On-Line Distributed Simulation for Real-Time Management of Systems

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With the widespread deployment of sensors, mobile computing and wireless communications, interest in the use of distributed simulation to manage operational systems is increasing. For example faster-than-real-time on-line simulations of transportation systems can be embedded into vehicles and roadside infrastructure to help reduce congestion, delays and pollution. Live data feeds from sensors in the transportation network are used to characterize the current state of the system while faster-than-real-time distributed simulations predict future system states. Other applications of on-line simulation include use in managing military operations, communication networks, or supply chains.

This presentation discusses distributed simulation technologies that have been developed to realize efficient on-line simulations. A distributed simulation paradigm termed ad hoc distributed simulation that focuses on a bottom up approach to creating distributed simulations is described. Techniques to efficiently complete multiple simulation runs are described as well as recent work examining the energy consumed by distributed simulations operating on mobile computing platforms. Our experiences in applying these techniques to transportation systems will be discussed.

**Bio**

Dr. Richard Fujimoto is a Regents’ Professor in the School of Computational Science and Engineering at the Georgia Institute of Technology. He received the M.S. and Ph.D. degrees from the University of California at Berkeley in 1980 and 1983 in Computer Science and Electrical Engineering. He completed his undergraduate work at the University of Illinois at Urbana-Champaign where he received B.S. degrees in Computer Science and Computer Engineering. He has been an active researcher in the parallel and distributed simulation field since 1985 and has published over 250 papers in this area. He has received several best paper awards for his research as well as the *ACM SIGSIM Distinguished Contributions in Simulation* Award. He led the definition of the time management services for the High Level Architecture for Modeling and Simulation, IEEE Standard 1516.  Fujimoto has served as Co-Editor-in-Chief of the journal *Simulation: Transactions of the Society for Modeling and Simulation International* and was a founding area editor for the *ACM Transactions on Modeling and Computer Simulation* journal.  He has also served on the organizing committees for several leading conferences in the parallel and distributed simulation field. He was the founding chair of the School of Computational Science and Engineering at Georgia Tech and led in the creation of several graduate and undergraduate programs.