

RAMSAFE AT THE OLYMPICS

A Stand Alone Responder Assets Management System Software Tool Designed to Dramatically Improve Crisis Response is Put Through its Paces at the 2002 Winter Olympics

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Abstract:

Situation awareness is a key factor in effective response to crises. Yet today, first responders typically arrive at the incident scene with little idea of what they will face. In cases where pre-incident plans exist, they are invariably labor-intensive paper products that are out-of-date and difficult to assimilate, therefore providing little help to an incident commander in the heat of a crisis. RAMSAFE features leading edge integrated fire and tactical pre-incident planning tools and state-of-the-art virtual tour visualization iPIX technology, and has recently been employed during the Winter Olympics at Salt Lake City, Utah. It travels on a laptop with the incident commander, can be accessed en route to the scene, and provides detailed visual information that helps the commander to better understand and manage a crisis situation. With this tool, the incident commander can view accident facility floor plans and access 360° x 360° iPIX pictures of key strategic locations such as entrances and exits, hazardous material storage sites, and alarm panels, simply by clicking on icons located on the floor plans.

RAMSAFE provides integrated planning, training, logistics, and operations support for police, fire, medical, and other emergency responders. It can be used at all levels of operations including city or EOC, police or fire headquarters, field command or precinct, and incident command, where it literally can be a laptop computer command post on the hood of a vehicle. RAMSAFE can be tailored to accommodate the needs of small towns and county jurisdictions as well as large metropolitan areas or states. It is designed to look and operate like a web browser and features a specially designed GIS engine that updates lightning fast. In a crisis situation, RAMSAFE scales up to manage the emergency response, including automated templates for managing disasters, compilation of data required for expenditures, equipment tracking, and time accounting reports for FEMA reimbursement. Its automated disaster management tool, called Response Options Generator (ROG), can be configured for any type of potential mass casualty, area-wide disaster. For the bioterrorism threat, use of ROG has the potential to reduce death and economic loss by approximately 50%, according to specialists at the June 2001 *Medical Disaster Conference* held at Dartmouth College [1]. RAMSAFE can also be used effectively to plan, execute and evaluate tabletop exercises. The program is inexpensive, easily mastered, and a substantial time saver.

This paper describes the design logic, functional capabilities, and future plans for RAMSAFE. Selected capabilities of RAMSAFE and its use as part of the 2002 Winter Olympic Games in Salt Lake City, Utah, will be demonstrated as part of the presentation.

Homeland Defense: Defending the Olympic Stage

Following the World Trade Center (WTC) tragedy of September 11, 2001 (911), extensive efforts were directed towards ensuring the safety and protection of the Salt Lake City Olympic Games, scheduled only a few short months away. Clearly, the Olympics were going to be a grand worldwide stage, and a follow-on terrorist incident on this stage, with the eyes of the world upon it, was unthinkable. Already well into the implementation stage, security planners for the Olympics were faced with the very real need to substantially upgrade their planning and resources. Scenarios considered unlikely prior to 911 now seemed very realistic, and priorities shifted from ensuring unobtrusive crowd control to absolute assurance that terrorist groups could not gain access and opportunity to attempt or carry out an attack. The magnitude of the task was monumental. Everything from the airport to the multiple Olympic venues, the Olympic Village, and Salt Lake City itself required a coordinated protection effort. Even with additional funding, complete sets of law enforcement and first responders for each of these potential targets were unobtainable. Instead, the available reaction force had to be able to respond to any of a number of these locations, rapidly assimilate any crisis situation, and be effective immediately to mitigate the consequences. What they needed was situation awareness.

Computer Enhanced Situation Awareness

Situation awareness is a key factor in effective response to crises. The current inability of the emergency responder community to share time-critical information and use this data to make informed decisions has been recognized by emergency response decision-makers. At the incident scene, arriving first responders need to be armed with up-to-date situational information in order to make the timely, informed decisions necessary to mitigate the potential crisis. In this respect, the fire ground is little different from the battleground, except that first responders are invariably "latecomers," arriving "cold" after the initiating event, potentially faced with a demand for immediate action. Yet today, first responders typically arrive at the incident scene with little idea of what they will face. In cases where pre-incident plans exist, they are invariably labor-intensive paper products that are out-of-date and difficult to assimilate, therefore providing little help to an incident commander in the heat of a crisis.

