SHINSHI Lab.

Mechanical Systems Applying Electromagnetic Force

Laboratory for Future Interdisciplinary Research of Science and Technology (FIRST)

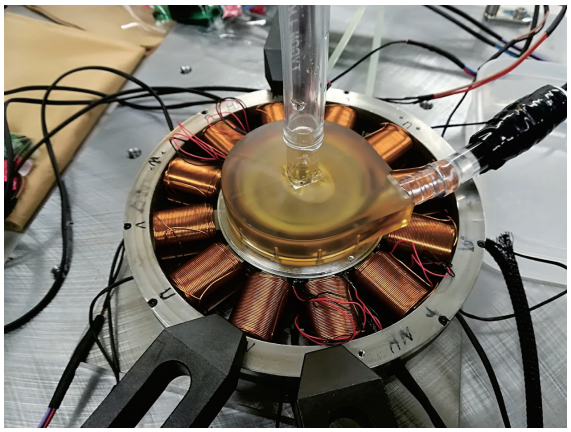
Industrial Mechano-System Research Core

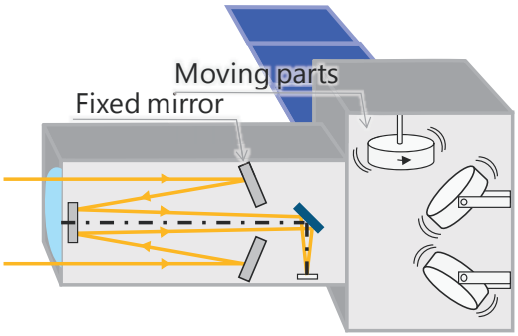
Biomedical Engineering Research Center

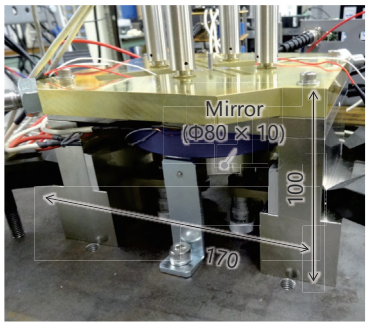
http://www.nano.pi.titech.ac.jp/

- Ventricular assist devices (artificial hearts) using maglev technology
- Vibration suppression and health monitoring of rotor systems using bearingless motors
- MEMS devices using permanent magnet films
- Multi-DOF, high response and high precision actuators

We are developing many types of non-contact, high response, multi-degrees-of-freedoms and micro electromagnetic actuators and trying to apply them to industrial and medical devices. Ventricular assist devices based on maglev technology, multi-DOF and ultra-thin actuators manufactured by using micromachining and micro magnetization technologies for permanent magnet, and high response and multi-DOF fast steering mirrors using maglev actuators have been developed.



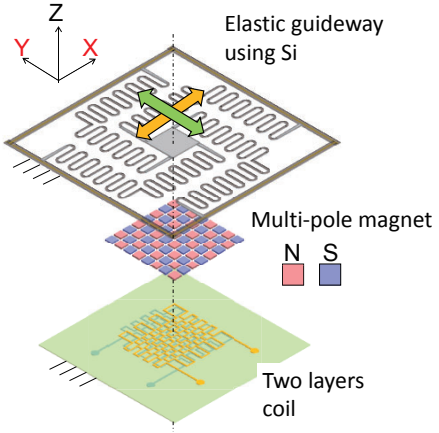


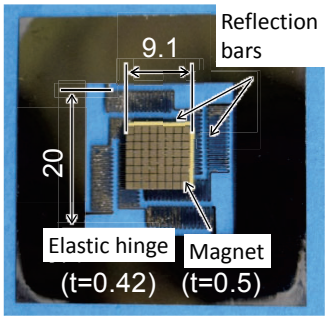


Three-DOF Fast steering mirror

Disposable centrifugal blood pumps using maglev technology

- High durability, low hemolysis and low thrombus formation realized by non-contact bearing technology
- Low cost and high bio-compatibility by PM free bearingless motor





High response and multi-DOF fast steering mirror supported by a super-elastic rod

- Fast steering mirror (FSM) for observation satellite
- Multi-DOF, high response and high precision positioning for image correction and focus adjustment
- Optimal design for FSM

Ultra-thin two-DOF MEMS actuator for smart phone camera

- Micro actuator for image stabilization of smart phone camera
- Micro-magnetization method for thin plate permanent magnet
- Multi-DOF guideway made of Si substrate