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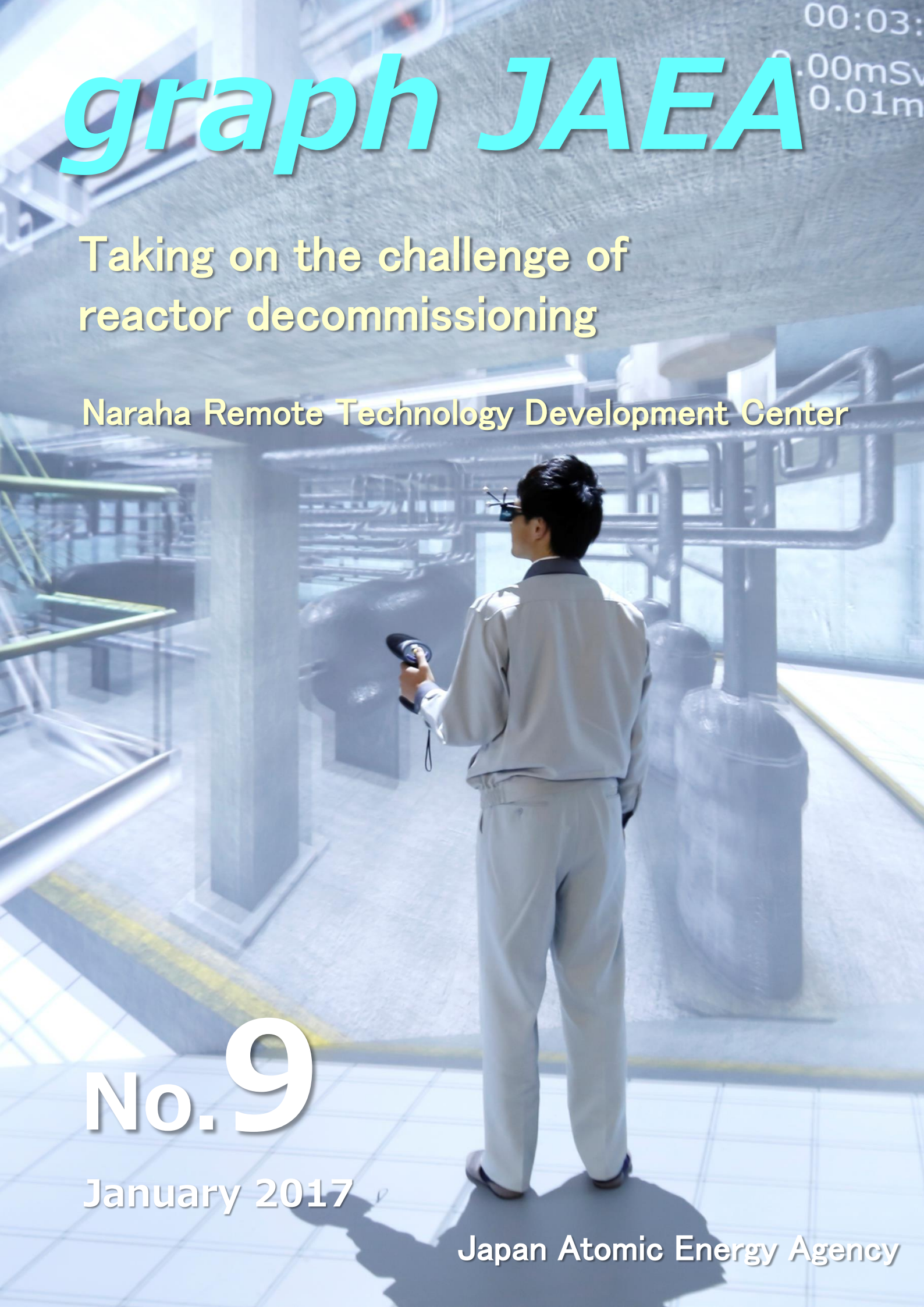
Taking on the challenge of reactor decommissioning

