High-Access Survey Robot begins work at nuclear power station

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High-Access Survey Robot.

Honda Motor and the National Institute of Advanced Industrial Science and Technology (AIST) have jointly developed a remotely controlled

survey robot that will conduct on-site surveys on the first floor of a nuclear reactor building at Fukushima Daiichi Nuclear Power Station of Tokyo Electric Power Company, Inc. (TEPCO) and help discern structures in high and narrow areas. This newly-developed survey robot will begin working inside the reactor building on June 18, 2013.

The survey robot was developed to support the actual needs based on information provided by TEPCO concerning conditions inside the reactor building. AIST developed the high-area accessible crawler work platform and Honda developed the survey-performing robot arm, which is installed on top of the platform.

In developing the survey-performing robot arm, Honda applied the following technologies which were developed originally for ASIMO, Honda's humanoid robot:

- Technologies that enable 3D display of structures surrounding the subject of the survey using a 3D point cloud (a group of vertices in a coordinated system)
- A control system that enables simultaneous control of multiple joints
- Control technologies which enable the robot arm to absorb the impact when it makes physical contact with surrounding structures

With these technologies, the newly developed robot arm can easily approach hard-to-see objects that are behind other objects in a structurally-complex environment in the reactor building by applying simultaneous control on multiple joints. When approaching the objects, the robot uses a zoom camera, laser range finder and dosimeter located at the tip of the arm to confirm detailed images, collect 3D data and identify the source of radiation.

For the high-area accessible crawler work platform applying a structure with a low center of gravity that enhanced the stability of the robot, AIST applied its various remote control technologies and ingeniously positioned camera, lights, laser marker and other devices, enabling it to be remotely controlled via 400-meter fiber-optic wired LAN and wireless LAN.

Moreover, Honda and AIST jointly developed an intuitive remote-control interface. Using this interface, the operator can control the robot from a remote location such as the Main Anti-earthquake Building and allow the robot to maneuver in dark and narrow places in the reactor building. Once the robot reaches a target spot, the mast can be extended to survey areas as high as seven meters without hitting the robot arm against surrounding structures.

While making progress in the development of ASIMO, a humanoid robot that can be helpful to people while co-existing with people in their daily lives, Honda also has been studying and researching the possibility of using humanoid robots at disaster sites. Following the development of this survey-performing robot arm, Honda will accelerate the development of humanoid robots also designed for use in response to disasters, including the prevention and mitigation of damage caused by a disaster.

In reaction to the Great East Japan Earthquake, AIST has been supporting recovery efforts in various forms including surveying the situation of underground seawater seepage in areas affected by the tsunami, leading the Kesennuma Kizuna Project, conducting and supporting radiation measurement and decontamination, and volume reduction of plant-based radioactive cesium. AIST will continue utilizing primarily its robotic technologies to contribute to the efforts to decommission the TEPCO Fukushima Daiichi Nuclear Power Station.

Provided by Honda