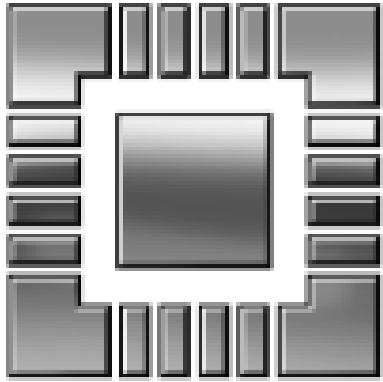



Mair Allen-Williams



Presentation for Research Training Course



Agent Coordination in the Disaster Recovery Domain

An agent:

- *senses* its environment
- *reacts* to its environment
 - may be simple (reactive) or *complex*
 - may be *irrational*
 - may have goals

Coordination

- The presence of other agents in the environment may affect the optimal behaviour for an agent
- Making decisions in the context of other agents is *coordination*

Forms of coordination

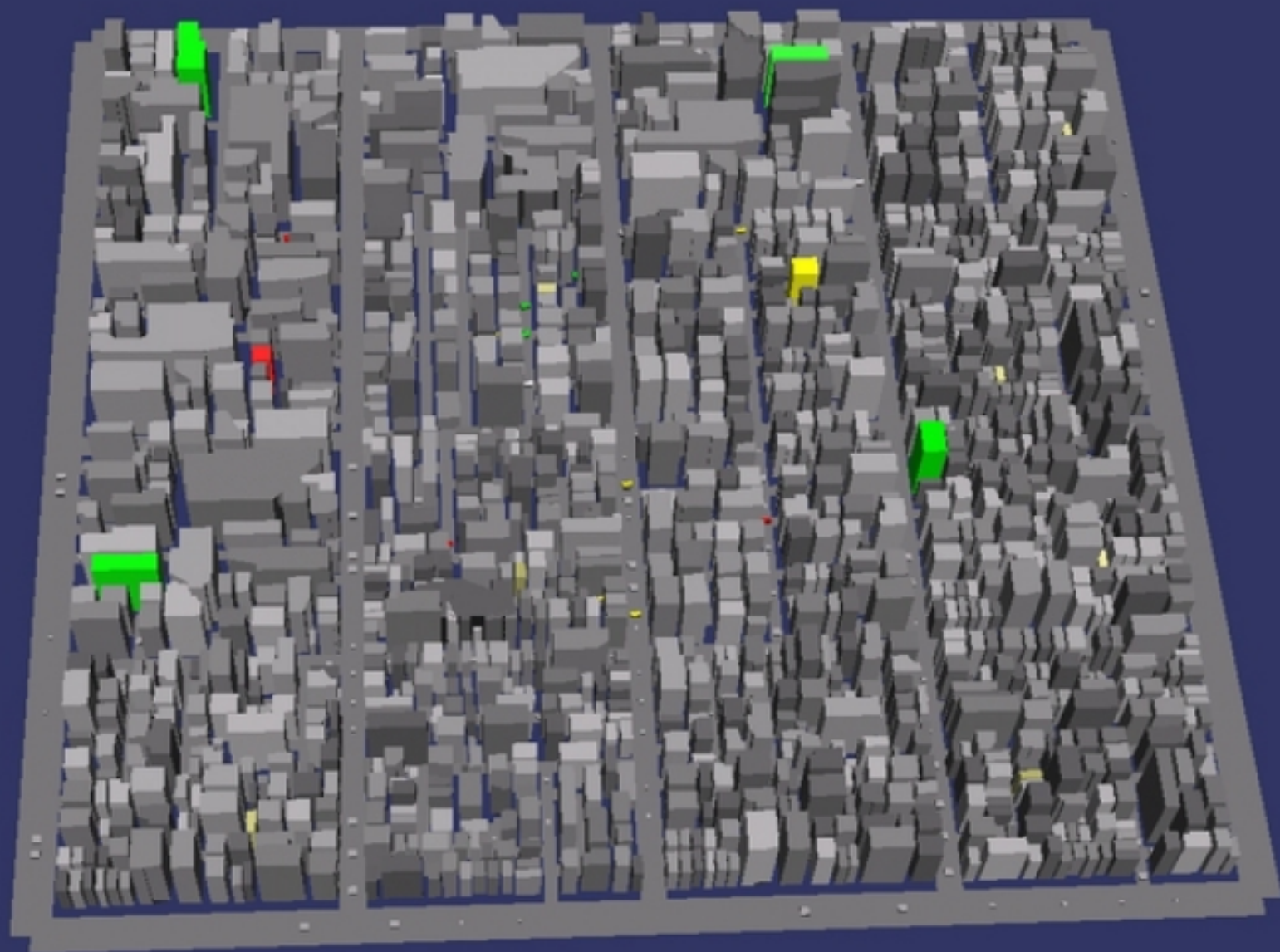
- Limited resources (share, compete)
- Limited space (bridges, ...)
- Avoiding malicious agents
- Tasks which need team solutions
- ... etc

