ASTM E54.08.01 Initial Meeting
December 5, 2005
ASTM Headquarters, West Conshohocken, PA

This meeting was the first for the newly-formed task group on performance standards for robots applied to Urban Search and Rescue, within ASTM Committee E54 on Homeland Security Applications, under the jurisdiction of Subcommittee E54.08 on Operational Equipment. This standards body was selected by the Department of Homeland Security to develop performance test methods and usage guidance for urban search and rescue robots. The standardization effort is building on extensive preparatory requirements development by the National Institute of Standards and Technology and the Department of Homeland Security Emergency Preparedness and Response Directorate's Federal Emergency Management Agency with support from the DHS Science and Technology Standards Portfolio. The objectives of the meeting were to bring industry experts together, identify specific standards needs, prioritize standards activities, assign working group leaders, and initiate standards development.

Close to fifty participants, including users, producers, government agencies, and academics attended the meeting[1]. Phil Mattson, Chair of the E54.08 subcommittee and Pat Picariello, Director, Developmental Operations at ASTM led the meeting. Elena Messina, of the National Institute of Standards and Technology (NIST), was elected Chair of the E54.08.01 Task Group. During the morning session, several presentations introduced the project to the audience and a scope statement was produced for the overall effort. In the afternoon, working groups split off into breakouts to begin generating scope statements for the individual working groups and near-term tasks. The meeting adjourned early due to impending snow.

Presentations in the morning included the following:
Overview Of Astm & The Standards Development Process by Pat Picariello
Background on Request for Activity by Phil Mattson (DHS perspective) and Elena Messina
Tutorial on Conformity Assessment by Gordon Gillerman of NIST
Example of a Standard Test Method by Adam Jacoff (NIST) and Gordon Gillerman

As a group, we drafted a statement of the scope for E54.08.01. The scope text is:

The scope of the task group is to specify a set of performance requirements, test methods, and associated standards for robot systems used in urban search and rescue applications. Emergency responders, pertinent technology developers, and interested government officials have defined these standards to provide an objective measure of robot performance for representative urban search and rescue applications. Results from such performance tests can be considered against specific purchaser/user performance objectives for envisioned applications.

- These standards specify a variety of performance criteria and associated test methods for urban search and rescue robots. Several representative applications of robots used in urban search and rescue have been considered in defining these test methods. These representative applications, although comprehensive, are certainly not complete.

- The standards developed by this task group will provide a means to ensure that a robot meets the performance requirements stated. Successful completion of the tests should not be construed as an ability to successfully operate in environments other than those specifically identified in the test methods.

- These standards do not address special applications outside the stated requirements, such as certain extreme weather conditions for example. To ensure performance for such applications, additional requirements need to be established along with associated standards.

Materials distributed to attendees included an article on conformity assessment by Gordon Gillerman, a copy of the NIST Special Report "Autonomy Levels for Unmanned Systems (ALFUS) Framework Volume I:

[1] See Appendix A

Terminology Version 1.1," as well as paper and electronic copies of the initial statement of requirements for urban search and rescue robots. This last document provides the foundation for the standards work, detailing over 100 initial performance requirements and over a dozen deployment situations or possible robot types. The terminology document defines several terms that the unmanned systems community within the government has been using and should form the basis for our terminology definitions.

In Pat's overview of the ASTM processes, he presented a variety of tools available to the task and working groups to facilitate standards development. ASTM has numerous templates and reference materials online. They also provide support for web-based teleconferences and provide web space for posting documents. Reviewing of draft standards and balloting is done electronically. We will try to leverage the use of cyber-space as much as possible to expedite this process and enable ongoing meetings and discussions throughout the coming months.

Gordon Gillerman gave an overview of the various considerations when designing a conformity assessment approach program. He recommended that for this particular effort, a "supplier's declaration of conformity" approach be adopted. This means that the producers state that their products have been tested according to the standard test methods produced by ASTM.

In Elena's introduction, she presented the DHS need to have standards in place prior to providing funding of any sort for procurement of robots. Therefore, she urged the participants to focus on near-term, achievable or low-hanging fruit for the initial wave of standards, which are targeted to be ready in about a year. The output of this standards effort will be as set of test methods, along with guidance documents that will reference the test methods. This would be analogous to a "Consumer's Report" listing of results of their testing procedures for a car or a television: you buy according to your own needs and criteria and trust that the test results are reliable. Depending on a particular department's application and deployment needs, the guides will suggest what ranges of performance results the robots should have. She also proposed an initial set of working groups, which followed the general categorization from the initial requirements set. The additional categories of safety and terminology were added during this meeting. In the afternoon, the participants attended breakout sessions at which working group leaders were selected and initial scope statements and task lists were generated.

The working groups and leaders were designated as:

- Mobility + Operating Environment, including Electromagnetic compatibility – Bill McBride, of Southwest Research Institute
- Communications – Chris Holloway and Kate Remley, of NIST
- Sensors – John Evans, of John M. Evans LLC
- Human-System Interaction – Jean Scholtz of NIST
- Terminology – Hui-Min Huang of NIST
- Logistics – TBD
- Safety – TBD
- Power – TBD

Participants expressed an interest in being able to contribute to more than one working group's initial breakout. The need for close collaboration between certain working groups (for example sensors and communications) was also noted. Therefore, we combined working groups for the purpose of the initial meeting. Dependencies between working groups are to be noted and addressed by the working group chairs as they emerge. The breakouts were: (I) Communications and Sensors, (2) Mobility, Operating Environment, and (III) Human-System Interaction.

