

# Topics Fukushima

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Participants visiting the Test Building

## Discussed “Remote-control Technology in Nuclear Facilities”

### International conference was held in Naraha Center for Remote Control Technology Development.

In responding to emergency at nuclear disasters and proceeding decommissioning of nuclear facilities, the development of remote-control technology such as robots working on behalf of humans is indispensable, because there are various kinds of danger such as radiation, harmful gas and flammable gas. Recently, it has become possible to measure in wide area with high precision by sensors, and computers are becoming high-performance and miniaturized. Under such background, robot technology is making remarkable progress. However, in order to apply such robot technology to nuclear facilities, there still remain many technological subjects to be solved. Furthermore, there are also operational challenges such as maintenance, training and usage. Since there are few similar cases regarding disaster response in addition to the decommissioning works of the Fukushima Daiichi Nuclear Power Station (1F), it would be important to closely exchange opinions and information with technological specialists and those who have knowledge on operation.

Under such circumstances, the Naraha Center for Remote Control Technology

Development (in Naraha Town, Fukushima Prefecture: hereafter referred to “Naraha Center”) has been holding international conferences which dealt with remote-control technology for nuclear facilities since FY2014. Based on the discussion in the conferences, the Naraha Center has been utilizing domestic and overseas knowledge. This time, the FY2019 4th Fukushima Research Conference (FRC\*) was held on October 23 (Wed) and 24 (Thu) at the Naraha Center. In this conference, 40 specialists on robots from France, Korea, USA and UK as well as Japan presented the research results and exchanged meaningful opinions.

### ■ **What is important through discussion?**

At the beginning of the conference, Mr. Yoichi Kashima, Deputy Director of Naraha Center presented opening remarks, expressing thanks to the audience that the conference was successfully held in spite of the influence of record heavy rain due to the Typhoon 19 and many researchers positively participated in the conference.



Participants listening to the keynote presentation.

As a keynote presentation, Professor Hajime Asama, the University of Tokyo, explained the progress of the 1F decommissioning so far. He also explained the history of the development of remote-control technology taking the following episode. —Unmanned heavy machinery system began to be developed triggered by the pyroclastic flow that occurred at the Mt. Fugen, Unzen in 1991.

After that, unmanned heavy machinery had been continuously used at the disaster sites, so it has become technology that can stably operate even at the time of disasters.— From this episode, Professor Asama stressed the importance to continuously use and maintain a technology. As the other topics, Professor Asama explained the difficulty in operating robots located far from the operator. As a technology to solve this problem, he presented the latest research examples concerning the ability of a robot in recognizing the surrounding situation, and the operability of robots. Furthermore, Professor Asama explained that the technology developed for the 1F decommissioning could be possibly applied to the other fields such as the developments of infrastructure and space. After the lecture, some audience asked a question as to how to promote the 1F decommissioning while cooperating with the researchers in the other fields. As to this question, there was a discussion that first of all it is important to widely communicate the current status of 1F decommissioning.

### ■ **Opinion exchange by domestic and overseas researchers through invited lectures and poster session**

As a first invited lecture, Mr. Philippe Kessler of the Groupe INTRA presented their

activities on preparation and operation of equipment for nuclear disaster response in France. He introduced equipment that is prepared in Groupe INTRA and the team preparing and operating the equipment. The audience was interested in the specification and training methods for robots, and the active discussion was exchanged. As a next invited lecture, Dr. Ji Sup Yoon, Korea Atomic Energy Research Institute (KAERI) presented the research and development of robots in KAERI. He introduced the recognition ability and operability of robots, which had been mentioned in the preliminary lecture by Professor Asama. Further, Dr. Ji Sup Yoon explained that there is a system to transfer the research results to industry in Korea, and some examples were presented. Both invited lecturers stressed the importance of the cooperation among research organizations in every country.



In the poster session, there were seven presentations mainly by domestic and overseas young researchers. The opinions were exchanged as to the topics in wide fields such as underwater robots, drones, technology to make three-dimensional data, and performance tests for robots. Along with the presentation, there was an exhibition of robot operation using simulation technology where the visitors

experienced to challenge the difficult robot driving (left photograph).

### **■ Visiting tour to Naraha Center and Fukushima Daiichi Nuclear Power Station**

In the visiting tour to Naraha Center, the participants first visited the VR\* room where people can experience the inside of the 1F in the virtual space. There, the visitors experienced the inside of the reactor building based on the three-dimensional data (right photograph).



In the tour to the “Test Building”, the visitors had a look around crawler-type robots, underwater robots and flight training of drones. They listened to the explanation about the size of the facility and the performance of robot (left photograph).



On the second day of the conference, the participants visited the facilities at the 1F site. There, the visitors listened to the explanation by the staff about the traces of damage by

the Tsunami and the activities on restoration. Some of the visitors expressed their impression, “It was valuable experiences for us to be able to visit the 1F decommissioning site for the preparation and operation of remote-control robots.”.

From now, the Naraha Center will continue to hold such international conferences to collect latest knowledge towards the 1F decommissioning, and actively promote such an exchange of opinions.

<Terminology>

\*FRC : Fukushima Research Conference

\*VR : Virtual Reality

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