The Jefferson County, Colorado, Sheriff's Commission Report on the Columbine High School shooting provides relevant anecdotal insight into the value of current information to situational awareness. Numerous media reports chronicled the SWAT team's long delay in entering the high school. In the "SWAT Team Activities" chapter, the Sheriff's Commission reported that the SWAT team commander's knowledge of the school layout was based on the original floor plans, however a subsequent major remodeling had relocated the cafeteria and library to the opposite end of the school. Unsure of his knowledge of the school layout, the commander had several students sketch a floor plan for him, yet still sent the SWAT team into the wrong end of the school. As a result, the SWAT team had to clear nearly 75 classrooms as it worked its way through the length of the school to the library where the suspects were [2].

Whether on a military battlefield, responding to natural or man-made emergencies, or in law enforcement operations, critical elements of information have always been necessary in order to make sound, timely and informed decisions. Today, this problem is further exacerbated by the particularly short response times inherent in the resolution of terrorist acts. In the war on terrorism, decisions must be made ever faster, necessitating the need for information sources that can keep up with the pace, in order to ensure adequate homeland defense. In the midst of the information age, it would seem apparent that effective application of information technology (IT) could harness existing information, and provide decision-makers with the tools necessary to make speedy,

informed decisions that would lessen the severity of potential terrorist crises, emergencies and disasters.

Such computerized information technology has been obtained by replicating capabilities used by the military, where computer based decision support tools have been employed to reduce data gathering, processing, and display time in order to provide the military commander as much reaction time as possible [3]. In fact, just as the military has found, computer based tools lend themselves well to the emergency response environment. It is at the very moment of arrival at the crisis scene, where immediate access to up-to-date, accurate information on the crisis environment and available resources is so vital, that a computer based support tool would be particularly beneficial. A computerized tool would filter stored pre-incident planning data and current crisis information to the minimum necessary to aid the commander in making a decision. It would then rapidly produce it and provide immediate access to it, as well as provide it in a way that ensured rapid assimilation in the heat of the crisis [4]. Yet at the same time, it must not impede the decision process. The tool would allow the incident commander to focus attention on assessing the extent of the emergency, alerting relevant authorities, and directing available resources to mitigate the consequences of the incident. Such a tool exists today in RAMSAFE.

Solving the Olympic Situation Awareness Need with RAMSAFE

The advent of foreign and domestic terrorist acts as retaliatory tools for US policy actions has necessitated a national program to prepare local medical, fire, and law enforcement first responders for the increased risk that may be encountered at an incident scene. The resulting Domestic Preparedness Program is an interagency cooperation designed to improve first responder training, equipment, and procedures across the country in order to mitigate the threat posed by the potential for terrorism on US soil. As part of this program, great strides are being made in computer based tools for first responders by combining the experience of the military and interagency counter-terrorism organizations, as well as input from state and local emergency response communities. Software decision support tools developed in support of this program promise wide applicability to all forms of natural and man-made disasters and crises.

One such program, SituationMaster, a decision support software product designed primarily to support the incident commander at the scene of a crisis, has recently been released by Public Safety Systems, LLC (PSS), a private company in Oak Ridge, Tennessee as part of their RAMSAFE emergency management system. RAMSAFE (previously called Responder Assets Management System (RAMS)), was jointly developed by the Department of Energy Oak Ridge Facilities and Public Safety Systems, LLC for the U.S. Department of Defense and Department of Justice. Developed in support of the nation's Domestic Preparedness Program, RAMSAFE provides integrated planning, training, logistics, and operations support for police, fire, medical, and other emergency responders. RAMSAFE can be used at all levels of operations: city or EOC level, police or fire headquarters level, field command or precinct level, and in a mobile version for incident command. It can be tailored to accommodate the needs of small towns and counties as well as large metropolitan areas and states.

The RAMSAFE SituationMaster program features advanced integrated fire and tactical pre-incident planning tools and state-of-the-art virtual tour visualization iPIX technology designed to eliminate many of the paper pre-planning problems caused by out of date and extraneous information. It travels on a laptop with the incident commander, can be accessed en route to the scene, and provides detailed visual information that helps the commander to better understand and manage a crisis situation. The tool stores current, accurate pre-incident planning information that is critical to the incident commander's situation awareness. It is designed to look and operate like a web browser and incorporates in its simplicity of design a hierarchical filter format and easily assimilated display that greatly reduces data overload caused by irrelevant information. The net

result is a clear and comprehensive understanding of the situation, in other words- situation awareness.

