OAK RIDGE NATIONAL LABORATORY FACT SHEET
MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY

Scientific Computing within the ORNL Modeling and Simulation Group: System-of-Systems Simulaion – Intelligent Virtual Simulation

The ORNL Modeling and Simulation Group (MSG) develops sophisticated numerical solutions for a wide range of scientific, engineering, and operational applications. MSG's core competency is computational physics and engineering, and within this context we have developed significant capabilities for the analysis of complex systems using on- and off-line virtual simulations. Virtual reality simulations have several advantages over traditional analysis techniques. Once a model with sufficient operational and technological sophistication has been created, simulations can easily be run

- across a wide range of predefined or random operational scenarios,
- for highly-coupled mechanical systems operating autonomously or as a result of player reactions,
- for varying number of players either on- or off-line across distributed or local networks,
- in either an interactive mode (person-vs-person or person-vs-computer) or an automated mode (computer-vs-computer),
- to provide scenario-specific player reactions and simulated equipment performance needed to refine operational procedures and optimize component designs,
- at minimal operational cost, and perhaps most importantly
- to safely simulate hazardous environments without endangering players.

MSG's virtual reality software suite includes in-house and commercial codes, as well as shared resources with Research Network Incorporated. These capabilities currently include the ***VISUAL TRAINING RESOURCE NETWORK CODE, VISUAL INTERACTIVE SITE ANALYSIS CODE***, the ***UNREAL*** gaming engine by Epic, the ***GAME DISTRIBUTED INTERACTIVE SIMULATION*** utilizing the ***SOURCE*** engine by Valve, rapid generation of georegistered terrain databases using in-house capabilities, and live-to-virtual bridges to the U.S. Army's McKenna MOUT Site Soldier Battle Lab and Simulation Technology Training Center. Virtual reality simulations represent an extremely versatile modeling and simulation resource for a broad range of R&D, industrial, homeland defense, and military applications. We welcome the opportunity to discuss your potential applications and ways MSG can contribute to a solution.

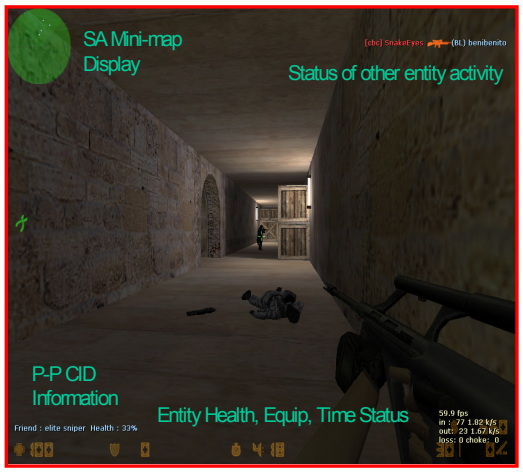

Illustration of proposed player-vs-computer force-on-force virtual simulation to evaluate functionality of a prototype optical combat identification system

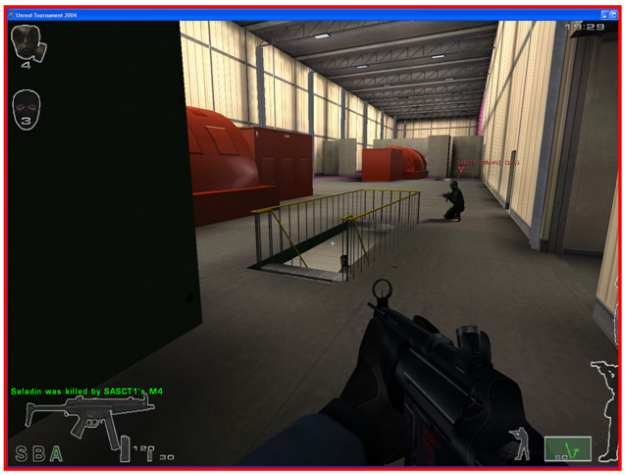

Illustration of computer-vs-computer force-on-force virtual simulation to evaluate operational security procedures at nuclear power plants

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