

# JAEA News

Our group visited the Naraha Remote Technology Development Center, which was established by the Japan Atomic Energy Agency (JAEA) to conduct nuclear power-related research. At the Center, we covered the development, research, and training activities under way there in preparation for decommissioning.

## One step closer to the decommissioning of the reactor

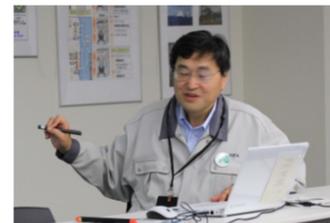


Operating the underwater robot was more difficult than we had imagined.

### 30 years of research in robotics

Responding to our interview questions was the Naraha Remote Technology Development Center's Director of Research and Development Shinji Kawatsuma (58), who has worked as a robotics engineer for more than 30 years at JAEA and its predecessor organization. Currently, he is working on the development of disaster response robots to be used in operations at the damaged nuclear plant.

About decommissioning, he said with obvious determination, "We are working at full speed and are confident of successfully completing the task. I believe everyone at JAEA and TEPCO feels the same. The decommissioning of the reactor will greatly contribute to the revitalization of Fukushima". (Tagami, Wariya)



Kawatsuma speaking passionately about decommissioning



With a 40m-high ceiling, the test building houses a full-scale replication of the reactor building.

## Rooting for robots dealing with nuclear power

### Visit to the Naraha Remote Technology Development Center

It was the first time any of us had visited the Center, which consists of the research management building and the test building. We were first shown around the research management building. There, we explored a life-sized mock-up of the damaged reactor through virtual reality. Even people who work at the nuclear plant are impressed with the high quality of the damaged reactor simulation. We experienced first-hand one of the procedures used during training, in which the operator has to insert an object through an opening in the stairs. Even a slight deviation will cause the object to hit the surrounding walls, triggering a warning alarm. Since actual conditions at the site allow no room for error, virtual reality

allows operators to train and prepare for work under safe conditions.

Set up in the same room is the robot simulator system. As part of training, the operator must guide a robot up the stairs inside Unit1 of the Fukushima Daiichi Nuclear Power Plant, which is faithfully recreated on a computer screen. It takes great skill to guide the robot smoothly up the stairs that are not only narrow but also bend at right angles.

Next, we visited the test building, where we were shown into a room of massive proportions with a ceiling 40 meters high. Here, we had the opportunity to operate the actual robots.

At the Naraha Remote Technology Development Center, JAEA puts

greater emphasis on training people to operate and manipulate robots, rather than the development of new ones. In all, four types of robots are developed and operated at the center: exploration, operation, underwater, and drone robots. With the exception of the drone robot, we were able to have a look at each of the robot types.

To simulate actual conditions in the plant, the water tank, which has a diameter of 4.5m and a depth of 5m, is filled with muddy saline water kept at a temperature of 60 degrees C. We got to try our hand at operating one of the underwater robots inside the tank. We also experienced piloting one of the exploration robots.

(Wariya, Kamiya, Mizuguchi)



This underwater robot is equipped with a camera and light, which it uses to move around and conduct inspections inside the tank.

### The surprising use of game controllers to operate the robots!

The state-of-the-art robots are operated using conventional game controllers

We were surprised to discover that the state-of-the-art robots were operated using conventional game controllers. Game controllers were introduced during the period right after the disaster when there was a

shortage of material. The fact that they are a familiar gadget and quite user-friendly makes such controllers ideal for use in situations requiring delicate maneuvering. (Sasaki, Suzuki)

## The joy of discovering debris

In July 2017, debris thought to be a piece of nuclear fuel that had melted and fallen off was discovered at Fukushima Daiichi Nuclear Power Plant by the exploration robot Mini-Manbo (little sunfish). Based on this discovery, the government was able to revise its Mid- and Long-Term Roadmap towards decommissioning. Although Kawatsuma is not directly involved in related operations, we asked him whether the authorities were happy about the discovery or if it was being treated with gravity.

After making it clear that he was expressing his personal opinion, he said, "The discovery of the debris was welcome news because, until now, no one had seen images of the melted uranium fuel, which made developing a workable strategy difficult. Although we still don't have a complete picture of the situation inside the reactor, at least this is a beginning and will be helpful in planning the next steps." His serious expression when he spoke was striking. (Tagami)

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