

SUMMARY OF VOLUNTARY COMMITMENT OF ROBOTICS

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Robotics is becoming a powerful tool for disaster risk reduction of preparedness, response and recovery after its history of 50 years.

In order to fully support the Post-2015 Framework of Action, an international committee of robotics will be established in cooperation with all the relevant stakeholders including but not limited to public bodies, local communities, disaster response teams, researchers, and industries as well as various projects worldwide of R&D and social dissemination, under the umbrella of the IEEE Robotics and Automation Society.

The committee will define the top goals and metrics for the contribution of robotics to the risk reduction. Sub-goals and actions will be identified with considering disaster risk reduction plans, operational regulations, laws, interoperability, missing capabilities, technical readiness levels and commercialization. The committee will be open to discuss further related issues with the appropriate bodies and organization to derive the necessary actions to be taken, and to serve as an advisory body to local, national and international groups and governments.

The recent evolution of wide variety of robotics and component technologies is rapidly enhancing their applicable areas and tasks. For example, unmanned aerial vehicles quickly surveyed wide disaster areas, remotely-operated underwater vehicles repaired leakage of subsea oil plants, and unmanned ground vehicles worked in contaminated areas of damaged nuclear power plants. 20 years ago, unmanned aerial vehicles could gather information from sky. At present, they can approach to structures of interest in the neighborhood providing detailed visual inspection for maintenance, and can enter damaged buildings through narrow entrance for searching victims. Autonomy and intelligence of unmanned ground vehicles can reduce responders' load, and integrate gathered information with measured 3D information into GIS at present as a powerful support for human decision. For this reason, specialists predict that robotics will become an essential tool for preparedness, response and recovery in ten years. Promotion of implementation of robotics with ICT is highly demanded for supporting the Post-2015 Framework of Action by enriching the global risk awareness with local information in detail.

The contribution of robotics is mainly 1) for gathering information and performing tasks

that human and conventional equipment cannot (e.g. search and rescue at inaccessible places and inspection in highly contaminated areas), 2) for reducing risks (e.g. substitution of workers for avoiding potential damage by explosion, toxic agents and radiation, and/or 3) for reducing time and cost (e.g. quick surveillance of potentially damaged facilities at high places without scaffolds).

The record of robot applications to disasters in the last decade shows gaps that have to be filled in order to materialize more effective full usage of robotic solutions. The following issues have to be discussed and solved at least.

At first, technologies need more improvement and evolution for the required tasks at disasters with higher technology readiness levels. Particularly, performance of mobility, stationary, sensing, recognition, remote situation awareness, wired and wireless communication, human interface, intelligent autonomy, task execution performance, and compliance under/with disaster conditions and environments including explosion proof have to be sufficient in the systems consisting of robots, human and organizations. International collaboration of academic societies, research centers, universities, test facilities, robot solution contests, robot training curriculums have to be promoted to make them ready.

Secondly, social barriers to deployment and application of robots have to be lowered. Regulations and systems have to be well adjusted for this new innovation, particularly for the acts for disaster countermeasure, road traffic, maintenance of infrastructure and industrial facilities, performance test methods for procurement, and insurance for predicted risks with Good Samaritan laws. Safety standards, wireless frequency allocation and component interfaces have to be common and standardized internationally for exchangeability and reusability of systems to foster smooth international cooperation in mega-scale disasters.

The united efforts of all the relevant stakeholders in the newly established international committee will resolve the above technical and social issues to fill gaps for the full use of this new technology in the future.