SituationMaster incorporates iPIX image technology that significantly enhances site visualization. With this tool, the incident commander can access 360 by 360-degree iPIX pictures of key strategic locations such as entrances and exits, hazardous material storage sites, and alarm panels, simply by clicking on icons located on the floor plans. This imaging technology is coming into wide use in a number of fields where visualization in every direction is critical, such as computerized virtual tours of homes for sale and vacation rentals. Once the iPIX icons are accessed, the incident commander can steer the visual image in any direction, up or down the hallway, up on the ceiling or down on the floor, or side to side, as necessary to see the features he is interested in, just as if he was standing at the spot.

Let the Games Begin

In November, 2001, RAMSAFE was selected by the Utah Olympic Public Safety Command (UOPSC), the joint command in charge of overall security at the 2002 Salt Lake City Winter Olympics, to assist with security operations at every organizational level. Responding in mid-November, a small team of PSS and their national strategic partner, Electronic Data Systems (EDS), took nearly 4,000 iPIX images of key locations throughout the various Olympic indoor and outdoor venues, the Olympic village, Washington Square, and the Salt Lake City International Airport. Site plans, floor plans and over two hundred other documents, including hazards listings, response plans, operations plans, available equipment and resources, were obtained, and numerous aerial photographs of Salt Lake City and surrounding areas were taken.

180-degree video cameras for live feed were strategically placed at the downtown Salt Lake City Washington Square events site and linked into the Salt Lake City Police Department Command and Control room. In just 60 days, all of these documents and images were produced or obtained, loaded into the RAMSAFE program database, and fully integrated with the other participating emergency and security organizations.

More than 225 federal, state, and local law enforcement officials representing twenty different agencies were trained to use RAMSAFE SituationMaster, and laptop computers were provided to responder teams strategically situated to respond to an emergency or terrorist attack at any of the more than 20 venues and Olympic related sites.

Performance in the Field

Although public safety personnel responded to a small number of incidents, including bomb scares, arrests for rowdiness, and a man arrested for trying to scale the fence that surrounded the living quarters of the athletes, a significant terrorist event or other major crisis did not occur at the winter Olympics. However, the Olympic stage proved an outstanding test bed for RAMSAFE, and reinforced the value of computer software that combined aerial photos, facility floor plans, 360-degree images, security documents, emergency strategies, and real time 180-degree surveillance video into one single comprehensive database providing situational awareness to all levels of security, from the potential incident commanders in the field to the UOPSC command center, in ways that had not previously been fully comprehended. RAMSAFE demonstrated its worth at every phase of an incident, crisis or emergency.

Planning Phase

The value of advanced computer software technology was never more evident than in the planning stage of the Olympics. In a 60 day period, the entire RAMSAFE data base was developed and the system integrated into security operations, demonstrating the superb deployable capability of a

software system that combines all forms of information rapidly and then can provide it in user friendly formats on demand.

RAMSAFE was a key tool in pre-incident planning and training for the Games. Using the virtual tour capability provided by the iPIX 360-degree images imbedded in the program, planners could take virtual tours of the venues, plan their strategy for rescue and assault, and then try other options and methods until they fully honed their operational plans. Once validated by these virtual exercises, the plans were then scanned directly into the program and set up as “hot” icons on the drawings, floor plans, and aerial views, right where they would be useful for managing an actual incident at that location. The operational plans were also indexed into the toggle menu tree alongside the floor plans and other documents applicable to that venue. Symbols representing command posts, protective positions, entry/exit routes, etc., could be dragged and dropped according to the scenarios, and then moved and tried from different locations to see if response improved (Figures 1 and 2). In this way, a myriad of potential combinations could be tried and evaluated until the best approach was determined.

Figure 1: Virtual exercise of a tactical plan at the Deer Valley Olympic Venue recorded directly off of RAMSAFE.

