

Supplementary explanatory document for the 5th emergency recommendation

Tasks and plan of action that robotics must execute in order to contribute to recovery from the Great East Japan Earthquake

1. Regarding the handling of the accident of the Fukushima Daiichi Nuclear Power Plant

(1) Operation period: from immediately after accident until the completion of a cold shutdown of the damaged reactors

Tasks: To reduce the exposure of the reactor repair workers to radiation and to improve the work efficiency, effectively use various domestic and international robot technologies for the monitoring of the radiological dosage in each location of the plant, photographing the images, sampling, operating equipment, and promptly and flexibly assisting in other various handling operations .

Actions: A joint team shall be organized immediately comprised of the electric power company , fire department, Japan Self-Defense Forces, the ministries and agencies concerned, comprehensive disaster prevention teams of robot specialists, nuclear power and radiation specialists, and a collaborative network (see Note 1) for support comprised of domestic and overseas universities, research institutions, and companies involved in robots (see Note 2) under the direction of the central government and with the cooperation of robot-related academic societies and the Science Council of Japan. Moreover, according to the situation on the field, prompt and flexible planning, provision, and development of robot technology shall be carried out, and information disclosed to the Japanese people and international communities that is fair and objective. The central government shall grant to the joint team the necessary authority and budget.

Reasons: The situation of the field exceeds far beyond that envisioned, and changes from moment to moment due to the measures implemented and transition of the plant conditions, which makes the necessary operations change as well. None of the single robots currently available can deal with this situation. Moreover, there are many robots and technologies available within Japan that can be effectively used with a small amount of modification work (see Note 3). A system that can apply, integrate, and modify these flexibly according to the field situation is essential.

Note 1: A hyper-academic organization, “Robotics Task Force to Deal with Disaster” has already been organized and has started work. Reference: http://www.rsj.or.jp/shinsai/RoboticsTF_1.pdf

Note 2: The Robotics Society of Japan, Robotics and Mechatronics Division of the Japan Society of Mechanical Engineers, System Integration Division of the Society of Instrument and Control Engineers, IEEE Robotics and Automation Society Japan Chapter, International Federation for the Promotion of Mechanism and Machine Science, Japan Council (Japanese Council of IFToMM), etc.

Note 3: Refer to “Technology of Anti-Disaster Robotics” by “Robotics Task Force to Deal with Disasters”: <http://roboticstaskforce.wordpress.com/>

(2) Operation period: from the completion of a cold shutdown of the damaged reactors – the completion of the decommissioning

Tasks: Reduction of the radiation exposure of the workers in the decommissioning operation of the damaged nuclear reactors, improvement of the work efficiency, and complete automation of some of the long-term operations (use of the autonomous intelligent robot etc.)

Actions: Making the above system into a specialized agency suited for the handling for longer periods, promoting systematically the development of a new robot capable of medium to long-term handling in addition to the immediate work onsite, planned development of a new operation system etc.

(3) Operation period: until the completion of the decontamination of the peripheral areas

Tasks: Thorough decontamination of the peripheral areas and continuous high spatial resolution monitoring of the radiation dose for that purpose

Actions: In addition to the plans as described above (2), the central government shall integrate and utilize various methods suggested from within and outside Japan and monitor continuously with patrolling autonomous mobile robots, and aim to realize a complete automation of certain aspects of the decontamination work, by autonomous working robots working in coordination with the monitoring.

2. Operation of the nuclear power plant and other high risk facilities and the fundamental reexamination and improvement of the safety system

Tasks: Establishment of the system that minimizes the damage regardless of the situation

Measures: For the strengthening of the safety functions along with immediate response to unexpected situations, a system design that presupposes the use of robots in various parts of the plant shall be carried out. Through the introduction of general purpose and autonomous robots, the aim is to achieve responsiveness to unexpected situations

and safety maintenance after system function damage. The central government shall establish a system that facilitates close cooperation between the site, related companies, nuclear power plant specialists, and robot scientists, and that conducts operations, tests, and research and development continuously for a long time. The societies concerned and the Science Council of Japan will circulate relevant information while promoting cross-field cooperation.

3. Re-inspection and improvement of the disaster management support technology

Tasks: Support of the victims, proposal of effective technologies for the restoration, strengthening of systems utilizing disaster management support technology in the future

Actions: Robot scientists shall cooperate with disaster prevention related institutions, analyze the disaster situation and restoration measures, provide effective technologies suited to the current situation, analyze technical and systematic issues to be addressed for effective robot use in the future, and provide solutions. Especially, the central government shall maintain and improve disaster management support robots and establish organizations or systems that constitutively conduct training in robot operation. The Science Council of Japan will support the necessary collaboration between universities, research institutions, local governments, and business enterprises as well as conducting fair and objective information disclosure to the Japanese people and to international communities.

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