



**NIST**  
National Institute of Standards and Technology



# Quantitative Assessment of Robot-Generated Maps

Organizers: Chris Scrapper, Raj Madhavan, and Steve Balakirsky

## A Special Session at the Performance Metrics for Intelligent Systems Workshop

August 19—21, 2008

[http://www.isd.mel.nist.gov/PerMIS\\_2008/](http://www.isd.mel.nist.gov/PerMIS_2008/)

### Call for Papers

PerMIS'08 will be the eighth in the series that started in 2000, targeted at defining measures and methodologies of evaluating performance of intelligent systems. The workshop has proved to be an excellent forum for discussions and partnerships, dissemination of ideas, and future collaborations in an informal setting. Attendees usually include researchers, graduate students, practitioners from industry, academia, and government agencies.

As mobile robots become more ubiquitous, their utility will rely on the ability of the robotic system to safely operate in dynamic and unstructured environments. These systems will need to explore new environments, generate maps that identify obstacles and hazards through exploration, and use these maps to safely navigate to any location. They will also need the ability to intelligently adapt to dynamic changes in the environment. Central to the realization of this vision is the robot's ability to develop a stable navigation solution, which we define as *"the ability of the system to sense the environment, create internal representations of its environment, and estimate pose (where pose consists of position and orientation) with respect to a fixed coordinate frame"*.

This special session is dedicated to the development of the tools and methodologies that will facilitate the quantitative assessment of navigation solutions against user-defined requirements, with special focus on the metric quality of robot-generated maps. Developing tools and objective evaluation methodologies will enable the inter-comparison of results and the rapid exchange of results thereby expediting the transfer of technology and the means to evaluate utility and benefit of different navigation solutions in a variety of environmental scenarios.

The emphasis of this special session will be on how to assess the quality of robot-generated maps and the development of standardized test methods that target specific aspects of the navigation solutions. Determining what environmental situations are problematic for specific algorithms will assist us in developing elemental testing scenarios and enable better understanding of how these errors impact the overall performance of the system. In turn, these testing scenarios will foster the development of more robust algorithms that have in-built mechanisms for overcoming these errors.

### Submission Information

Prospective authors are requested to submit a draft paper (max. 8 pages) or an extended abstract (1-2 pages) for review. All submissions must be written in English, starting with a succinct statement of the problem, the results achieved, their significance, and a comparison with previous work. Papers are to be submitted directly to the organizers using the specified templates at [www.isd.mel.nist.gov/PerMIS\\_2008/submission.htm/](http://www.isd.mel.nist.gov/PerMIS_2008/submission.htm/).

### Important Dates

Submission of extended abstracts/full papers	June 25, 2008
Notification of acceptance	July 11, 2008
Final papers due	July 25, 2008

### Speakers

TBD

### Related Events

#### **Performance Evaluation of Navigation Solutions for Mobile Robots**

(Organizers: Raj Madhavan, Chris Scrapper, and Alex Kleiner) Workshop to be held at the Robotics: Science and Systems 2008 Conference on July 28<sup>th</sup>. This workshop is dedicated to bringing together an amorphous research community to define standardized methods for the quantitative evaluation of navigation solutions and robot-generated maps. The resulting papers and presentations will be made available via <http://kaspar.informatik.uni-freiburg.de/~rss/>.

#### **Self-Localization & Mapping Camp**

is a robotic exercise that will be held at NIST late-2008 that will bring together researchers and manufacturers of robotics technologies to assess quality of robot-generated maps and measure the performance of navigation solutions in a variety of testing scenarios.

### Location

Washington, D.C. (The workshop will be held at NIST, Gaithersburg MD 20899)

### Contact Details

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