Naraha Remote Technology Development Center

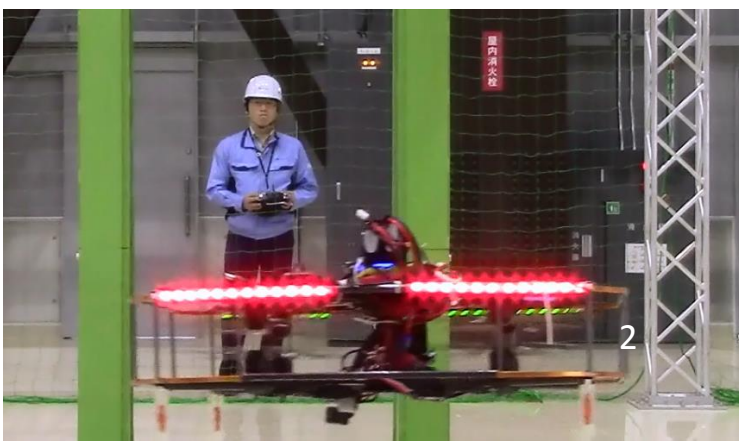


No.9

January 2017

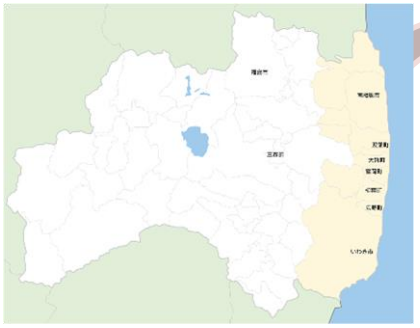
Japan Atomic Energy Agency

Taking on the challenge of reactor decommissioning



Naraha Remote Technology Development Center in Fukushima Prefecture

JAEA's site of operations in Fukushima Prefecture (as of January 2017)



Fukushima Environmental Safty Center
（Minamisoma City）
Covers work related to research and development into remote monitoring technologies.

Fukushima Office
（Fukushima City）
Coordinates JAEA activities in Fukushima Prefecture with the relevant Fukushima Prefecture authorities.

Fukushima Environmental Safty Center
（Miharu Town）
Conducts environmental impact studies and R&D into decontamination and reduction of radioactive waste to assist with environmental restoration efforts.

Okuma Analysis and Research Center
（Okuma Town） ※Under construction
Conducts analysis and research of Fukushima Daiichi NPS rubble, fuel debris and other objects.

Collaborative Laboratories for Advanced Decommissioning Science
Office for Tomioka Collaborative Laboratories

（Tomioka Town） ※Under construction
To ensure Fukushima Daiichi NPS decommissioning work progresses safely and according to schedule, experts from Japan and around the world conduct R&D and provide training to personnel.

Naraha Remote Technology Development Center
（Naraha Town）
Conducts development and testing of remote equipment (such as robots) required for progressing with Fukushima Daiichi NPS decommissioning work.

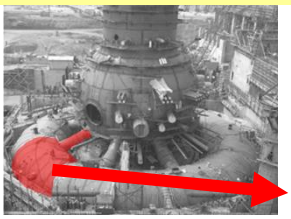
福島市
南相馬市
三春町
双葉町
大熊町
富岡町
楢葉町
広野町
いわき市

Fukushima Daiichi Nuclear Power Station,Tokyo Electric Power Company Holdings
(Fukushima Daiichi NPS)

Iwaki Office
（Iwaki City）
Provides office functions for JAEA activities in Fukushima Prefecture, and coordinates work with R&D facilities in the Hama-dōri region and Ibaraki district.

Three facilities at Naraha Remote Technology Development Center

Reactor primary containment vessel (PCV)

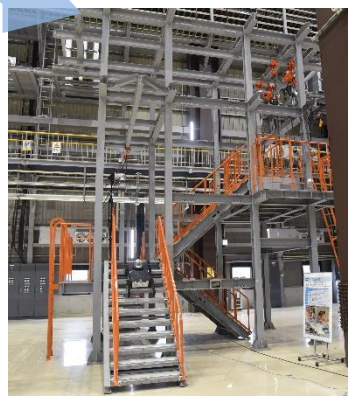


(same type reactor as Fukushima Daiichi NPS Unit 2)

