

The Space Robotics Laboratory

Department of Aerospace Engineering, School of Engineering,

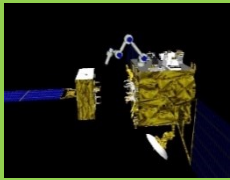
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This laboratory's primary research topics are dynamics and control for on-orbit servicing robots and lunar/planetary exploration robots. We are also developing privately-funded lunar rovers for a real mission and university-designed micro-satellites.

On-Orbit Servicing Robotics

We address dynamics and control of a space robot with manipulators. From the ETS-VII project in 1999, to the current HTV capture missions, we have engaged in various JAXA missions. For robotics in micro-gravity, we predicted the touch-down dynamics of "Hayabusa" and developed the exploration robot MINERVA-II2 for "Hayabusa2" mission.



Flight Experiment of
"ETS-VII" project



Touch-Down Dynamics for
"Hayabusa" S/C



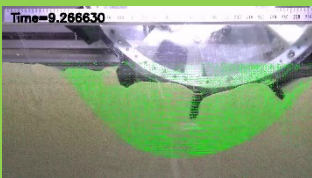
Dynamic Simulator for HTV
Capture by Space Manipulator



MINERVA-II2 for
"Hayabusa2" S/C

Lunar/Planetary Exploration Robotics

To support tele-operation of lunar and planetary rovers, we focus on locomotion mechanics and motion control, and sensing and understanding of environments for, especially those with soft-soil and rough terrain. Furthermore, we are supporting the development of rovers for Japan's first privately-funded lunar mission. We also research and develop a rock-climbing robot for exploration in challenging terrain such as lunar skylight.



Single Wheel Test
Apparatus



Space Exploration Rover
Test Bed "EX1"



Pre-Flight Model of
HAKUTO's Lunar Rovers



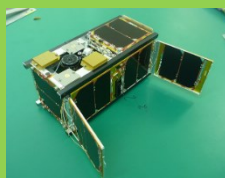
Rock-Climbing Robot for
Lunar Skylight Exploration

Micro-Satellite Engineering

To date, we have launched 7 micro-satellites and are developing four more. Our micro-satellite RISING-2 proved successful in best-in-class high-resolution spectral photography of the earth's surface. On campus, via our 2.4 meter parabolic antenna, every day we receive data from and send commands to on-orbit satellites.



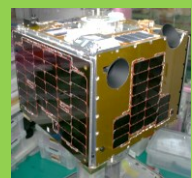
50kg-Class Micro-Satellite
"RISING-2"



CubeSat released
from ISS "RAIKO"



Parabolic Antenna of
Ground Station



Latest 50kg-Class
Micro-Satellite "RISESAT"