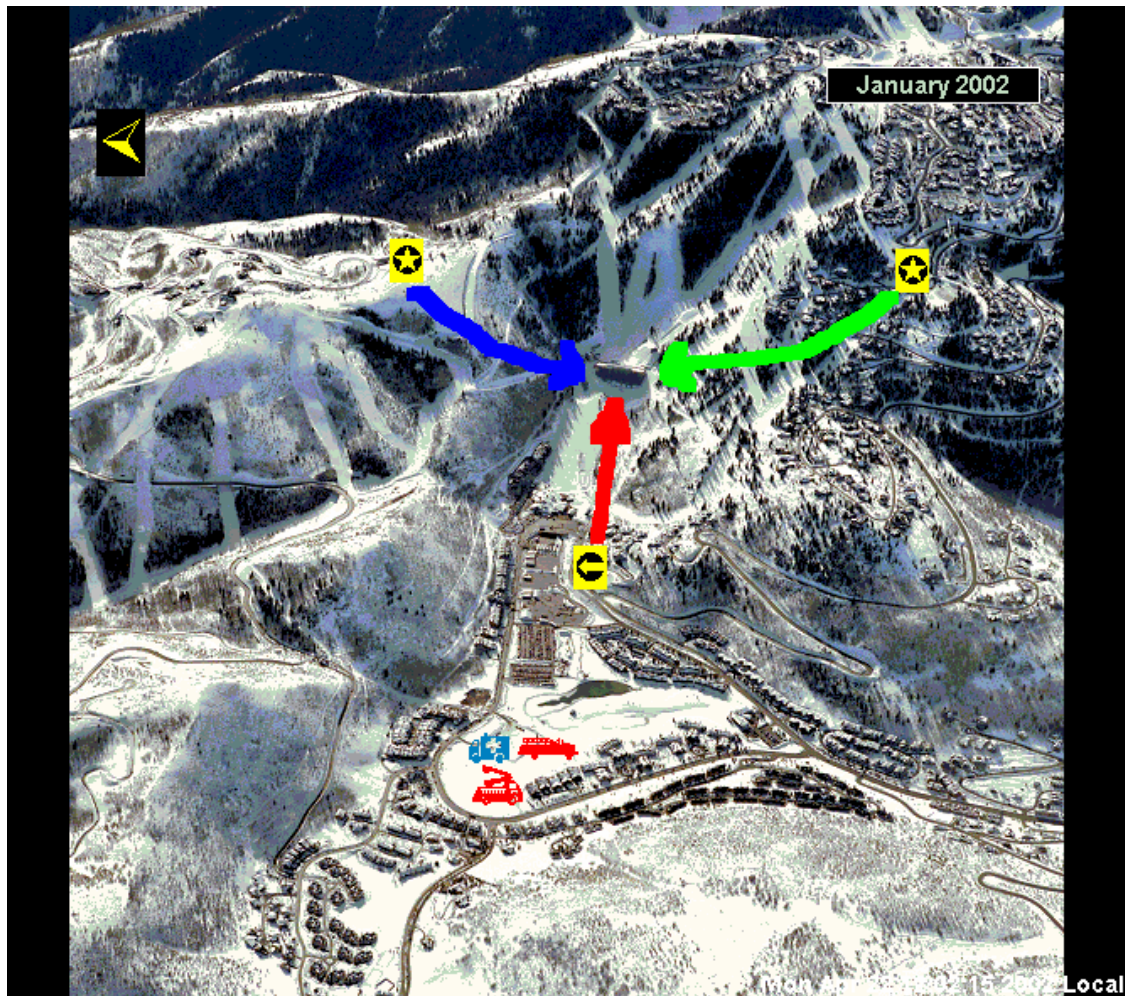