1/8 sector mock-up

PCV lower-section repair technology testing area →p.6

Virtual reality system for training workers and remote device operators→p.5



Mock-up stairs

Motion capture system

Robot testing pool

Remote controlled device testing area→p.7～9

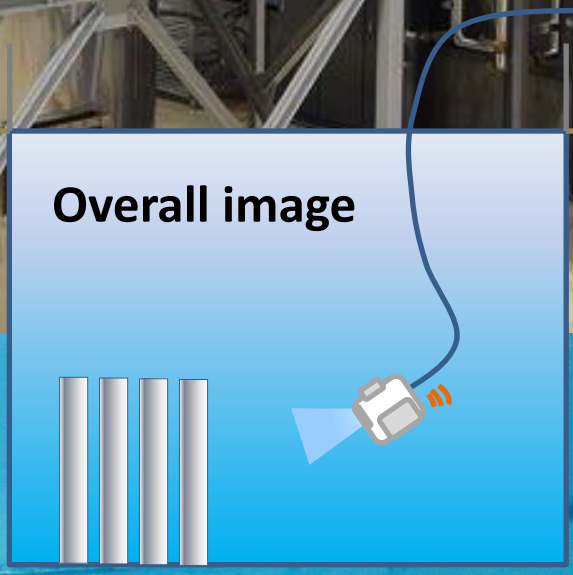
A 3D look into the reactor building

Generates a virtual 3D view within the reactor building, and is used for developing procedures for remote controlled devices as well as training of workers.

PCV lower-section Mock-up

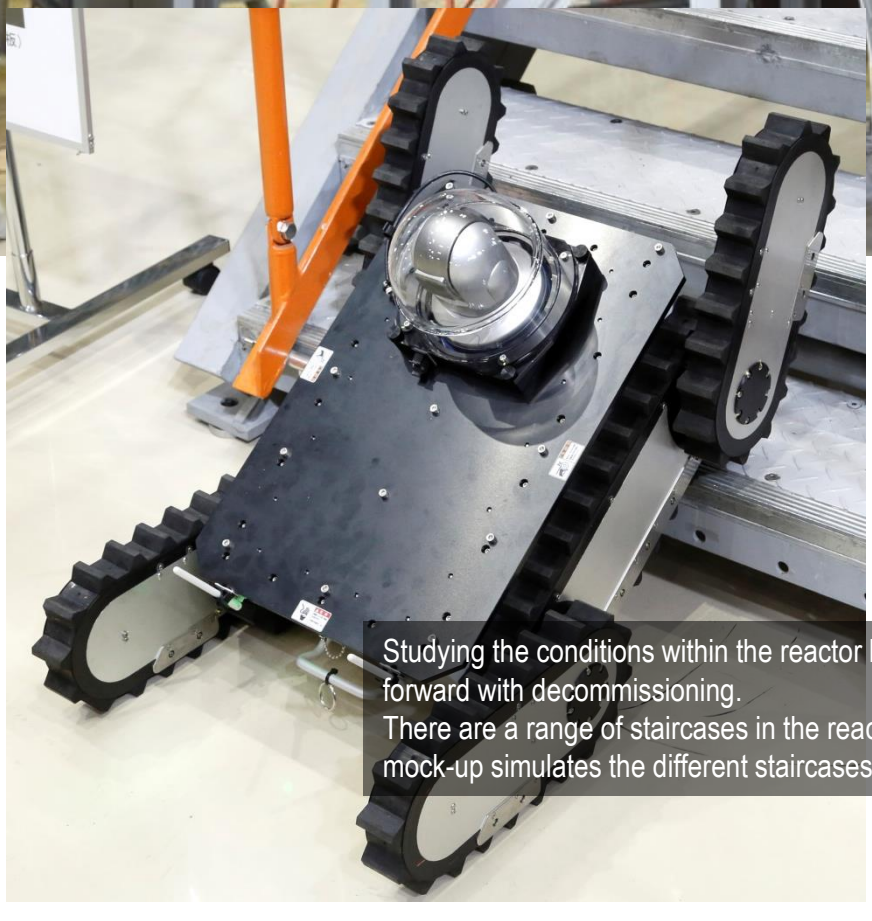
The International Research Institute for Nuclear Decommissioning (IRID) uses the mock-up reactor primary containment vessel (PCV) lower-section for full-scale testing, for demonstration experiments of repairs to leaking areas and technologies to combat water leakage.
Photo above shows the mock-up testing area during construction; photo below is an internal view (source: IRID)

Mock-up of underwater sections within the reactor building



Provides a mock-up of underwater sections within the reactor building with varying conditions such as temperature changes (from normal temperature to around 60℃), salt water and turbidity, to test the operation of underwater robots.