Example: disaster recovery

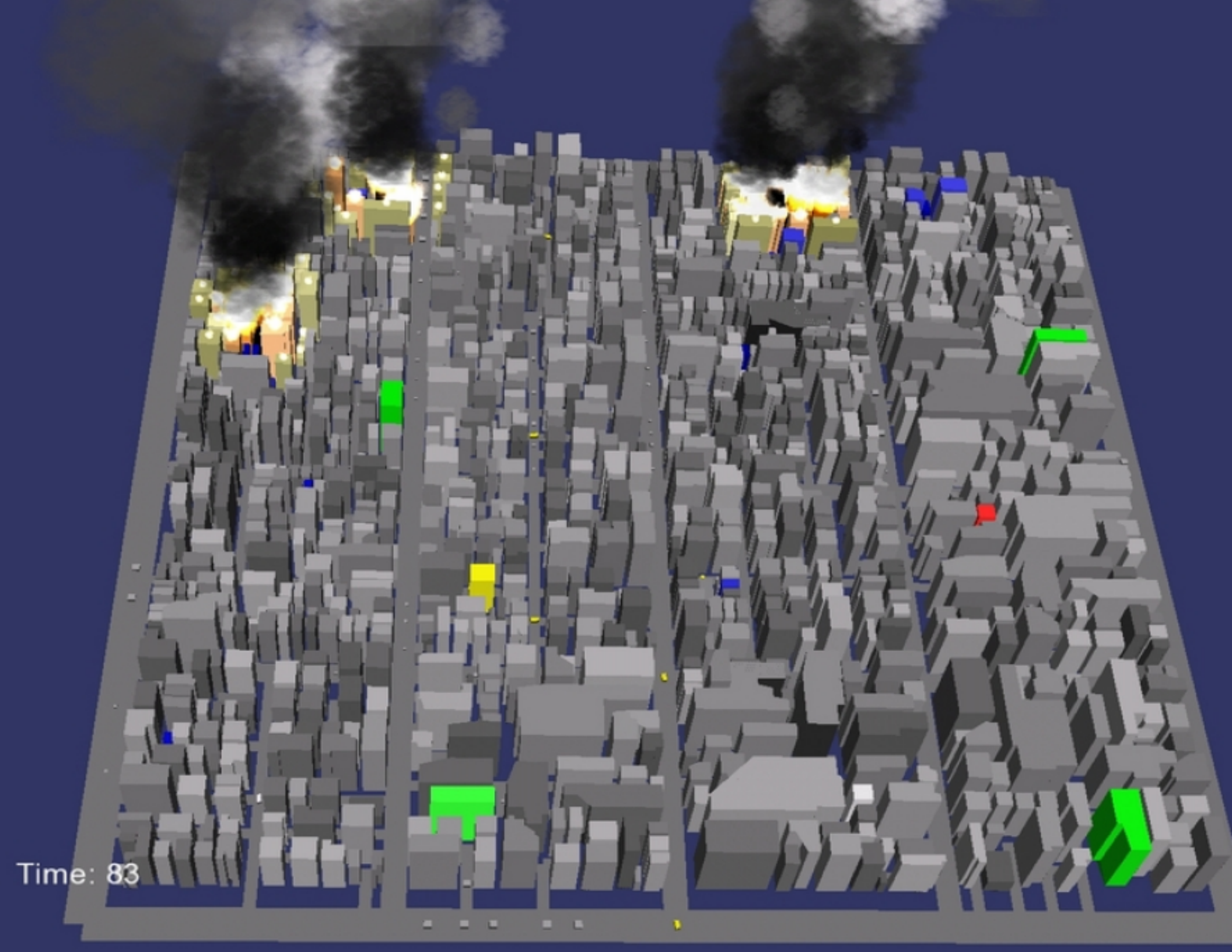
- traffic jams
- cooperation between services
- coordination within services
- resource competition with press
- competition or cooperation for bandwidth
- sharing information

