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
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.)

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
Breakout Session #1 IT GROUP 2 – ROBOTICS (Room 546)

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

Existing
  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...