Reactor building
Mock-up stairs



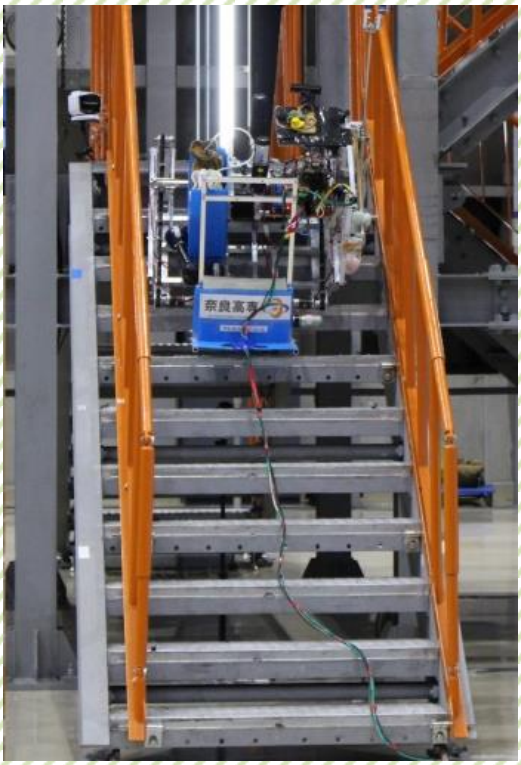
Studying the conditions within the reactor building is the first step required when moving forward with decommissioning.
There are a range of staircases in the reactor building with different widths and gradients. This mock-up simulates the different staircases as part of assessments for robotic devices.

Closely monitoring robot movements

The movement of robots such as drones are captured with 16 high-speed cameras and saved as digital data for use with quantitative motion analysis.

The First Creative Robot Contest for Decommissioning held for personnel training

The "First Creative Robot Contest for Decommissioning" was held at the Naraha Remote Technology Development Center by the Ministry of Education, Culture, Sports, Science and Technology, and the Decommissioning human resource development consortium on December 3, 2016. Students from 13 technical colleges around the country pitted their ideas and technical capabilities to achieve objectives such as carrying objects up stairs based on the actual conditions present within the actual reactor building: being unable to see the actual robot, or signals failing to reach the robot due to thick concrete walls.

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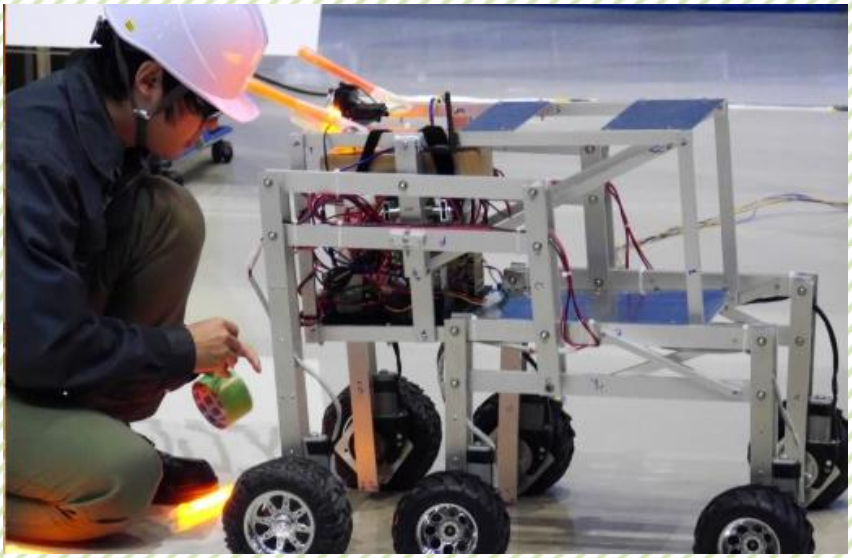

