

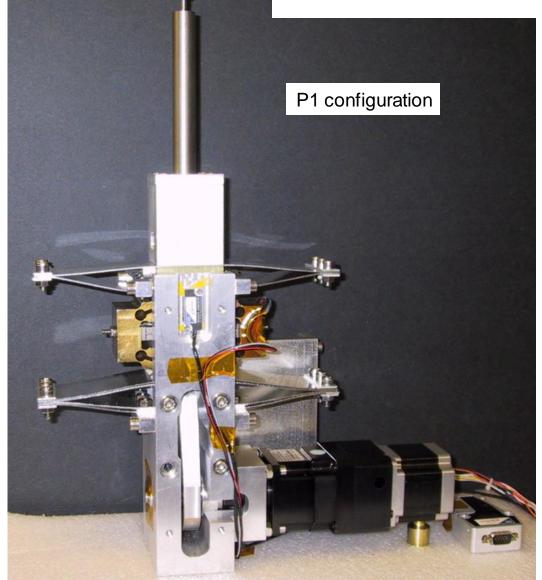


PZT/Motor Actuator





PZT/Motor actuator



- Two stage actuator
 - Long-travel PZT fine stage (~200 um)
 - » Also provides damping via shunt impedance
 - Motor/gearbox/eccentric drive coarse stage (~5 mm)
- This is a "discrete-offload" actuator
 - Tracks ≥15 minutes using just the fine stage
 - » Meets the 4.4 nm rms requirement with low crest factor
 - Then offloads quickly, and resumes tracking
 - » The transient is ~1 um, and lasts several sec.





PZT/motor actuator overview

- PZT stack in scissor mechanism + discrete motor + gearbox + eccentric offload
- For P2, PZTs would be in two hermetic assemblies, each consisting of two 36 mm stacks + one 18 mm long stack, electrically in parallel
- Total stroke: 208 um \pm 10% at -5C (perf. range); 10 N/um
 - As before, stiffness × stroke² conserved for same range
 - Stroke requirement is 175 um to achieve 15 min offload period for worst actuator at fastest elevation rate
 - For scoring the efficiency impact of the discrete offload, we used the required range, and average rates adopted from the Gemini data set, and an adopted composite observing scenario



PZT/Motor Actuator Development Model

- A "hard" (position) actuator
- Two-stage mechanism
 - Long-travel PZT fine stage with mechanical amplifier for continuous tracking
 - Stepper motor + eccentric-drive coarse stage to offload PZT between observations

