

## Project 16: Agent Based Simulation for Disaster Rescue (Tambe)

DEFACTO is a simulation tool to help train incident commanders for a large-scale urban disaster.

**Modeling Area:** Risk Management

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Incident commander display during a fire.

### Brief Description:

This modeling and simulation effort is developing a tool to improve on current methods for training fire departments' incident commanders. DEFACTO will enable more extensive training without taking as many fire fighters off duty. DEFACTO's collection of simulators driving the training scenarios will enable the training fires and situations to unfold in a more accurate manner. The fire fighters in the experiment coordinate amongst themselves and with the human incident commander. This tool further enhances training by adding a sense of realism and perspective so that incident commanders feel as if they are really there.

### Objectives:

The key objectives of this effort are to explore human-agent team interaction so as to improve training methods, and to develop a simulation tool that will enhance preparation of Incident Commanders. One interesting challenge that has come up during our human-agent team experiments is that because the humans and agents may have different views of the world, they will have different sets of priorities for the team. Resolving these differences and preventing the team from have a degradation in performance is a goal of this project.

### Major Products and Customers:

The DEFACTO simulation tool will be made available to the Los Angeles Fire Department (LAFD) and other training details.

### Interfaces to other CREATE Projects:

This effort will initiate a collaboration with the other risk management projects (Larson, Dessouky/Ordonez), to apply recent lessons learned in emergency response, and integrate with RAW.

### Interfaces to non-CREATE Projects:

This effort will continue to interface with the LAFD, and explore inquiries from local companies interested in further development, technology transfer and licensing. We also interfaced with the GamePipe Lab on campus and helped them with knowledge and data to create a related training system.

### Technical Approach:

We use a proxy based teamwork framework for creating teams. The teams have an explicit model of what the team plan is and what role each team member is serving. All of this is encapsulated in a 3D interactive world with a powerful simulator underneath it all modeling everything from the

progression of fire to the flow of traffic on the streets. We use the OGRE 3D engine create a 3D representation of GIS maps for our simulated environment.

**Major Milestones and Dates:**

1. Testing and feedback from first LA Fire Department users -- November 2005.
2. Work with LAFD on details of an actual training scenario -- February 2006.
3. Conducted experiments with virtual Incident Commanders to test strategies -- September 2006.
4. Developed and implemented a technique for the multiagent team to question the directives of the Incident Commander -- February 2007
5. Demonstrate how the response team can improve performance by allowing directives to be questioned and clarified -- April 2007