NUS National University of Singapore

CENTRE FOR INTELLIGENT CONTROL
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CIC NUS, SINGAPORE

Servo Challenges for 10 Tbits/in^2 Magnetic Storage

BACKGROUND

Recording density is less than 1 Tbits/in^2 in the current state of hard disk drive technology. To keep the competitive edge over other forms of mass storage, HDD industry continues to push recording density to higher level. The next target of 10 Tbits/in^2 can only be achieved with breakthrough in all related technologies. This project aims to provide servo control solutions demanded by 10 Tbits/in^2 recording density.

DESIGN TARGET

Track density:	2200k TPI (Tracks Per Inch)
Track Pitch	11.6 nm
3σ position error	< 1.16 nm

MAIN FEATURES

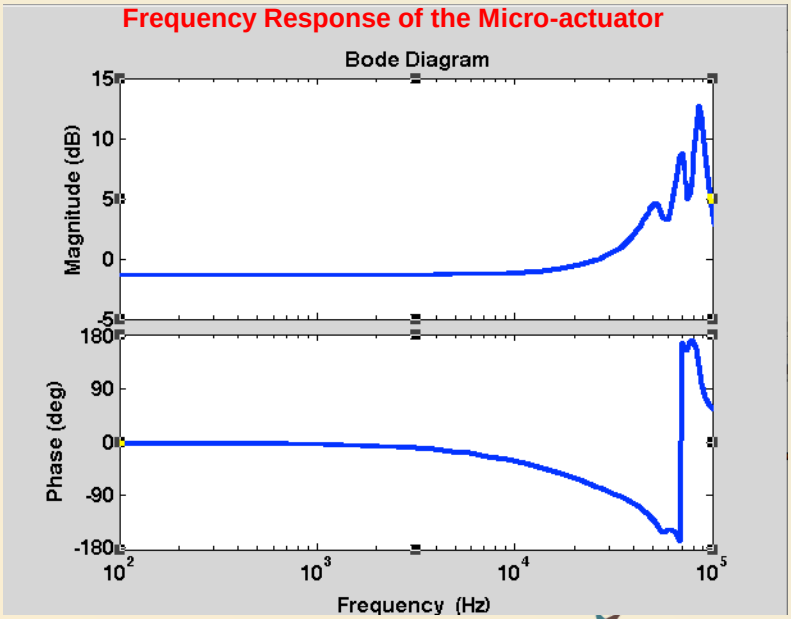
(1) PZT-based actuated slider ⇒
the secondary actuator placed as close to slider as possible

(2) Track-following controller with robust performance ⇒
stability and performance is guaranteed in spite of disturbance, noise and model uncertainty

(3) Demonstration of the target 3σ error ⇒
LDV-based closed loop position control setup capable of measuring displacement in picometer resolution

PROJECT STATUS

- Micro-actuator fabricated and tested.
- Displacement range: ±20 nm with ±12 V input
- No resonant mode below 50 kHz
- Integration of micro-actuator with suspension and slider in progress



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