

# Special Issue: Simulation Methodologies For Complex Urban Environments

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This special issue was developed from select papers originally presented at the Interservice/Industry Training, Simulation, and Education Conference (IITSEC'04). The papers were rewritten in article form and reviewed for publication in *JDMS* in accordance with its normal review procedure for special issues. The resulting articles showcase the power of modeling and simulation in the training and education community. Even more importantly, the special issue accentuates the universality of challenges faced by modeling and simulation professionals across the defense M&S domains.

The first paper, "Adapting to Urban Warfare," by Ceranowicz and Torpey, discusses the Urban Resolve experiments being conducted by the U.S. Joint Forces Command J9 Directorate and the Joint Advanced Warfighting Program at IDA. The experiments are focused on evaluating whether future sensors will provide a significantly higher degree of situational awareness in urban operations. The authors explain how the dense environment characteristics of urban areas pose significant challenges for current combat simulations and provide a comprehensive look at the issues associated with adapting simulations for urban warfare.

In the next paper, "Advanced Message Routing for Scalable Distributed Simulations," Gottschalk, Amburn, and Davis describe the communications infrastructure used to run the large-scale entity simulations supporting the same set of Urban Resolve experiments. To achieve truly large-scale (over 1M) clutter entities, their work extends the RTI-s software route infrastructure to accommodate a more general router topology.

The third paper, "The Future of Mixed Reality: Issues

in Illumination and Shadows," by Kontinen, Hughes, and Pattanaik, addresses technologies necessary to fully immerse dismounted soldiers in virtual environments. Augmented reality will provide significant enhancements in training effectiveness, practicality, and flexibility. This paper documents, in a rigorous manner, technical lessons derived from experiments and research in this area. The authors have captured many of the issues, proposed solutions, and demonstrated the efficacy of the proposed approach.

Finally, in "A Validation Methodology for Human Behavior Representation Models," Goerger, McGinnis, and Darken have taken up a challenge faced by modelers across M&S communities: validation. Further, they chose as the stage for this task the representation of human behavior itself, arguably the most difficult component of warfare to simulate. They measured performance bias on the part of the experts as it affects both the accuracy and consistency of their judgments. The M&S community has begun to consider improving the evaluation by subject matter experts by providing some common evaluation criteria. Goerger, et al, have provided measurements that suggest the type of criteria that could be used successfully. While applied to human performance, their results are applicable across a far broader area of M&S. Their work places a measurable milestone in the path to providing more robust validation for simulations.

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