

Grateful for technology that never failed: Every single test went off without a hitch.

Mitsushige Oda
Professor
Department of Mechanical and Aerospace Engineering,
Graduate School of Engineering,
Tokyo Institute of Technology
Senior Guest Researcher
Robotics Research Group
Japan Aerospace Exploration Agency



At the International Space Station, where invaluable experiments that can only be done in outer space are conducted every day, there are never enough hands for all the work that needs to be done. Only a limited number of crew members can be aboard and they can only work for a limited time, so a robot is needed to stand in for the humans. The robot should have hands to do the work, legs to get it to the work site, and a brain to size up the situation and figure out what to do next. I created the REX-J project in order to develop a new type of robot that can support and assist astronauts. THK is in charge of developing a robotic hand for the project.

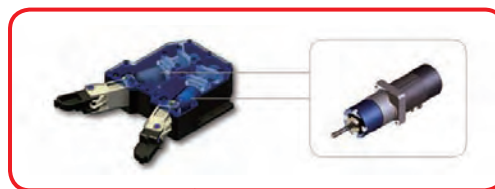
Whether you're out in space or here on earth, when you perform physical labor you have to be able to grip things with a certain amount of force. A hydraulic motor could provide plenty of gripping power, but in outer space we need to be able to attach different tools to the end of the robot's arm so it can perform a variety of tasks, and a hydraulic motor would never fit inside the arm. This is what drew our attention to THK's linear actuators.

Working under the auspices of JAXA's collaborative Aerospace Open Laboratory program, THK had already developed a linear actuator small enough to fit in the palm of your hand. They had also produced a prototype robotic hand incorporating a linear actuator, intended for commercial use, equipped with 30 kilograms' worth of gripping power—strong enough to crumple a beer can with ease.

To ensure that this robotic hand could be used in space, in the REX-J project it was tested to see if it could withstand the noise and vibration of a rocket launch and a thermal vacuum and radiation while in orbit. The robotic hand system is highly complex, but it passed all the

tests and operated without any problems when it arrived at the station. We were very pleased.

THK has been assisting us as a participant in the REX-J project since 2007. It's amazing that they came up with such a reliable robotic hand in such a short time. It happened because the THK employees involved were committed to creating something really good. In developing a robotic hand that has both aerospace and consumer applications and paving the way for its actual use, for the first time, in outer space, THK has played a very important role in our program. Their efforts are an inspiration to researchers involved in space exploration.



Robotic hand used at the International Space Station experiment module.