Strategies to Prepare Emergency Management Personnel to Integrate Geospatial Tools into Emergency Management

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ABSTRACT

Emergency management is a diverse field. Effective disaster management involves knowledge of various subjects as well as work experience in all aspects related to mitigation, planning, response, and recovery efforts. One field not being fully exploited by disaster management is the use of geospatial tools in the form of Geographic Information Systems (GIS), cartography, and geovisualization. One reason for this is that many emergency managers are not fully aware of the assistance GIS can lend to effectively manage disaster situations. All functions of emergency management have a strong geographic component. Where is the earthquake epicenter? Where is the damage? Where does the dam inundation run and who/what is in that path? Where is the area of road closures? The questions asking “where” are endless in effective emergency management and range from the mitigation stage through to the recovery stage. For example, a tsunami may inundate only a certain portion of the region, therefore, it is important to have mitigation and planning efforts concentrated in those regions. It is also important to know what businesses, housing, and populations are in the affected areas. The integration of geospatial tools for risk assessment, mitigation, planning, response, and recovery efforts is emerging as an effective and potentially invaluable resource for answering such questions in regards to emergency management.

Keywords: Emergency Management, Geography Information Systems, Geovisualization

INTRODUCTION

Disasters impact every inch of the earth’s surface. They can be tectonically driven such as earthquakes and tsunamis, weather driven as hurricanes or tornados, man-made terrorist events, technological disasters as in a chemical explosion, or fires that are part of the earth’s natural process. According to Munich Re, the world’s largest reinsurer, natural disasters killed at least 25,000 people in 2001 (Dahinten, 2002). No matter the disaster, effective emergency management can mitigate the effects of these disasters and save lives.

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Modern civilizations have begun organizing attempts to protect life, property, and the environment. This is known as emergency management. Emergency management can be defined as the organization and management of resources and responsibilities for dealing with all aspects of emergencies, including risk assessment, mitigation, preparedness, response, and recovery.

Geospatial tools can lend aid in these disaster management functions. However, the wide-range of support geospatial tools have to offer is not always being used to its best advantage. This thesis will explore the strategies to prepare emergency management personnel to integrate geospatial tools, in the form of Geographic Information Systems (GIS), geovisualization, and cartography into the emergency management functions of risk assessment, mitigation, preparedness, response, and recovery.

BACKGROUND

After the terrorist attacks of September 11, 2001 killed nearly 3,000 people and the most destructive - and costly - natural disaster in U.S. history, Hurricane Katrina in August of 2005, killed over 1,800 people, emergency management began seeing fundamental structure changes and moved to the forefront of media and government (Dahinten, 2002; Koch, 2007). On February 28, 2003 President Bush released Homeland Security Presidential Directive (HSPD) 5 for the management of domestic incidents. HSPD-5 states:

“To prevent, prepare for, respond to, and recover from terrorist attacks, major disasters, and other emergencies, the United States Government shall establish a single, comprehensive approach to domestic incident management. The objective of the United States Government is to ensure that all levels of government across the Nation have the capability to work efficiently and effectively together, using a national approach to domestic incident management. In these efforts, with regard to domestic incidents, the United States Government treats crisis management and consequence management as a single, integrated function, rather than as two separate functions” (Bush, 2003a).

HSPD-5 set in place the National Incident Management System (NIMS) which is expected to provide a consistent nationwide approach for Federal, State, and local governments to work effectively and efficiently together to respond to crises (Bush, 2003a). NIMS will also “include a core set of concepts, principles, terminology, and technologies covering the incident command system; multi-agency coordination systems; unified command; training; identification and management of resources (including systems for classifying types of resources); qualifications and certification; and the collection, tracking, and reporting of incident information and incident resources.” (Bush, 2003a)

The Interagency Geospatial Preparedness Team (IGPT) is a team of experts from FEMA, the National Imagery and Mapping Agency (NIMA), the U.S. Geological Survey (USGS), and the U.S. Department of Agriculture Forest Service. IGPT was created to help make geospatial information and technologies more readily available to the national community of emergency managers and responders. Susan Kalweit, former Chief of IGPT, believes the need for geospatial technology in homeland security is a necessity as when something occurs, the first questions asked include: where is it,’ what does it look like, where are the assets necessary to respond, how do I get those assets from where they are to where I need them, and how do I get people safely out of harms reach? This makes the utility of geospatial information for preparedness, emergency response, and recovery is of utmost importance (Francica, 2004).

All phases of emergency management involve the collection, analysis, and dissemination of data in a logical manner. GIS can provide a mechanism to integrate and visually display all of this data (Johnson, 2000). GIS, geovisualization, and cartography can convey information quickly because comprehension
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