

# Ad-hoc collaboration in emergency management situations

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## Abstract

Today, advances in small-scale computing, sensing, cellular as well as short range communication allow people to communicate ad-hoc based on their proximity in the same geographic space. Often the information about events such as a fire, an accident or a toxic spill is most relevant to the people located nearby. Therefore, quick response, alerts, and collaborative event handling are very important. Today's ubiquitous technology such as smart phones makes such timely and locally coordinated reaction and event handling possible.

Traditionally, these situations are handled via centralized entities such as emergency response personnel (police, firemen, SWAT teams, National Guard). The centralized entities are informed about an event and coordinate response and rescue efforts. However, a significant delay can be involved between notifying the authorities and sending response teams to the event location as well as the emergency event response is. This delay can mean life or death for people close to the event. It is likely that in the near future people will use today's technology such as cell phones to coordinate warning and rescue efforts in situations such as a house fire or a shooting in a mall or university in a timely and ad-hoc way.

Imagine the following scenario: a fast spreading fire has occurred in a room of a public building, or large apartment complex. Many people are present in the building who might be familiar or a not familiar with evacuation routes. People close by the fire can use handheld devices to notify all other handheld devices in the proximity. This can be done by an "emergency connection", which could be based on short range wireless communication between all devices in the vicinity or via cellular links and web-based applications such as Google Latitude. Once being notified, people can coordinate with each other with regard to evacuation routes, blocked routes, smoke and/or rescue victims.

In the domain of geosensor networks the term *decentralized spatial computing* was coined. It captures the fact that individual wireless sensor nodes can only sense a local glimpse of a geographically larger phenomenon, but they coordinate with their local neighbors the recognition and identification the phenomenon. No global control or coordination is necessary, nor do local nodes need to understand the global phenomenon to coordinate locally. A similar paradigm can be seen as possible in ad-hoc situational collaboration and emergency rescue situations that involve information handling of spatially and temporally constrained events and the people located in proximity of the event.