

The Need for Response Robot Standards

Response robot systems are called into service on a daily basis across the country. Larger scale incidents such as major hurricanes and earthquake responses - or the Times Square bombing attempt - are more visible examples of the use of robotic systems. Response robot performance standards and test methods were not in place following the events of 2001. The President's 2002 budget included a priority to fund "new and better technologies" for emergency responders. Congress then followed suit in 2004 with language directing the Department to develop criteria for certification of urban search and rescue robots.



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Averting Putting First Responders in Life Threatening Conditions

The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) engaged in a multi-year partnership with Federal Emergency Management Agency (FEMA) Urban Search and Rescue (USAR) Task Forces, the DHS National Protection and Programs Directorate Office of Bombing Prevention, the National Institute of Standards and Technology and ASTM International to develop a comprehensive suite of standard test methods and associated performance metrics to quantify key capabilities of emergency response robots. This includes robots intended for urban search and rescue, bomb squads, and other civilian response applications. These test methods, which are being published through ASTM International, address responder-defined requirements for robot mobility, manipulation, sensors, energy, communication, mapping, human-robot interfaces, logistics and safety. They are intended for remotely operated ground vehicles, aquatic vehicles, and small unmanned aerial vehicles (under 2 kg/5 lbs) for urban environments.

To date, five test methods have been formally published through ASTM International and an additional 24 test methods are in development to address the following robotic characteristics:

- Mobility
- Manipulation
- Sensors
- Energy
- Communication
- Human-Robot Interface
- Logistics
- Safety

Robots Employed at "Disaster City"

In the past year, the largest Response Robot Evaluation Exercise event to date was held at the responder training facility called "Disaster City," at College Station, TX. Over 200 people attended, including 30 first responders from FEMA USAR teams, bomb squad technicians, other Federal, state and local agencies, and over 25 robot researchers and developers. The robots practiced using the sample test methods developed by S&T and the event allowed for the capture of performance data to establish the "repeatability" and "reproducibility" required for standards development. When the standards are released, it will enable first responder agencies to procure robotic systems that have performed to these test methods.



The robot performance data information provided through this program provides emergency responders with the tools to:

- Compare different robot models,
- Make purchasing decisions, and



DHS Science and Technology Directorate

S&T Standards & Test Methods for Urban Search and Rescue (USAR) & Bomb Robots

- Better understand deployment capabilities.



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To learn more about Standards & Test Methods for Urban Search and Rescue (USAR) & Bomb Robots, contact Philip Mattson, Deputy Director, DHS S&T TES/Standards Branch at Philip.Mattson@hq.dhs.gov

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