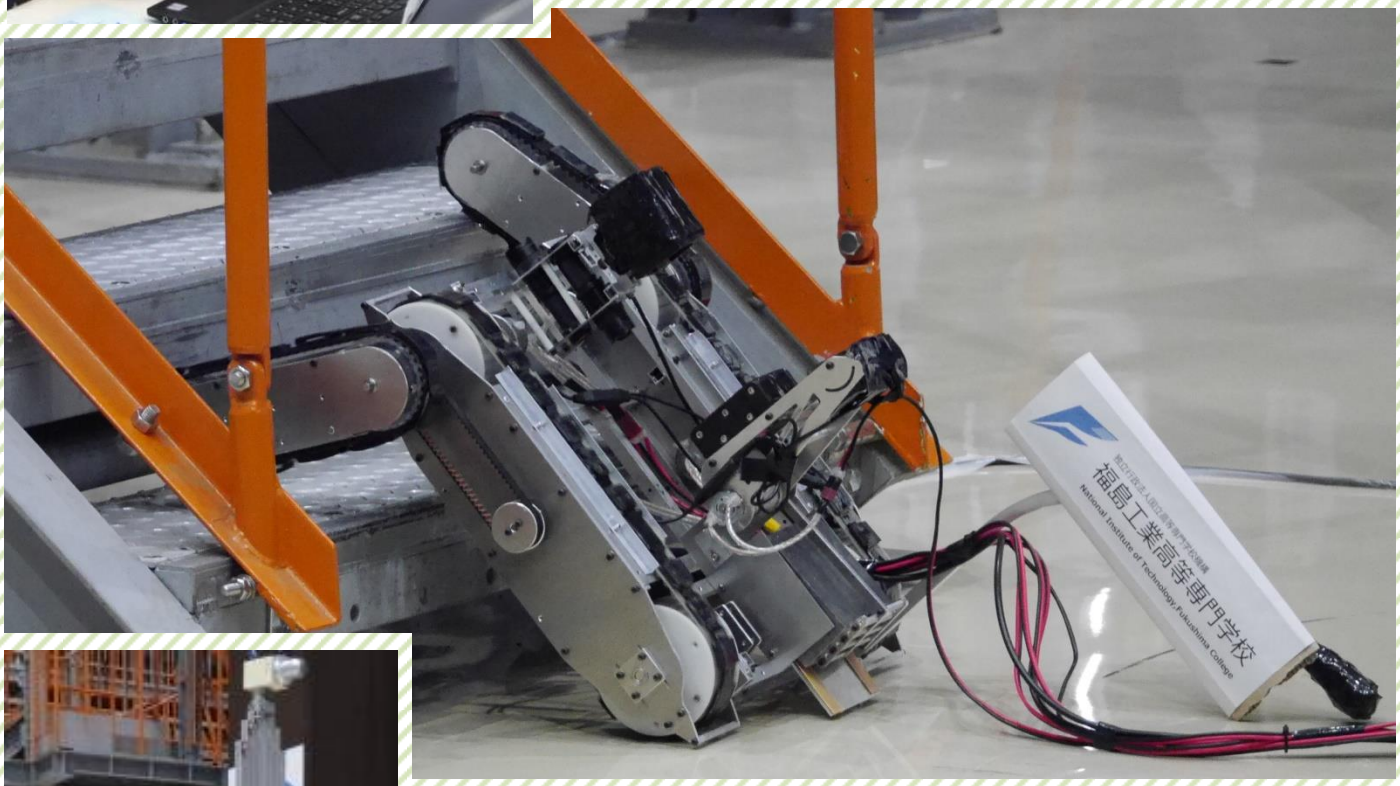
福島工業高等専門学校
National Institute of Technology, Fukushima College


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廃炉創造
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廃炉創造
ロボコン

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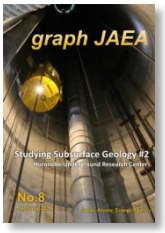
Naraha Remote Technology Development Center is a facility that conducts development and demonstration testing of remote controlled devices (such as robots) for decommissioning efforts for the Fukushima Daiichi NPS as well as disaster relief measures. Members of the general public are welcome to use the facilities, and applications for use can be sent via the homepage.
Naraha Remote Technology Development Center homepage: http://naraha.jaea.go.jp/en/

graph JAEA backnumber https://www.jaea.go.jp/english/publication/



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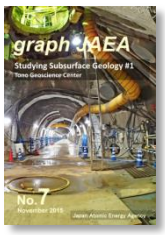

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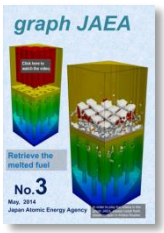

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