Breakout Session #1 IT GROUP 2 – ROBOTICS (Room 546)
Co-led by Kazuya Yoshida and Mark Haley

1. Where and how were robots deployed after the earthquakes in New Zealand and Japan?
   - New Zealand
   - Japan
   - Types of robots: land, aerial, under water
   - Missions
2. Lessons learned from these deployments
3. What are the issues of intensive research for next possible disasters?
4. What are possible mechanisms to share the data/experience, benchmark technologies, and encourage collaborations?

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1. Where and how were robots deployed after the earthquakes in New Zealand and Japan?
   - New Zealand

   There was no robot used.

   - Japan

   a) Land
   Inspection of half-collapsed buildings
   Fukushima Daiichi nuclear plant (Unmanned construction machines, QinetiQ, Packbot and Quince)

   b) Under Water
   Port inspection (Mimami Sanriku etc.)
   - Victim recovery, environmental remediation
   - where it was difficult by human divers
   - ROV (not autonomous)

   c) Aerial
   Fukushima Daiichi (Honeywell T-hawk)
   - Structural inspection and radiological measurement

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2. Lessons learned

- Mobility, sensing capability and human interface were important.
- Accessibility was limited
  (permission, complexity of environment, a priori knowledge was only partial.)
- Lack of trust on Autonomy
- Victim recovery was very difficult after the Tsunami attack.
  (Fast responses were conducted by human rescue teams.)

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3. What are the issues of intensive research for next possible disasters?

Mobility, sensing, mapping, operation, autonomy

Cooperation of multiple/heterogeneous robots and organizations

Human robot interaction

Communication

Training and exercise

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4. What are possible mechanisms to share the data/experience, benchmark technologies, and encourage collaborations?

Existing

- Academic society (IEEE Robotics and Automation Society, Technical Committee on Safety Security Rescue Robotics)
  Academic conferences (ICIUS, FSR….), workshops, tutorials…
- RoboCupRescue

Proposed

- Disaster Challenge (under the leadership of NSF/JST)
  cf. Ground Challenge, Urban Challenge
- Data sharing standardization and archives
- Workshops with practitioners, civil disaster researchers…