

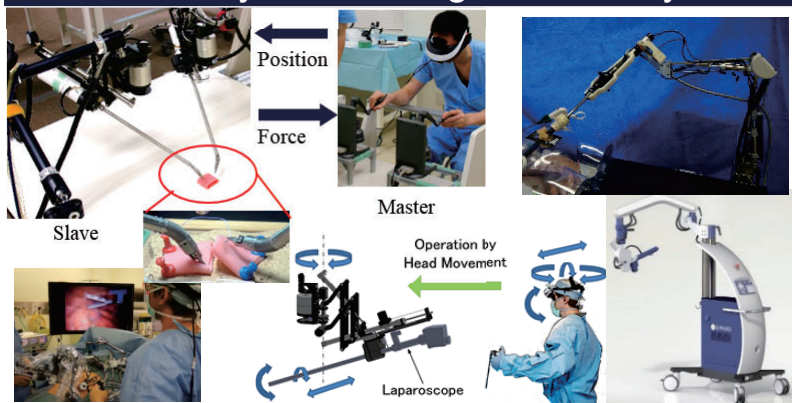


Medical Robotics, Human Support Systems, Pneumatic Systems

Laboratory for Future Interdisciplinary Research of Science and Technology (FIRST), Industrial Mechano-System Research Core

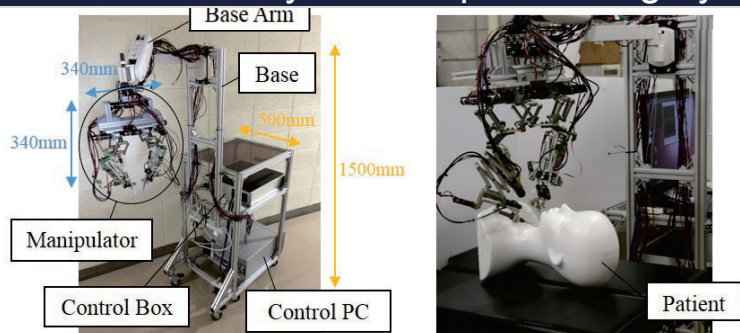
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Pneumatically-driven surgical robot systems



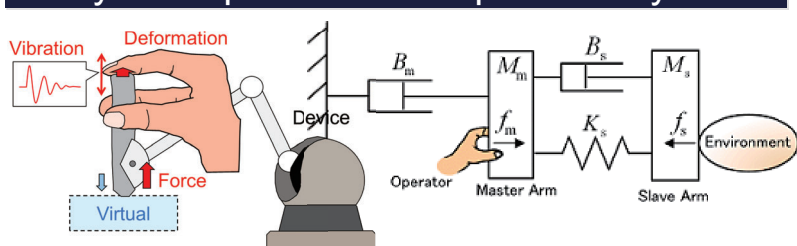
We have been developing a master-slave type robot system for laparoscopic surgery. The slave arm is driven with pneumatic actuators so that it is able to estimate the contact forces. We also develop a laparoscope control system where the scope is held by a pneumatically-driven robotic arm.

A master-slave system for plastic surgery



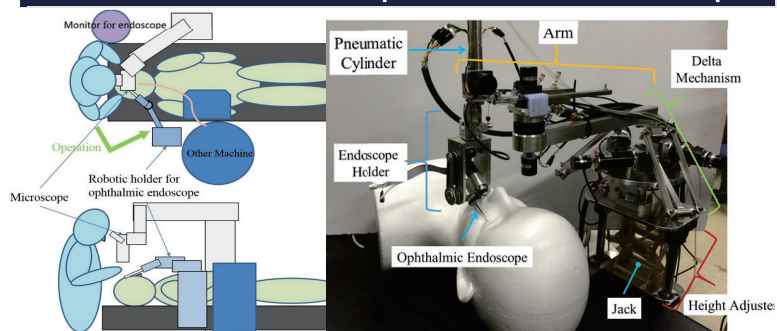
We are developing a master-slave type robot system for microsurgery especially targeting plastic surgery. We aim to realize high operability by studying mechanical design and control method.

Study on haptics for tele-operation systems



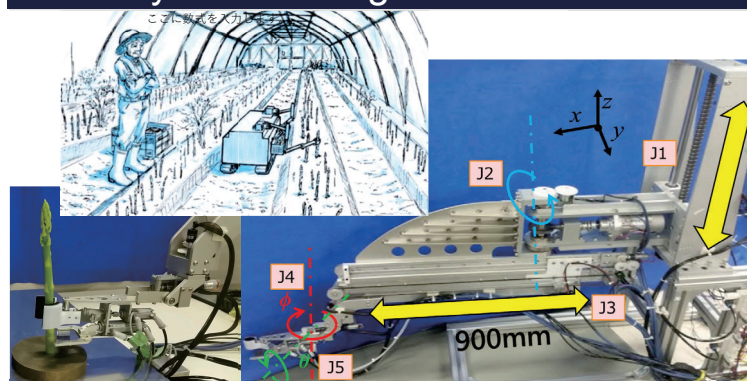
In order to enhance hardness perception during tele-operation, the perception mechanism and effective stimulation methods are studied. Also, we have established an index to evaluate how easily perceive contact with external objects. A design method of control parameters have been developed based on the index.

Robotic Holder for ophthalmic endoscope



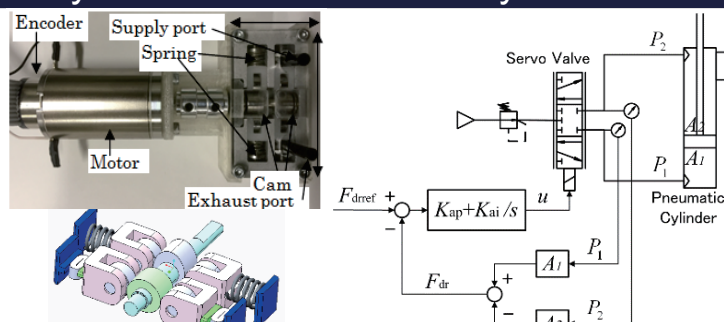
We are developing a robotic arm to hold an ophthalmic endoscope as a third hand of an operator for vitrectomy. We study a safe mechanism and view compensation for eye movements.

Robot systems for agriculture



In order to reduce the work burden in agriculture, we are developing a robot system to automatically harvest crops and a robot system to pull out weeds. We are studying recognition of targets and motioning of the robotic arm.

Study on Pneumatic Servo System



Aiming to enhance the performance of the pneumatic drive systems, we are studying servo valves, pneumatic circuits and control methods so that the driving force of pneumatic actuators are controlled with high accuracy and high-speed response.