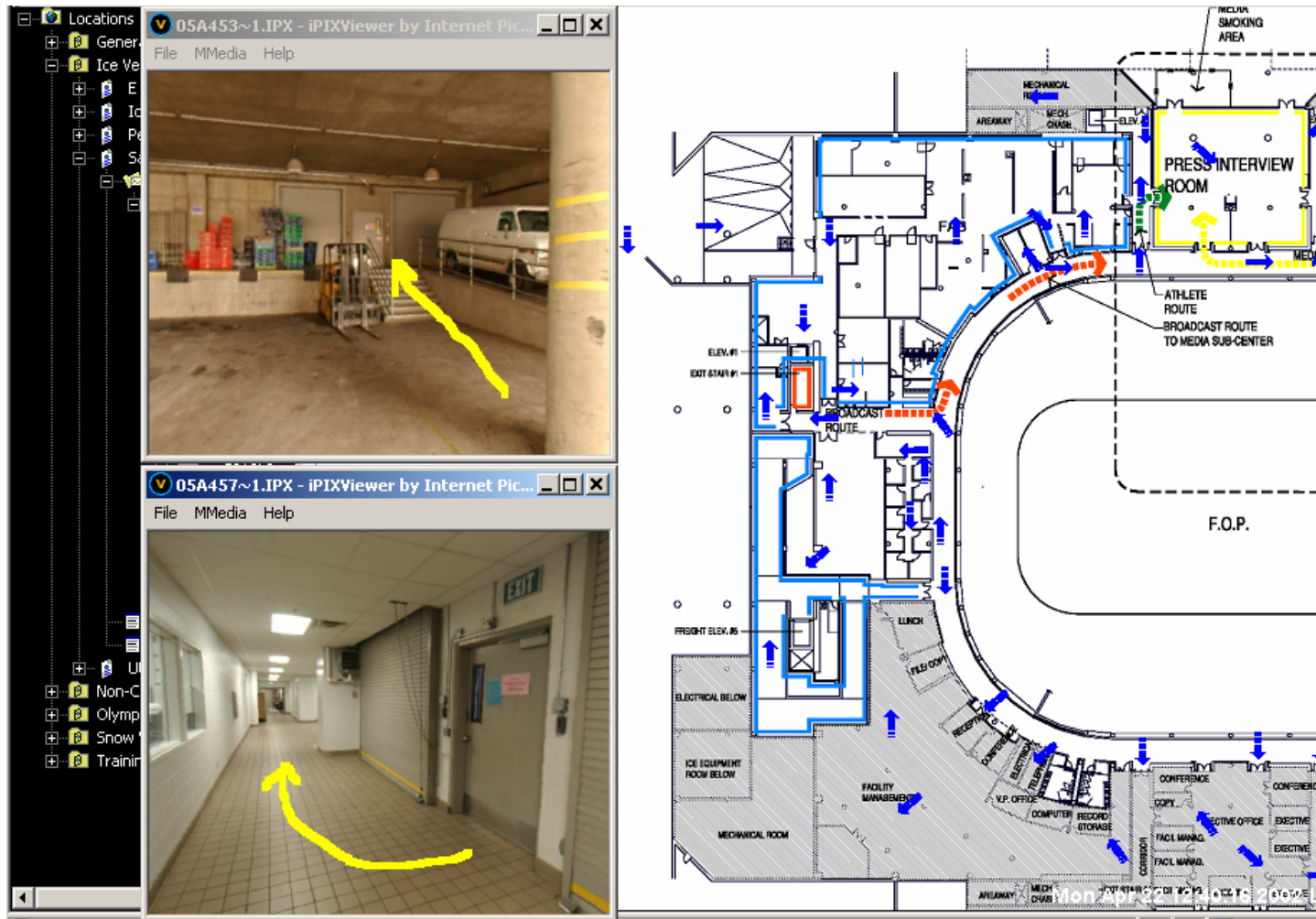


