

# Location-Based Services for Emergencies

Whether for business or recreation, travel requires detailed planning. Prior to departure we can use the internet to search for directions to all the places we plan to visit. But how many of us take the time to plan our response to any emergency that might occur during the trip? Very few planning a trip bother to locate hospitals, emergency shelters or their own national embassy, and only a few will familiarise themselves with emergency procedures at the destination. If something were to happen, how would we tell authorities where we were, and how would they instruct us how to find safety? ?<P>

The fact is, as travellers we rarely consider the possibility of a disaster striking while we are abroad or even when travelling close to home. Consumed by the details of the pleasant experience awaiting us, we forget to plan for our own safety. The consequences can be catastrophic; foreign tourists, unfamiliar with language, local customs, procedures and available services, are at a disadvantage and will probably find it difficult to find safety in a time of crisis and chaos. Many recent disasters, such as the 2004 tsunami, the earthquakes that hit China in 2008 and the 2009 Australian wildfires, clearly illustrate the need for emergency information readily available to both local citizens and tourists alike.

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## Surviving Disaster?

Disaster survivability is largely dependent on a combination of several factors, including early warning or notification and the ability to find a safe haven. Time is the most critical factor. Advance warning of disaster allows people to seek shelter and move out of harm's way. However, most disasters, such as earthquakes, occur without warning. Knowing where to go in a catastrophe increases the chances of survival. The chaos and confusion arising from an emergency add to the challenge of obtaining this information.

Both travellers and local citizens may be unfamiliar with evacuation routes, procedures or the location of shelters. Although predicting or preventing disaster is difficult, technology can allow us to be better prepared. Location-based Services (LBS) can improve disaster survivability by supplying information to people in the proximity of a disaster impact zone.

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## Location-based Services?

LBS involve software solutions leveraging the association between a handheld mobile device and a wireless network. Each device/subscriber should have the necessary software configuration to operate on a specific network to track the location of the device. In addition, an LBS solution requires a GIS server application to provide the device owner with information such as emergency alerts, evacuation routes and shelter location relative to their own.

Software applications on the LBS device help the user understand data such as their location/environment, time, resources and activities or events. The result provides situational awareness, so that the user understands where they are, where they are going, how to arrive there more efficiently, what they need to know about the place they are going to, what they will need to do when they get there and how their surroundings relate to their given situation. Figure 2 illustrates the interaction between software applications, the device's ability to know its location and the network consuming and feeding information back to the user.

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## Community Alert?

Providing location-specific information is mainly the function of the software application running on the mobile device. But the device also plays a role, and screen display size may present working constraints. This means the software application should be designed for compatibility with the device to be used. For example, a user is not going to be able to type much onto a small, two-inch LCD screen on the keypad of a mobile phone. It is therefore important to select a device that provides display capabilities appropriate to the desired software and tasks to be performed.

Many manufacturers are building devices with GPS chips already embedded in them. This feature allows the device to report its position to a central server, or back to itself through a user interface. Interfaced with a software application the device becomes essentially spatially intelligent and can alert the user to events, workflow triggers and other crucial information relating to their surroundings, all functions important in providing emergency alert. In an emergency LBS technology will first alert the user to an event having occurred, secondly provide them with their proximity to the epicentre, thirdly provide either a map or detailed textual instructions regarding evacuation and shelter locations, and fourthly indicate whom to contact for further help and/or assistance.

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## Device Features?

The mobile device is a strategic element in emergency alert because it is the object with which a user interacts to get information. The

ability of the device to run sophisticated applications and perform multiple functions, such as communication and data acquisition and management, is therefore extremely important. To ensure GIS enablement some simple rules apply for the selection of a mobile device. It should:

- be able to report its position (or be enhanced through accessorising to perform this function)
  - provide display resolution commensurate with the application being used?
  - be rugged enough to withstand heavy wear and tear.
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#### Preparedness?

We have described a solution using products and technology readily available on the open market. However, implementing LBS solutions for emergency alerting has yet to be accomplished due to privacy issues and network costs; many consumers view location tracking as an invasion of privacy, and without revenue opportunities telecommunication providers have no incentive to provide LBS. Thus greater public safety must be ensured by government legislation and investment encouraging telecommunication companies to provide emergency alerting and messaging based on location.

GIS technology supports the ability to provide location-based emergency alert and instructions in a mobile environment. It has analytical capabilities to identify the location of mobile telephone users within a hazardous area, determine the most appropriate route away from danger and pinpoint shelters. GIS functions on a server consuming mobile telephone location information determined by GPS, triangulation or presence notification from the wireless-network provider. Essential information is then presented to the user via a map interface or as textual/audio instructions when the device is unable to support a graphical map interface.

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#### Action Plan?

Many telecommunication and mobile-device providers are interested in LBS but have difficulty in determining the value of offering the service to their customers. Thus government agencies responsible for emergency management should perhaps consider subsidising this capability as part of an emergency-notification system. As consumers begin to understand the value of accessing information contextualised to their geographical location, the demand for additional LBS capabilities will increase. Until then, consumers, especially frequent travellers, should contact their telecommunication provider or local emergency-management official to enquire whether or not location-based emergency-notification capabilities are available and, if not, when they will become so. Numerous enquiries will certainly promote awareness and generate an interest in providing such capabilities.

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