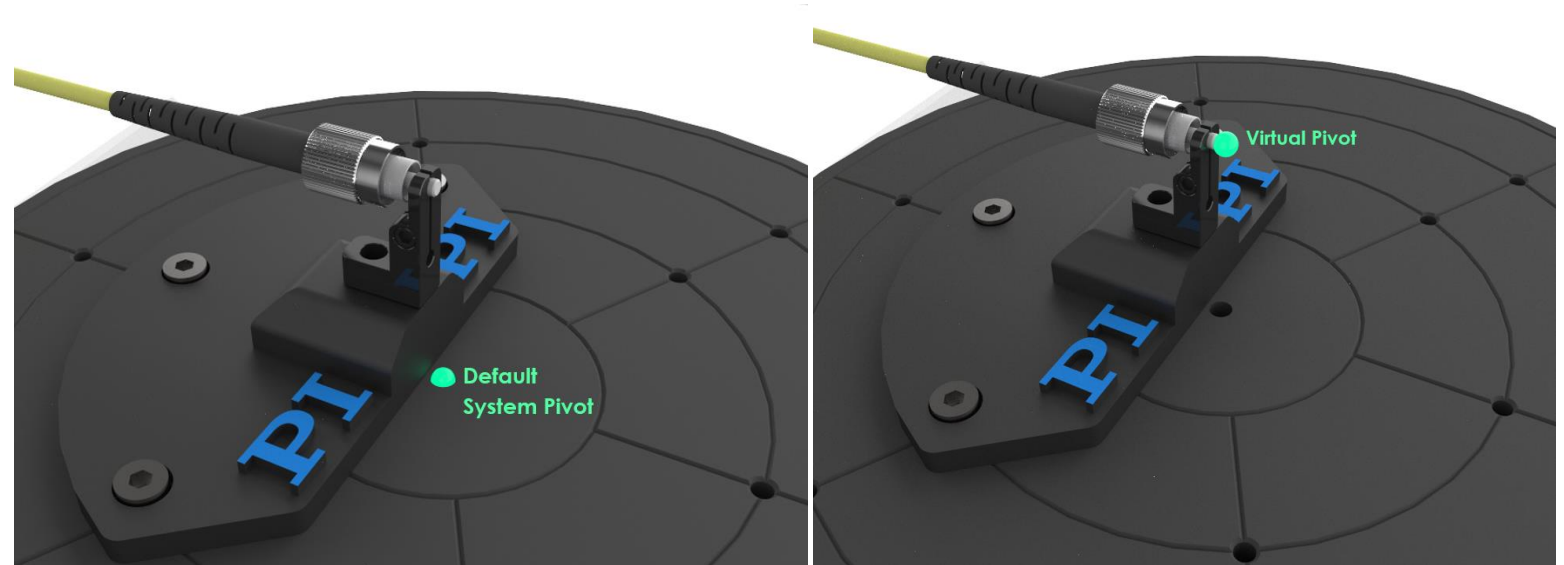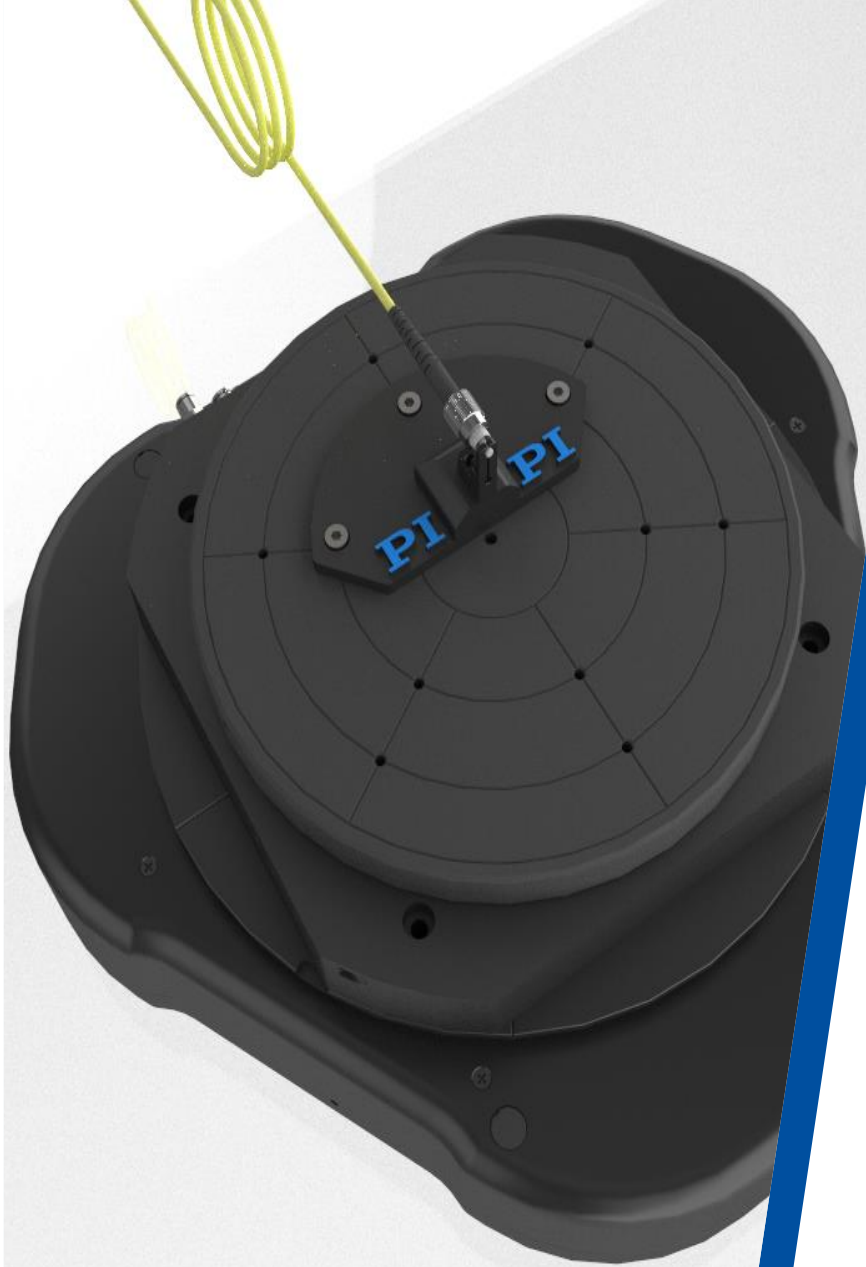
Virtual Pivot

Onboard Inverse and Forward Kinematics provide automatic coordinate transforms for simple commanding of the 6-DOF motion system with programmable virtual pivot. This allows simple