

**Kilo-DM Deformable Mirror System.** A high performance wavefront corrector for demanding applications in astronomy and lasercom. The Kilo-DM is an enabling component for precise, high speed, high resolution wavefront control. With 1020 actuators controlled to under 1nm of precision and no hysteresis, this system is ideal for demanding applications in astronomy and laser communication. The high-speed electronics driver is capable of 60 kHz frame rate and 14 bit step resolution. Originally developed for a DARPA coherent laser communication project, the Kilo-DM is currently used by the European Southern Observatory, NASA's Terrestrial Planet Finder, and various defense agencies.

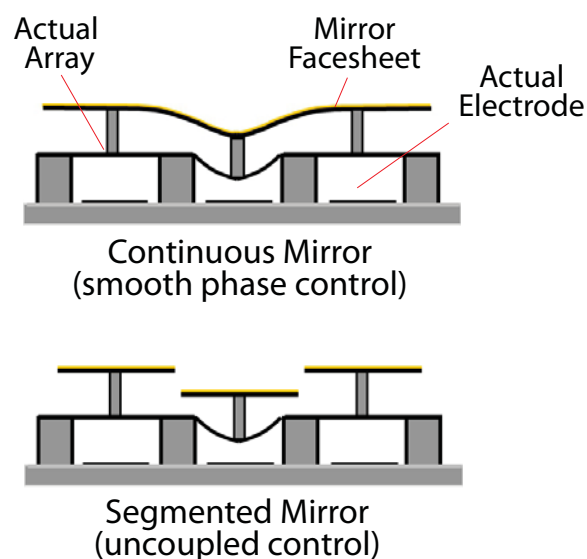
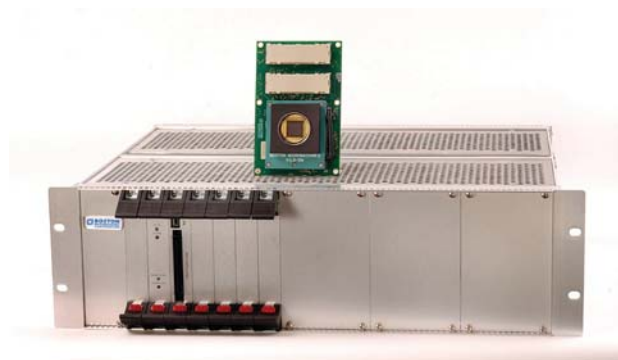
### MEMS Deformable Mirrors

MEMS deformable mirrors are currently the most commonly used in many AO applications given their versatility, maturity of technology, and the high resolution wavefront correction capabilities. Using advanced, inexpensive manufacturing technology, MEMS DMs' performance strengths are inherent to micromachining:

1. Large actuator arrays create high resolution wavefront correction
2. Advanced microstructures allow minimal influence between adjacent actuators for high spatial frequency surfaces
3. Optimized design enables rapid wavefront shaping for high speed applications

### DM Specifications

- Continuous (DM) or Segmented (SLM) Surface
- 1020 actuators (32x32 array without 4 corners)
- Coating: Aluminum or Gold
- Protective window with 400-1100nm, 1550nm or 550-2500nm AR coating
- Zero hysteresis
- Fill Factor >99% (DM), 98% (SLM)
- Sub-nm average step size
- Surface Finish: <20nm RMS
- Stroke: 1.5  $\mu\text{m}$
- Aperture 9.3 mm
- Pitch: 300  $\mu\text{m}$
- Approx. Mechanical Response Time (10%-90%): <20  $\mu\text{s}$
- Approx. Interactuator Coupling (+/- 5%): 15%



### Driver Specifications

- DIO Interface: 32-bit LVDS (200 MB/s)
- 14 bit step resolution
- Frame Rate: 34 kHz / 60 kHz (Low Latency)
- Dimensions: 5.25" x 19" x 14" (3U Chassis)