INTRODUCTION

Managing crises requires collecting geographical intelligence and making spatial decisions through collaborative efforts among multiple agencies and task forces. Typically, one or more emergency operation centers (EOCs) work in cooperation with teams of first responders through communication of the situation and coordination of actions. Unfortunately, current geographical information technologies are not designed for use by such collaborative applications, and their human-computer interfaces do not support or even impede collaboration and communication among distributed teams. We demonstrate a same-time different-place collaborative environment supporting distributed teams to manage crisis situations using geospatial information. Our system enables collaborative spatial decision-making by providing multimodal interfaces and enabling conversational dialogues among team members. Decision makers in front of large screen displays (simulating Emergency Operation centers) and/or desktop computers (simulating mobile command centers), and with tablet PCs (simulating first responders in the field) can engage in collaborative activities for situation assessment and emergency response.

A CRISIS SCENARIO

A category 4 hurricane has struck the south east part of Florida, potentially causing flood that affects along the coastal area. While evacuation alerts have been sent out to affected communities, state and local emergency management forces must make sure that all residents evacuate in time and (if needed) find shelter in designated facilities.

While she was searching a residential area in Palm Beach county, Sue (a member of the first responder team) found a group of people who need assistance getting to a shelter. These people are elderly and some have serious health care needs.

In the EOC, a manager, Matt, and his assistants, have access to a large-screen display which shows the overall situation in the whole flooded region. They get reports from multiple sources (sensors, satellite, 911 phone calls, field reports) and have the responsibility to help field teams.

CONCLUSION

GCCM is a multimodal, same-time different place collaboration environment to support spatial decision making in crisis situations. This work is currently being extended to support a variety of mobile devices (PDAs, pocket PCs, mobile phones). It is also being used to test theories and hypotheses on how visually-enabled groupware systems support the needs of decision makers in emergency response.

GCCM DESIGN FEATURES

- Large-screen display coupled with speech and free-hand gestures for same time, same place collaboration in emergency operation centers (EOC).
- Mobile access to geographical information and shared collaborative sessions using Tablet PC (or pocket PC) controlled by speech and pen-based gestures.
- Dialogue-assisted multimodal interactions for robust communication.
- Interactive maps are used as shared visual workspace for the team to coordinate their actions and perspectives.
- Semantic fusion of multimodal inputs from multiple users.
- Supporting awareness of group activities.
- Context-adaptive visualization.

COMMUNICATION PORTAL

- Authentication and Access Control
- Session Management
- Collaboration Management
- Dialogue Manager
- Intention Recognition
- Discourse Modeling
- Response Planning
- GeoVISTA Server
- ArcIMS Spatial Database