Figure 2: Use of RAMSAFE iPIX 360° x 360° images with floor plan for tactical entry planning.



Operations Phase

With the advent of the Games, it was possible to integrate all phases of operations, from traffic control to management of the several minor incidents that occurred, yet the program always remained ready to scale up to support first responders and senior emergency decision-makers in the event of an actual crisis or terrorist act. The imbedded pre-incident planning information provided first responders and senior emergency decision-makers with immediate situation awareness, including an understanding of the layout and the operations procedures, resources and other tools available for employment and mitigation of the event.

Anecdotal evidence of the value of the software came from numerous venues, staging areas, and command centers. During lulls in activity, pre-staged responders were found independently reviewing their venues and facilities on their laptops, conducting their own virtual tours and reviewing the pre-stored operations plans, improving their knowledge of the venues and the actions they were responsible for in the event of a serious incident.

Largely as a result of the bomb explosion in the Olympic Park during the Atlanta Olympics, comparable sites in Salt Lake City, such as Washington Square, were monitored by live video cameras as part of the pre-incident plan. 180-degree iPIX lenses and camera systems installed in discrete locations enabled a number of users from different computers (including one on the desk of the chief of police) to simultaneously view live incidents from several different angles of their own choosing. These recordings were later extremely valuable for training activities, lessons learned, and for use as evidence in claims litigation.

RAMSAFE was repeatedly used to conduct briefings for dignitaries and VIPS. The visual capabilities of the software and ease of use made it a particularly effective ad hoc briefing tool, effectively used to demonstrate Olympic preparations to senior federal and state decision-makers (see figure 3).

Consequence Management Phase

In the consequence management phase, RAMSAFE is highly effective for many different types of after action reporting. Information recorded in RAMSAFE during an operation, crisis or incident is automatically time and date stamped, and readily retrieved and formatted within the program for providing lessons learned, training documents, or presentation in FEMA reimbursement reports. Social services as well as non-profit and government agency post disaster capabilities can be loaded in the program and accessed during consequence mitigation to minimize complications caused by an emergency and shorten recovery time. The recovery manager will know where to go for specific resources, can file for reimbursement for resource usage, and keep accurate records of recovery decisions and operations.

Conclusion: Emerging Decision Support Software Programs Show Great Promise

911 educated the public to a new reality - that the vertical battlefield had reached U.S. soil, and now included American cities and homes previously considered secure. A chronological review of the last decade is punctuated with an increasing trend of domestic terrorist acts, in both frequency and human cost. Paper-intensive plans necessitated by traditionally low government funding structures can no longer be considered a satisfactory trade off for this higher anticipation of casualties.

Figure 3: RAMSAFE was used to brief senior federal officials on Olympic security preparations for Park City, Utah.



A paradigm shift towards computer software emergency management decision support tools has been mandated in order to respond to the very real reaction times required to protect homeland targets from terrorist extremists. Fortunately, homeland defense funding initiatives coupled with the relatively low costs of emerging powerful software programs like RAMSAFE have been demonstrated to meet the challenge. Even as computer information and connectivity result in force multipliers for the military, a revolution in the tool set required for emergency managers and law enforcement crisis decision-makers is necessary at home in order to substantially reduce the morbidity/mortality rates portended by 911. Decision support software tools like RAMSAFE can be that crisis and emergency response force multiplier today, substantially improving pre-planning and training before the event, enhancing situational awareness and resource management during a response, and organizing post-action information to rapidly provide valuable lessons learned.

The critical mass is present today to take this step. The funding is becoming available through the various homeland security initiatives, and the software programs themselves are demonstrating their viability in challenging situations such as the Salt Lake City Winter Olympics. The costs of the software and hardware to implement this technology is falling, and economies of scale can

bring these costs in line with federal, state, and local budgets. Properly implemented and effectively executed, emerging decision support software for crisis and emergency planning and response can be one of the most cost effective, value added improvements federal, state, and local decision-makers can make to enhance our homeland defense.

References:

1. Rosen, J., Gougelet, R., Mughal, M., Hutchinson, R. (2001). Medical Disaster Conference, Draft Conference Report, June 13-15, 2001. August 30, 2001, 37.
2. Lindsey, D., (2000). A Reader's Guide to the Columbine Report. <http://www.salon.com/news/feature/2000/05/17/guide>.
3. Sanders-Newton, D.& Scott, H. (2001). "But the Computer Said!": Credible Uses of Computational Modeling in Public Sector Decision-Making. Social Science Computer Review, 19(1), 47-65.
4. Sanders-Newton, D.& Scott, H. (2001). "But the Computer Said!": Credible Uses of Computational Modeling in Public Sector Decision-Making. Social Science Computer Review, 19(1), 50.

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Dr. Susan M. Smith is an Assistant Professor at The University of Tennessee Department of Health and Safety Sciences in Knoxville, Tennessee. Prior to accepting her current position Dr. Smith completed a successful 20 year career working with rural communities on the complex issues of disaster mitigation, environmental protection, community safety and community development. She teaches graduate level courses in emergency management, accident prevention and environmental health. Dr. Smith's research areas include: emergency evacuation and warning systems affecting special populations such as the hearing impaired or mobility limited; and the evaluation of rural strategies to achieve disaster mitigation.