angular adjustments to be made around critical alignment points easily, quickly and with high-precision
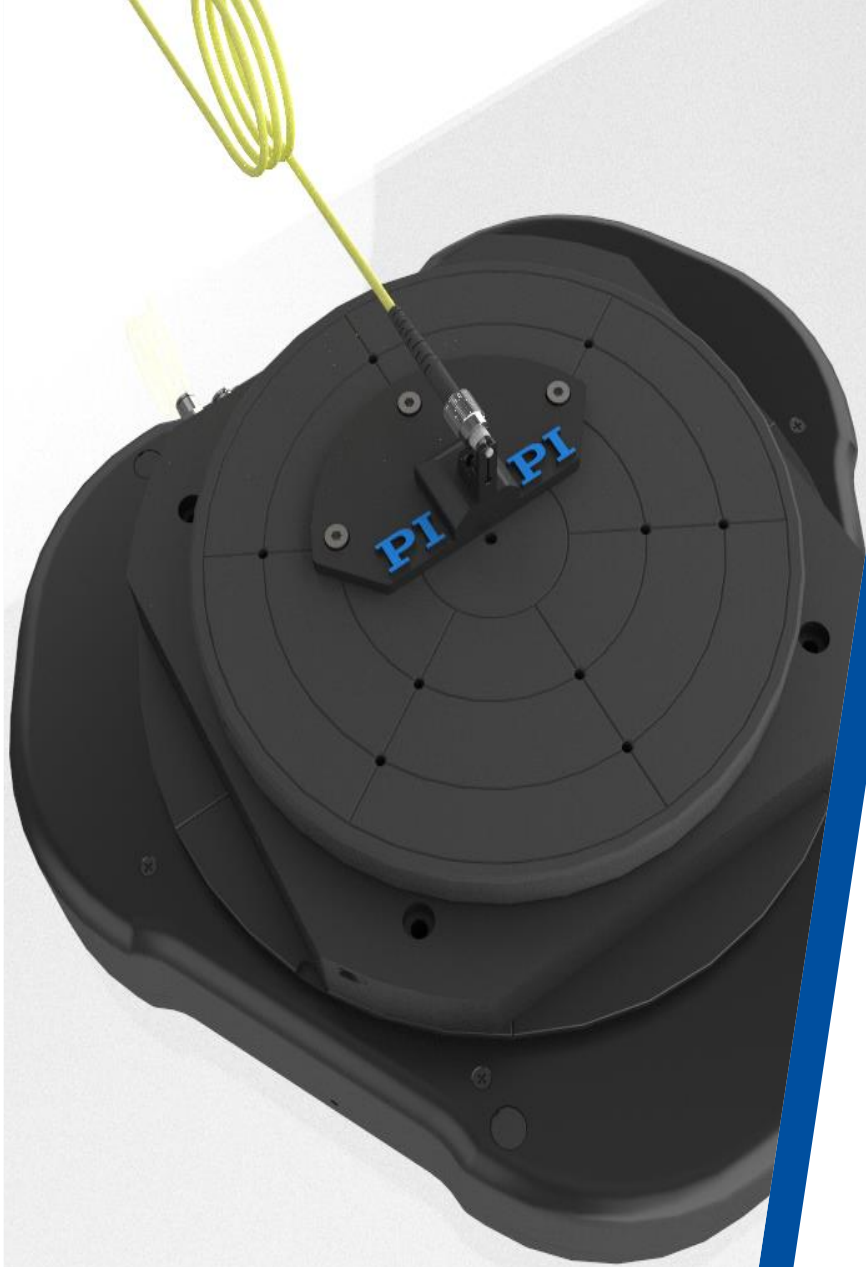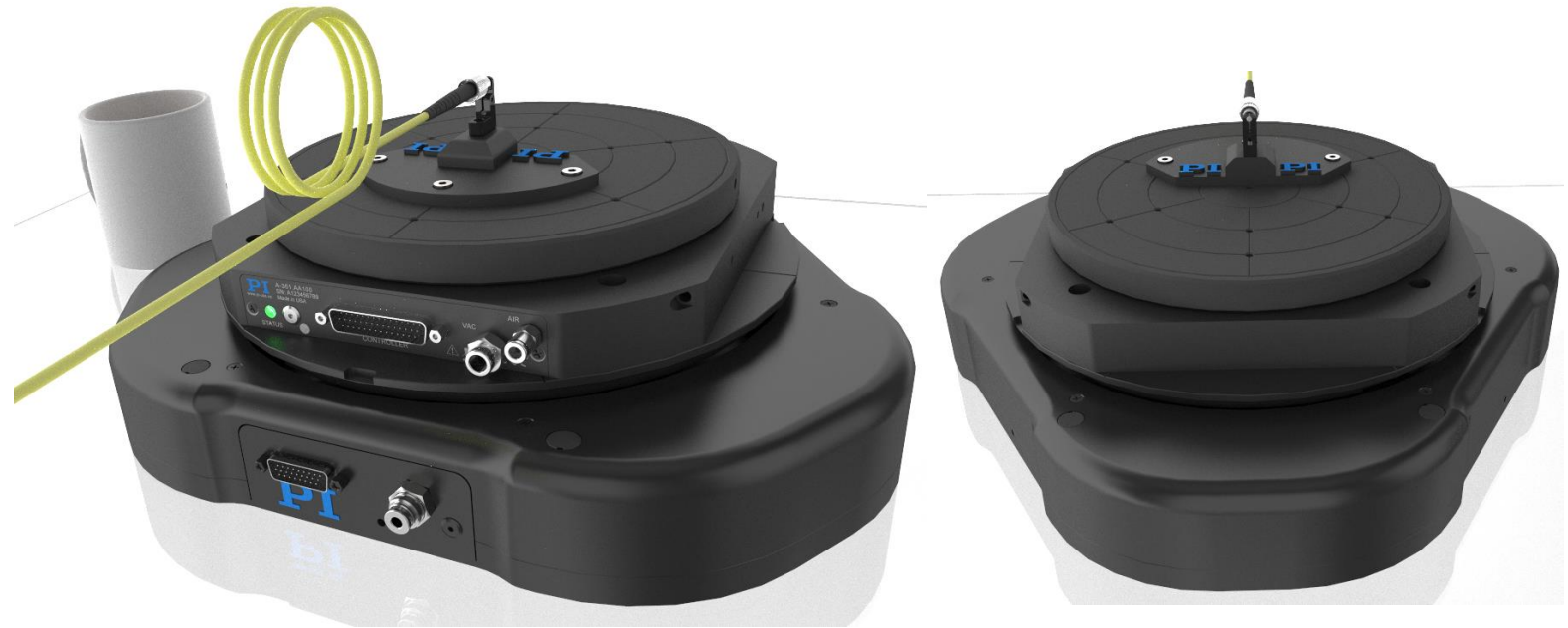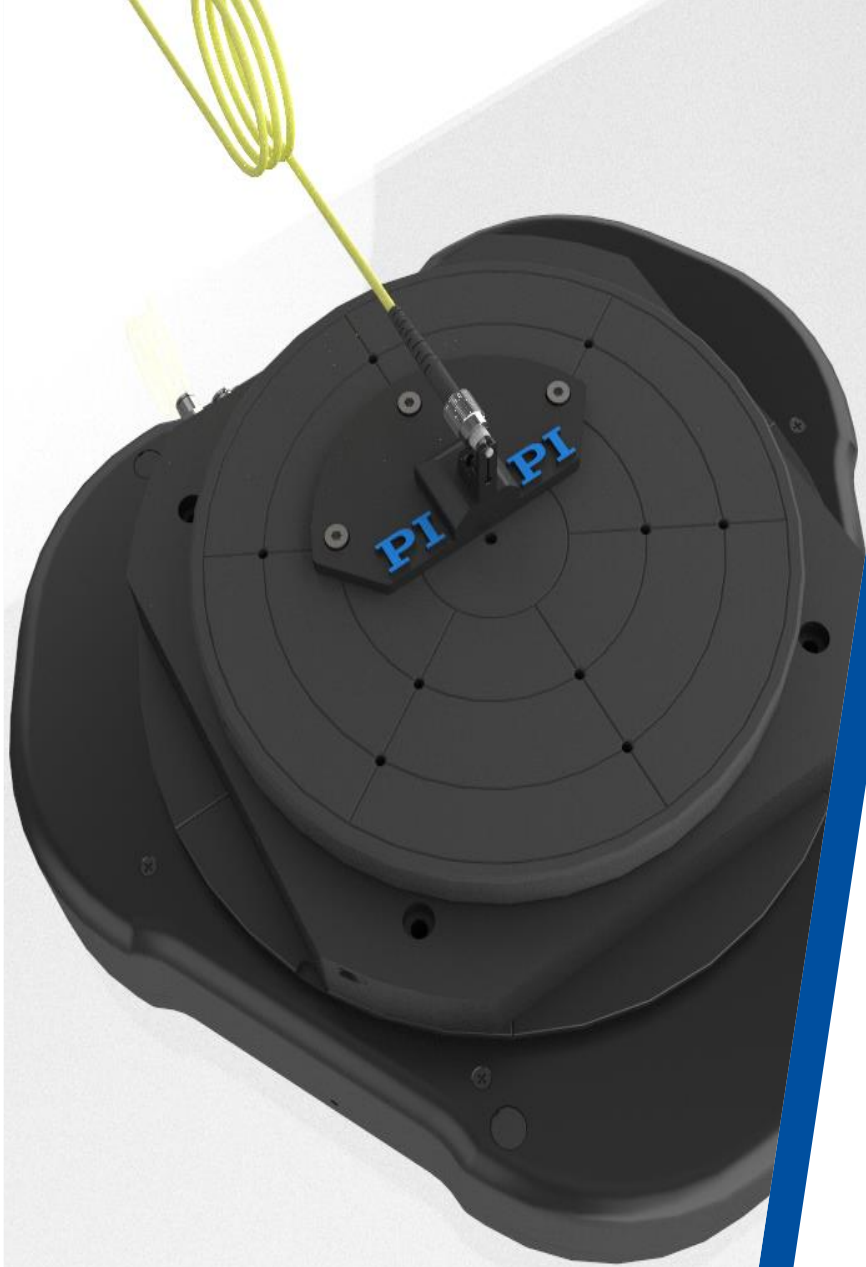
6-DOF Integrated Air Bearing Motion System
