

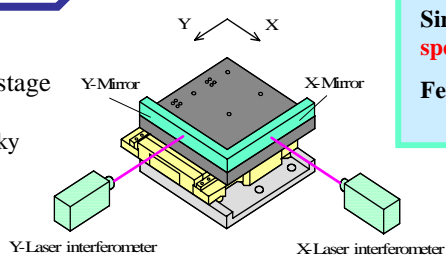
Development of the surface motor driven planar motion stage

JPPN 2003-022959

Background

Conventional planar motion stage

- Stacked structures
- Centre-of-gravity shift and bulky
- Complicated construction
- Extra high cost sensors



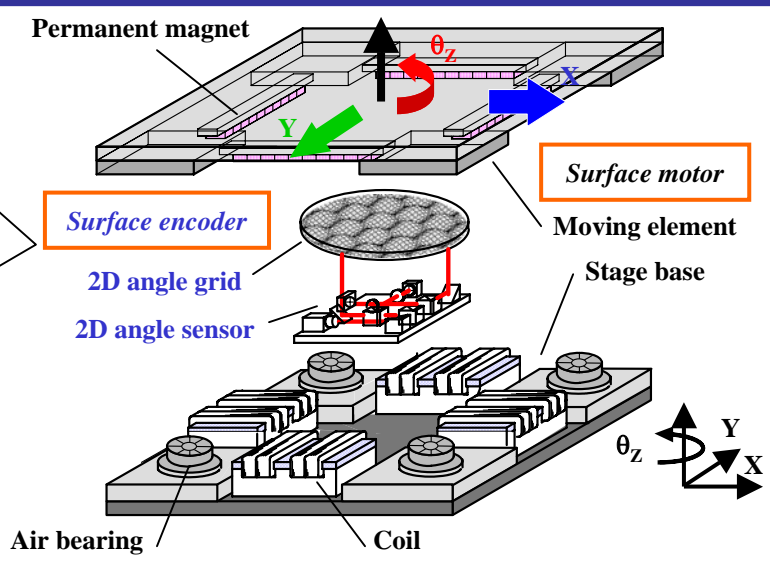
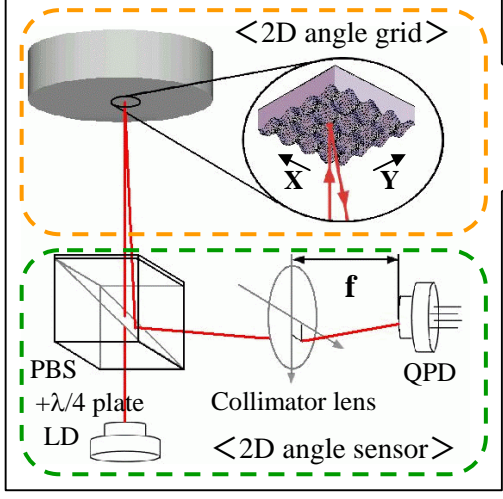
Simple and light moving element is effective for **high-speed positioning** → A surface motor

Feedback control is necessary for **precision positioning** → A surface encoder

A **Surface motor** driven planar motion stage with a **surface encoder**

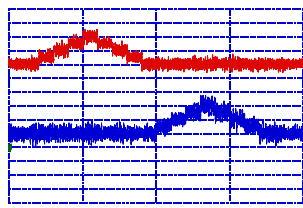
Principle

< Principle of position detection >

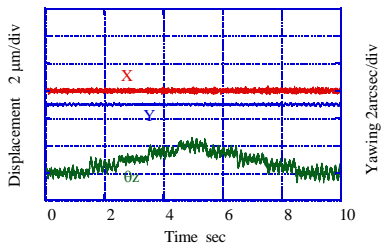


XYθ_z precision positioning system

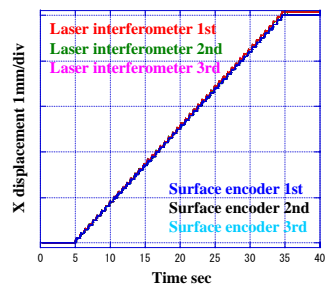
Results



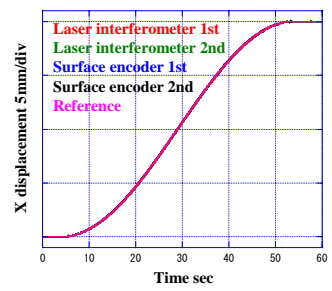
Responses to X- and Y-directional 100nm step-motion command



Responses to θ_z-directional 0.5 arcsec step-motion command

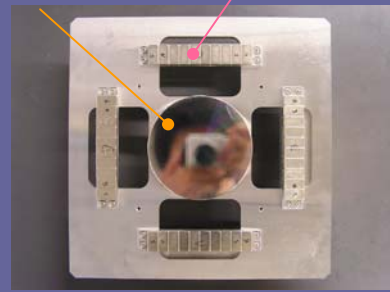


Repeatability of X-directional 100nm step-motion command



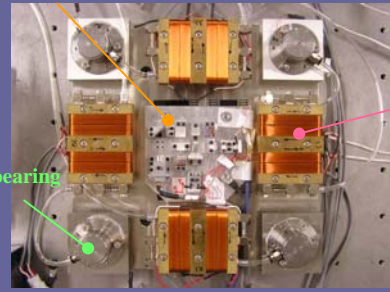
Responses to X- and Y-directional 20mm step-motion command

2-D angle grid Permanent magnet



< Moving element >

2-D angle sensor



< Stage base >

(Movement range : 40mm × 40mm × 20arcmin)