

ASTRODYNAMICS SYMPOSIUM (C1)
Attitude Dynamics (1) (8)Author: Prof.Dr. Mitsushige Oda
JAXA, JapanREX-J (ROBOT EXPERIMENT ON ISS/JEM) TO DEMONSTRATE ASTRONAUT SUPPORT
ROBOT - RESULT OF THE IN-ORBIT CHECK OUT OF THE REX-J MISSION**Abstract**

Needs of New type of space robots With increase of human's space utilization, satellite becomes larger and larger. Recently the International Space Station, the biggest orbiting space facility ever made by human beings. Nowadays, far more bigger orbiting facilities are being proposed such as the Space Solar Power System (SSPS). Size of the SSPS will be as big as a few kilo-meters by a few kilo-meters. Construction and maintenance will require EVA (Extra-Vehicular Activities) which astronauts work outside spacecraft. Astronauts staying long period in the EVA environment will have higher risks of receiving more and more radiations and micro debris. We believe that the astronauts' EVA should be replaced or supported by space robots which can move and work like astronauts. Such robots which we call the astrobot, need locomotion and manipulation capabilities.

Concept of new type of space robots The astrobot's manipulation capability is mostly realized by robotic hands. There are several concepts of astrobots' locomotion such as free flying or moving on tracks. We are developing a new locomotion system to be realized by an extendable robot arm and tethers. The proposed concept of the space locomotion has several advantages over the other ways. The advantages are such as (1) easy to have redundancy in the robot. (2) it is compact in size while it has many capabilities, (3) Size of the robot can be small while the locomotion area will be wide.

Introduction of the REX-J mission. Since the newly proposed space locomotion method is difficult to demonstrate in the gravity environment, we are to conduct the in-orbit technology demonstration experiment to verify the concept of the new robot. This mission is named REX-J and will be launched to the ISS using H-IIB/HTV this year. At the IAC conference, we are to conduct various experiments to verify our concepts of the space locomotions. Since the REX-J will be launched in July, results of the initial checkout of the REX-J mission will be introduced at the conference.