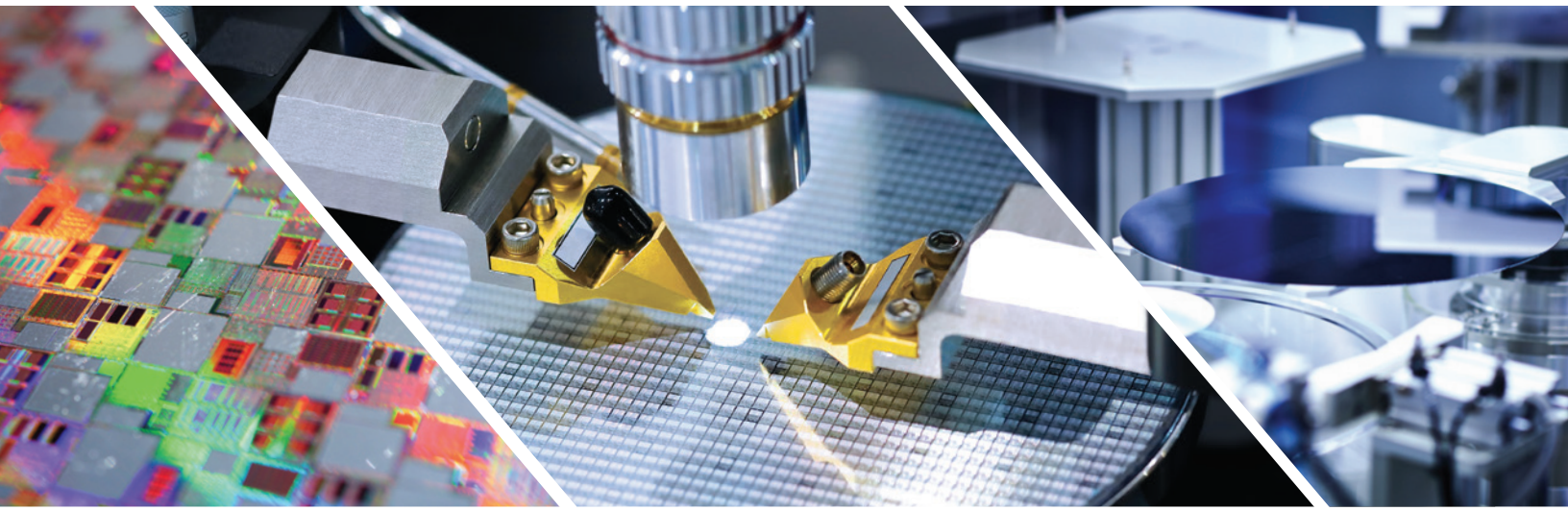
AEROTECH

SILICON PHOTONICS WAFER TESTING

Automated Alignments to Scale Silicon Photonics (SiPh) Wafer Probing

To scale silicon photonics wafer probing and meet high-volume throughput requirements, an industry-leading wafer test machine manufacturer had to solve new system design challenges.

THEIR GOAL: Develop a new, high-throughput wafer probing system to expand their market reach.



CHALLENGE

To combine their existing systems' precision with industrial high-volume manufacturing equipment and meet production-level throughput requirements, this OEM needed:

- Positioning flexibility in several degrees of freedom to precisely align photonic sources & detectors
- High-dynamic motion for rapid alignment of test components
- Tightly coordinated motion between wafer positioning & probing stages
- Extreme accuracy & repeatability for movement between die without manual user interaction
- Specialized software & algorithms to reduce development time
- Sensor integration to prevent undesired motions & collisions

SOLUTION

Aerotech's engineering teams addressed all of these challenges with a solution that included:

- Modular stages enabling complex kinematic motion needed for precision alignment in 6 degrees of freedom
- Direct-drive servo motors for move-and-settle performance that exceeded throughput requirements
- A high-performance, multi-axis motion controller that coordinates all axes' motion
- Nanometer-level positioning accuracy & repeatability across all ranges of travel, including 0.5 nm minimum incremental step sizes
- Out-of-the-box optical alignment algorithms & custom algorithm development support
- Analog & digital interface options & configurable fault thresholds

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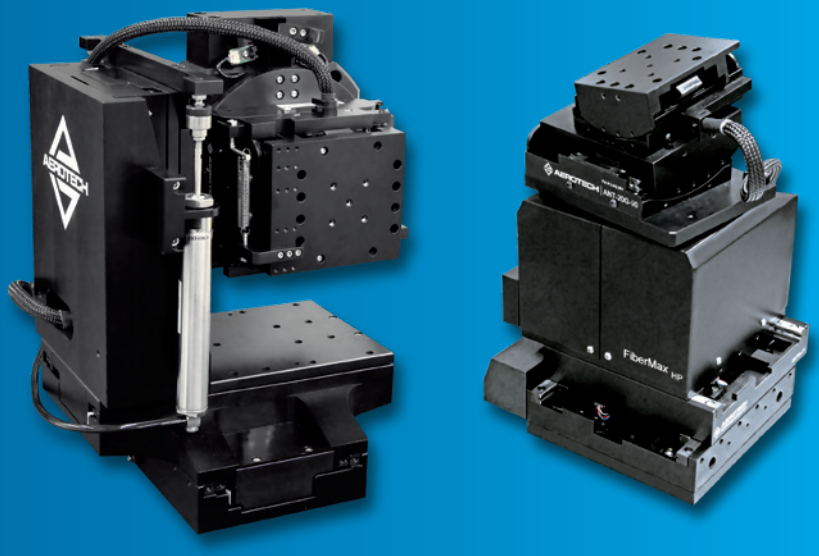
Dynamic Stages for High-Throughput Processes

With nm-level accuracy and incremental step size capabilities, Aerotech's modular nanopositioning solutions enable rapid probe positioning and alignment without manual interaction. These direct-drive, high-speed positioners achieve the precision required for the most demanding probing applications while maintaining the process speeds necessary for production-scale throughput.



Modular serial kinematic positioners

Multi-axis wafer stage with integrated chuck

Robust Motion Solutions for Scaling SiPh Wafer Probing

Aerotech offers specialized positioning solutions for silicon photonics wafer testing—including wafer stages and probe aligners—and higher levels of integration for process tooling such as vacuum chucks and sensor interfaces. Our systems are robustly designed for 24/7, production-level use to ease bottlenecks in SiPh wafer manufacturing operations.

User-Friendly Controller for Rapid Deployment

The Automation1 Motion Controller includes built-in optical alignment algorithms and easy-to-use configuration tools, streamlining setup for new test platforms. Designed for maximum flexibility, Automation1 has a wide range of interface options and plug-and-play expandability to adapt to even the most challenging user requirements.

Automation1 Intelligent Motion Controller