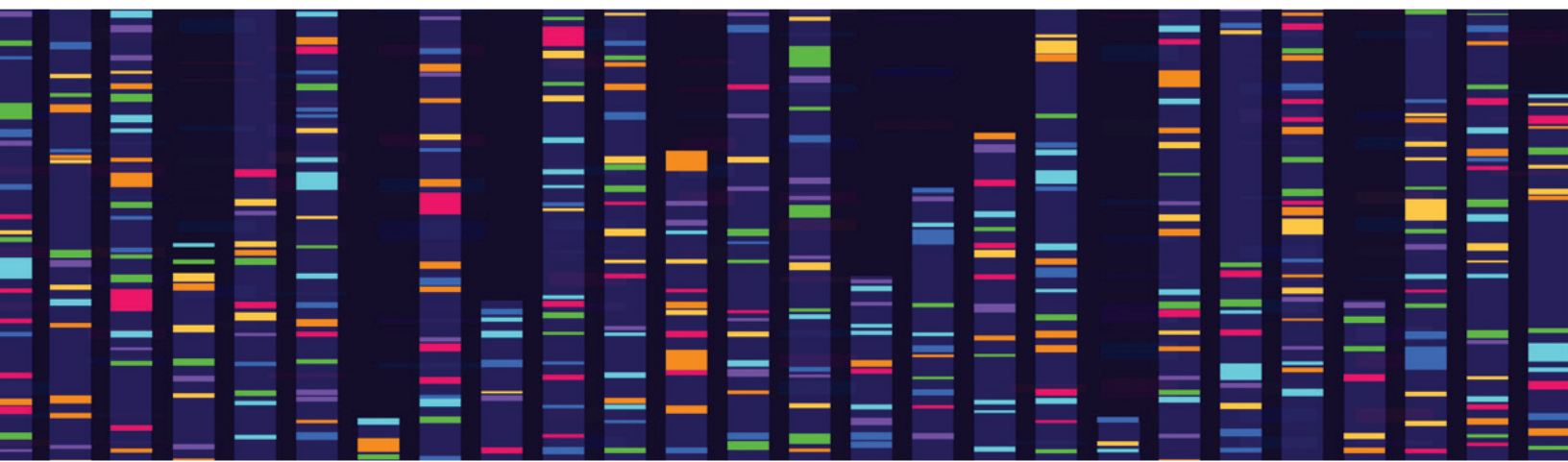




MOTION SOLUTIONS FOR NEXT GENERATION SEQUENCING (NGS)

Enabling NGS by Combining Superior Geometric & Dynamic Performance

Next Generation Sequencing (NGS) is now mainstream. To stay competitive, a major NGS instrument producer needed the highest accuracy over long-read sequences and lower sequence time.



CHALLENGE

Produce a compact, extremely high-performance motion and control system that delivers unprecedented geometric precision and dynamic performance for long-read sequences, specifically:

- ◆ Low-profile, direct-drive XY stages that deliver nanometer-level performance over relatively long travels (up to 160 mm)
- ◆ Extremely high accuracy, horizontal & vertical straightness (flatness)
- ◆ Fast move & settle performance with single-digit nanometer minimum incremental motion
- ◆ Coordinated, high-speed triggering for imaging

SOLUTION

Aerotech's engineering team created a successful solution by:

- ◆ Refining a nanopositioning servo stage solution that met all geometric performance criteria (± 250 nm repeatability, ± 2 μ m flatness & straightness, accuracy ± 0.5 μ m) over travel, in the compact form factor desired for optimal integration to instrument
- ◆ Delivering a high-performance control platform capable of servo update rates as fast as 20 kHz, with high-speed outputs tied to stage position feedback
- ◆ Producing a system capable of high-dynamic performance (1 g acceleration, 200 mm/sec maximum velocity, 0.5% velocity stability at targeted scan rates) without sacrificing precision over relatively long travel ranges

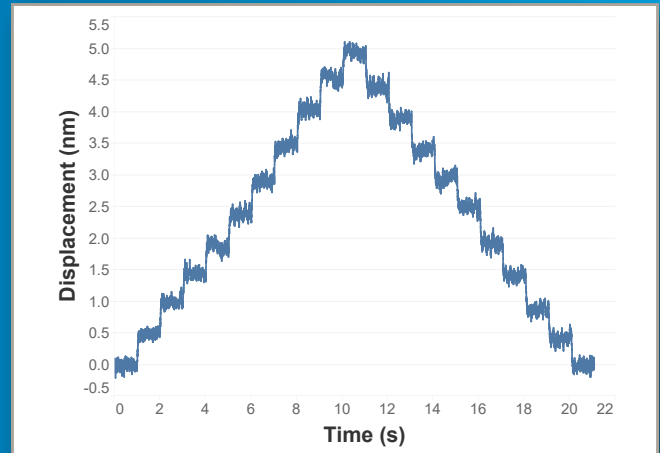
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Compact, high-performance motion stages

Aerotech's ANT stages provide the combination of high performance and small form factor required for NGS instruments. Enhanced performance is achieved with ultra high-accuracy 2D factory calibration and tightly controlled orthogonality (0.5 arcsec). These stages deliver in-position stability of <math><0.5\text{ nm}</math> and minimum incremental motion down to 0.5 nm. They also maintain these extreme performance results over a long life due to a non-contact linear motor and robust mechanical design.



ANT130XY-160-E4-PL3 step plot showing 0.5 nm minimum incremental motion of the lower axis. Best-in-class resolution and exceptional in-position stability for large travel stages.



Controls that move at the speed of light

Aerotech delivers best-in-class performance for the complete mechatronic system—mechanics, electronics and controls. Built on the backbone of a proprietary optical communication bus, HyperWire®, the Automation1 control platform enables lightning-fast communication speeds and tightly coordinated motion. By enabling high-speed triggering of outputs based on position feedback, Automation1 provides the fastest and highest fidelity sequence imaging available.

Global support

Because of NGS technology's widespread adoption, instruments will find their way into laboratories around the world. Aerotech has physical locations in every major region, with service and support personnel located near every major metro in the world.

