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High Expectations for the Widespread Use of Robots Made with THK's Globally Competitive Technology

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In the past, robot software was developed separately by each university and manufacturer, creating a major hurdle for newcomers in the field. Then, a movement centered around the Ministry of Economy, Trade and Industry arose to construct a software environment with standardized specifications and make that software available so that it could be freely used to accelerate robot development. For instance, with machine components being standardized under JIS, parts can be replaced even with those from a different manufacturer. The same principle applies to software. We at JSK are pursuing robot research capable of interoperability between the Japanese RTM[*1] and American ROS[*2] software environments.

Our collaboration with THK began with the development of the robot hand when we were participating in the DRC[*3] emergency-response robot challenge in the US in June 2015. For the DRC, we needed sturdy hands that could not only grasp various objects, but could also be attached to four legs to walk on. However, we only had one year to prepare. That was when we requested the help of THK, who had experience in and knowledge regarding robot hand development. There were many people at THK who had polished their skills by participating independently in numerous robotics competitions in Japan, and we were amazed by how easily they created their design. They also had highly experienced staff with a deep understanding of how the product would be used. The world of robotics evolves at a rapid pace. Organizations cannot keep up with the latest trends without people who can grasp the developments that come out every day. Their success depends on whether they have those people.

Even after the DRC, we have been doing joint research and development with THK, combining ROS and a large, life-sized robot constructed with **SEED Solutions**. The objective is to develop robots for research and education that can be used in experiments at university laboratories. There are many university laboratories in Japan that would like to use robots, but are not capable of making them. Because people unfamiliar with robots will be running experiments, it is crucial that the robots do not break easily. Operability is also important, as it enables robots to be brought to and used in many different locations. In the past, robots were largely unable to be disassembled, so it was very difficult to transport them. However, the robot with **SEED Solutions** has few wires and can be easily disassembled, so its transportability is a plus. The robot has actually fallen over and been treated somewhat roughly during experiments, but it never broke, and it has been easy to transport to competitions and exhibitions.

The creation and practical application of robots is difficult for a university laboratory to accomplish on its own, so we value our partnership with THK, which makes the actual products through our joint research. If other educational institutions see the fruits of our labor, they will definitely be asking for one of their own. We think it's very important for more young people to gain experience by actually touching and working with complex robots.

Grabbing an object and checking the color

*1 **RT-Middleware:** *Middleware for robots developed by the National Institute of Advanced Industrial Science and Technology.*
*2 **Robot Operating System:** *Robot software development platform managed by the Open Source Robotics Foundation.*
*3 **DARPA Robotics Challenge:** *Emergency-response robot competition held by the US Defense Advanced Research Projects Agency.*