



International Conference on

**INTEGRATION OF  
KNOWLEDGE INTENSIVE  
MULTI-AGENT SYSTEMS**

**KIMAS '03:  
Modeling, Exploration, and Engineering**

**September 30 - October 4, 2003  
Royal Sonesta Hotel, Cambridge, MA**

**Sponsored by: IEEE Boston Section**

**Technical Co-Sponsor:  
IEEE Robotics and Automation Society**

**In Cooperation with :  
IEEE Neural Network Society,  
IEEE Systems, Man and Cybernetics Society,  
INNS, US Air Force, US Army, US Navy, and DARPA**

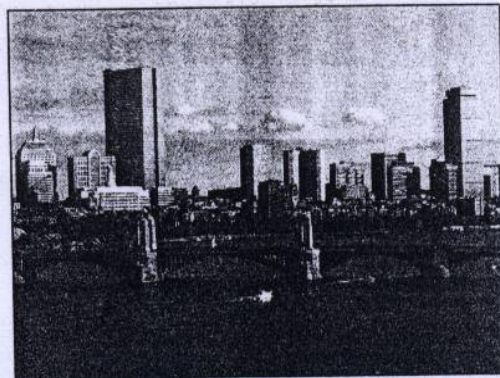


Photo courtesy of Sonesta Hotel, Cambridge, MA

**Editor: Henry Hexmoor**



## Session 1.3: Theoretical Aspects of Multi-Agent Systems

### *Chairs*

Anatoly Shalito, Saint-Peterburg State Institute of Fine Mechanics and Optics, Russia  
Henry Hexmoor, University of Arkansas, Fayetteville, AR



# Table of Contents

iii	KIMAS'03 Forewords	41	<b>Design and Implementation of An Agent-Oriented Expert System of Loan Risk Evaluation</b> YU Guo-an, XU Hong-bing, WU Chao, Department of Computer Science and Engineering, Southeast University, Nanjing, China
iv	KIMAS'03 Conference Organization		
v	KIMAS'03 Invited Talks		
<b>Keynote Plenary Lectures</b>			
2	<b>Knowledge Understanding and Behavior</b> James S. Albus, National Institute of Standards and Technology	46	<b>An Organization-Based Adaptive Information System for Battlefield Situational Analysis</b> Eric Matson and Scott DeLoach, Multi-agent and Cooperative Robotics Laboratory, Department of Information and Computing Science, Kansas State University
9	<b>Intelligent Nodes for Course of Actions Analysis</b> Edward Dawidowicz, US Army, CECOM, RDEC Command and Control Directorate	52	<b>Avoiding Collision Logjams through Cooperation and Conflict Propagation</b> K. Madhava Krishna, Henry Hexmoor and Subba Rao Pasapuletti, University of Arkansas
<b>Session 1.1: Intelligent Agents with Elements of Autonomy</b>			
14	<b>Can Your Autonomous Robot Come Out And Play?</b> Luis O. Arata, Department of Fine Arts, Languages, and Philosophy Quinnipiac University Hamden, CT	58	<b>Modeling of Knowledge Intensive Computerized Systems Based on Capability-Oriented Agent Theory (COAT)</b> Atoosa P-J Thunem, OECD Halden Reactor Project Institute for Energy Technology
19	<b>Agent-based Dynamic Information Security Model</b> H. Kuo, M, National Defense Management College, Taiwan, R.O.C.	<b>Session 1.3: Theoretical Aspects of Multi-Agent Systems</b>	
25	<b>Enhanced Frame-Based Knowledge Representation for an Intelligent Environment</b> Chaminda Ranasinghe, Ajith P. Madurapperuma, Department of Computer Science University of Colombo, Sri Lanka	65	<b>Automata Theory for Multi-Agent Systems Implementation</b> Lev Naumov and Anatoly Shalyto, Saint-Peterburg State Institute of Fine Mechanics and Optics, Russia
31	<b>A Multiple Objectives Optimization Approach to Robotic Teams' Analysis, Design and Control</b> Allon Guez, Drexel University, Philadelphia, PA	71	<b>Multiple Knowledge Intelligent System</b> Shigeki Sugiyama, Gifu Research & Development Foundation, Japan
<b>Session 1.2: Applied Linguistic Representation</b>			
36	<b>A Multi-Agent System for Natural Language Understanding</b> Mostafa Aref, Dept. Comp. Science and Engineering University of Bridgeport, CT	77	<b>SUO Communicator: Agent-based Support for Small Unit Operations</b> Barbara Brown <sup>1</sup> , Paul Morris <sup>1</sup> , Craig Thompson <sup>2</sup> ; 1ScenPro, Inc., Richardson, TX; 2University of Arkansas, Computer Science and Computer Engineering Dept., Fayetteville, AR