PI Proprietary FMPA Algorithms
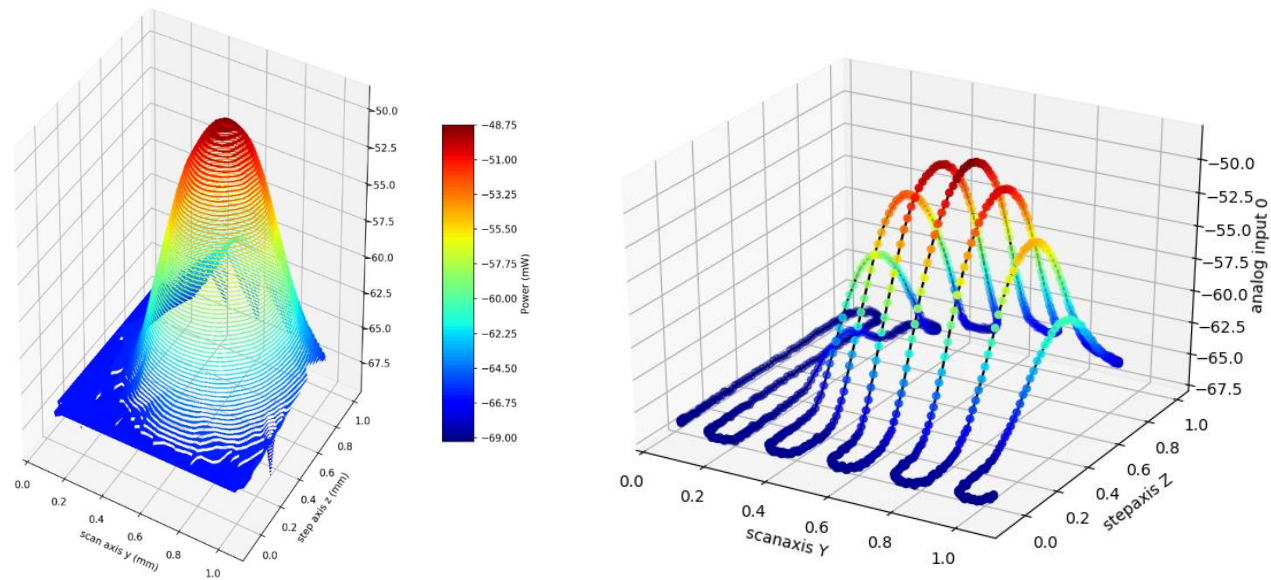
Onboard FMPA Alignment Algorithms offer industry leading state-of-the-art performance. PI FMPA solutions have demonstrated orders of magnitude better throughput than alternative solutions and include an array of novel tools including area scanning for first light finding, as well as Gradient and Centroid Algorithms for Peak Coupling Optimization.

6-DOF Integrated Air Bearing Motion System
Dynamics and Resolution

The 6-DOF Air Bearing Motion System uses ironless linear motors, and high precision linear scale encoders to ensure precision and throughput required by high frequency scanning motions typical to alignment applications. Provided with a high-performance motion controller with high-resolution analog inputs, guarantee robust, repeatable results.