Robocup Rescue

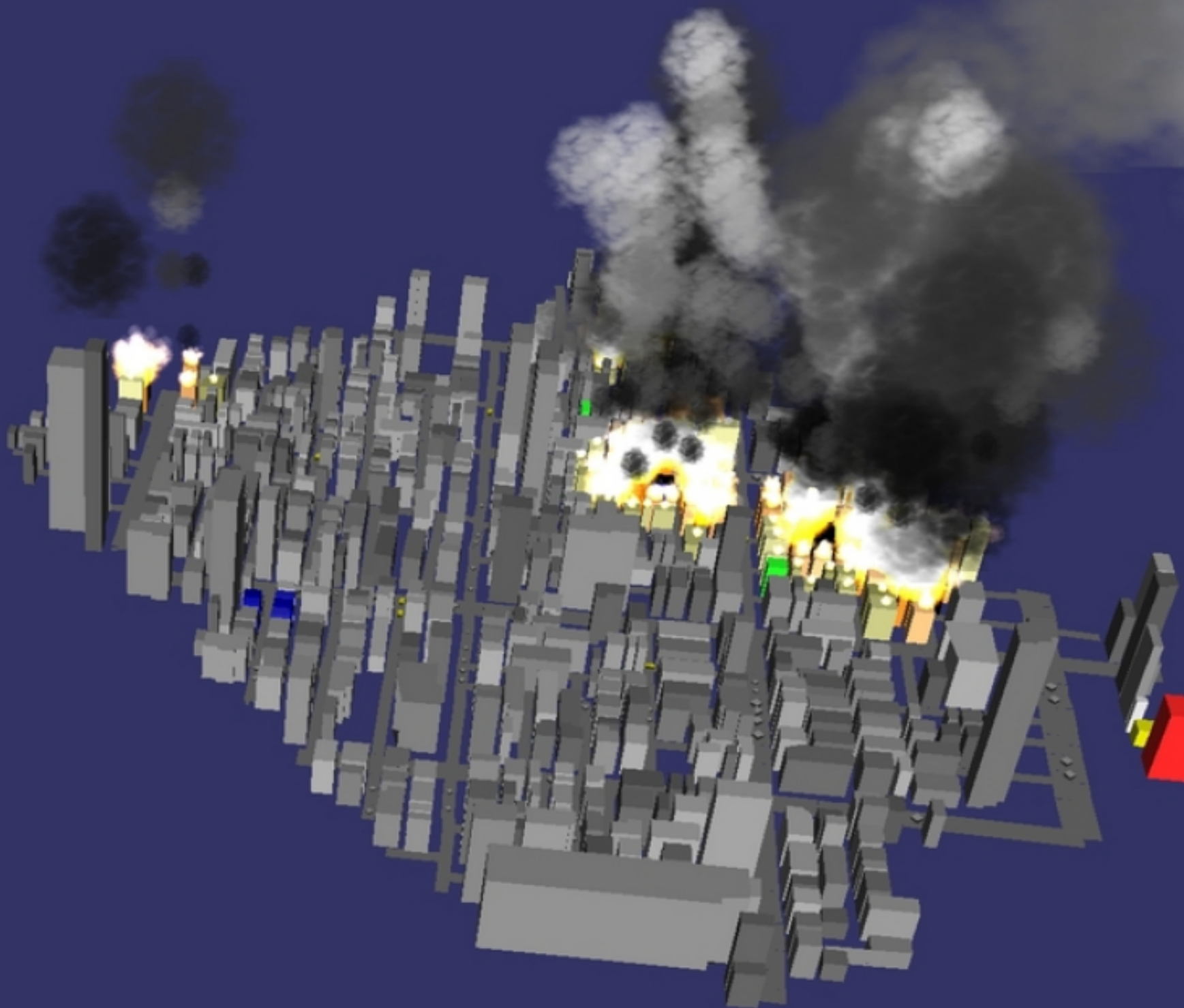
- simulates a town post-earthquake
- agents:
 - police clear blockades,
 - fire brigade extinguish fires
 - ambulance teams rescue people
- all contribute to the search for civilians
- communication bandwidth is limited



Time: 7



Time: 83



Time: 80

How should we coordinate?

- English services use hierarchies
- But not ideal:
 - information flow (think 7/7: mobile phone networks saturated)
 - timeliness
- *Can we evolve efficient local coordination algorithms?*

Issues

- Scalability: a model that worked in the Mountbatten fire may fail for Katrina ...
- Agent goals may conflict (police not disturbing scene of the crime, journalists bidding for resources)
- Dynamic, uncertain systems. Need to operate on the fly.
- ... and more

Solutions

- *Next 2.5 years...*
- **Learning** to handle large state spaces
- Interconnected **local** models
- **Levels of abstraction** in hierarchical control