After brief breakouts, initial scope statements for each group were reported, along with some initial dependencies on other working groups, near-term tasks, and initial sets of relevant standards to reference. The working groups were given until December 19th to submit their final scope statements, timeline, and starting set of referenceable standards, enabling others within this task group to comment. Use of existing standards where applicable is encouraged. Due to limited time, prioritization of the top 2 or 3 robot deployment categories did not occur. This is a high-priority action item for the near-term.

Action items:

Working Group Chairs: by December 19th, submit to Elena Messina
- working group scope statement
- initial set of items to develop standard test methods (for Wave 1)
- timeline for work
- existing standards to reference (initial candidates)
- dependencies on other working groups
- terminology items to be defined
- additional participants for working group

Task Group Chair: ASAP
- identify working group chairs for safety, power, and logistics
- coordinate prioritization of which will be top robot deployment categories/types
- continue outreach to other participants, especially manufacturers

Upcoming Relevant Meetings in 2006:

February 8: ASTM Committee Week, Phoenix. E54.08.01 TG on US&R Robots will meet with Committee E54 at the venue described below. The full E54 meeting will run from Monday, Feb. 6 through Wednesday, Feb. 8th. The meeting of the E54.08.01 TG will take place during the E54.08 Subcommittee, Wednesday, Feb. 8, 9:00 AM to 11:30 AM.

> Note to task group members: It is probably too early in the process to need heavy participation at this meeting. Unless you have other reasons for attending the ASTM Committee Week, it is not necessary for you to plan on coming to his.

February 10-11th – Proposed Responders meet Robots in the Snow Workshop, Salt Lake City. We would like to set up an exercise similar to the one held at the FEMA Nevada Training Facility, where responders operate a variety of robots through test artifacts and relevant scenarios at a Utah training facility. This is still tentative. We would encourage participation by all our FEMA Task Force Advisors, robot manufacturers and researchers.

February 12th – American Nuclear Society Workshop on ''Urban Search and Rescue Performance Measures for Intelligent Systems," Salt Lake City. At this workshop, we plan to present draft test methods and other approaches for evaluating capabilities of robots applied to US&R. If we hold the Utah training facility exercise Feb 10th and 11th, we will present the results of this effort.

August 21-24 – Joint Performance Metrics for Intelligent Systems and IEEE Safety, Security, and Rescue Robots Conferences, Gaithersburg, MD. This will culminate with demonstrations of test methods and robot exercises at NIST or nearby FEMA facilities.

Meetings of Working Groups – on an ongoing basis in cyber-space. We expect that the working group chairs will make use of the ASTM web-based facilities as much as possible to disseminate information and conduct meetings. Face-to-face meeting opportunities occur in February in Salt Lake City and in August in Gaithersburg.

Appendix A: Registered Participants in E54.08.01 Meeting December 5, 2005

Phillip	Adsit	AFRL/MLQF
James	Bastan	New Jersey Task Force 1
Joseph	Bayer	Nevada Automotive Test Center
John	Blitch	Blitz Solutions
Brian	Burney	Vortex HC
John	Canning	Naval Surface Warfare Center Dahlgren Division, G80
Michael	Conditt	Lincoln Fire and Rescue
Joel	Criswell	Northrop Grumman Corporation/Remotec
John	Evans	John M Evans LLC
Walter	Fell	NJ-TF I
MaryAnne	Fields	Army Research Laboratory
Bob	Fuchs	Automatika, Inc.
Vito	Gambino	Northrop Grumman Corporation/Remotec
Dave	Gilliam	Nevada Automotive Test Center
Gordon	Gillerman	NIST
Christopher	Holloway	NIST
George	Hough	NY-TF1
Hui	Huang	NIST
Mark	Hundley	VA-TF2
Jim	Ingledue	VA TF – 2, FEMA Urban Search & Rescue Team
Adam	Jacoff	NIST
Simon	Julier	AIT/NRL
Dan	Kawamoto	FEMA USAR Colorado Task Force 1
Glenn	Keller	Allentown Fire Department
Dale	King	Technical Support Working Group
Richard	Leap	San Diego Fire-Rescue Department; CA-TF8 US&R Task Force
Alan	Lytle	NIST
Phil	Mattson	NIST
Bill	McBride	Southwest Research Institute
Elena	Messina	NIST
Randy	Miller	NY-TF1
Bill	Monahan	CA-TF2
Roger	Moulder	James Gregory Associates
Bruce	Naslund	MA-TF1
Marty	Nevil	PA-TF1
Roger	Quinn	Case Western Reserve University
Rory	Rehbeck	CA-TF2
Casandra	Robinson	Savannah River National Laboratory
Tom	Rosenbury	Sperient Corp.
Tom	Ryden	iRobot Corporation
Hagen	Schempf	Automatika, Inc.
Jean	Scholtz	NIST
Bill	Sigafoos	Va. Task Force 2, Norfolk Fire Rescue
Ananthakrishnan	Surianarayanan	Pathway Technologies, Inc.
Satoshi	Tadokoro	International Rescue System Institute, Tokyo University

David	Veney	Renaissance Assoc, Inc
Richard	Voyles	University of Minnesota
Mark	Yim	University of Pennsylvania
Pat	Picariello	ASTM International