State Emergency Response Management Networks

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Abstract

We have seen it happen too many times in the past few years, natural disasters occur and the responses appear to be unorganized, fragmented, and not as efficient as it should be in this day and age. There is a multitude of technology available that could be utilized to better coordinate, facilitate communications, and streamline response to better serve and protect those citizens affected by the event. There are multiple resource management systems in place that could link several different agencies together and track responders and resources during these events, as well as provide them with real time data and images as they occur. Some of the questions I will be addressing are: What does your state currently utilize as a resource management network for your commanders, who are tasked with managing the resources that will respond to these types of events? What capabilities does each system have, and does your state have someone exploring new technology available? Florida has experienced many such events in recent years and seems to be ahead of the game on their resource management network. This research will assess the current technology and capabilities of disaster response systems and make recommendations for the development of a single interoperable national system.

Literature Review

History

Throughout history we have witnessed public outrage and frustration over governmental response to natural disasters, man made disasters and terrorist attacks with a continuing common thread crying for a change or overhaul of how all governmental entities respond to these events. The results of the studies that have been done on all the incidents throughout the years continually call for revamping how government's respond to these emergencies and demand a more efficient response. Despite the outcry for a more efficient response we still, in this day and age of technology, see responses such as the one to Hurricane Katrina that cries for further research and development into emergency response management. Lakshmi Sandhana looks at the importance of an efficient deployment by emergency managers in an article in Homeland Security Today. During disasters of all types, be it man made, natural, or a terrorist attack it is absolutely imperative for emergency resources to be deployed efficiently and for life critical supplies to reach first responders in a timely fashion, a delay of even seconds can lead to loss of life (Sandhana, 2008). Establishing a truly effective disaster relief effort requires authorities to work as a single team with real time situational awareness of assets and personnel, allowing the right people to make faster and better decisions at the right time (Sandhana, 2008). Over the past five years, the state of Florida has greatly improved its

capability in the emergency response realm. This research will look at the technology available in order to improve emergency response as well as examine and evaluate the lessons learned from emergency response over the years.

Agnes and Three Mile Island

There were two major emergencies during the seventies that left a strong and continuing imprint on federal policy towards disasters and, indirectly, upon homeland security. In the book *Disaster Response and Homeland Security: What works, What doesn't,* James Miskel looks at different disasters in the history of the United States and how emergency managers have responded to them. The two were Hurricane Agnes in 1972 during the Nixon administration and the Three Mile Island nuclear incident of 1979 which occurred during the Carter administration (Miskel, 2008). These two incidents gave the perception that the state and local governments were not as well prepared as they should have been and that the operations of the federal agencies had not been effectively coordinated (Miskel, 2008). Critical lessons learned from incidents such as these over the years have taught government entities that the key to a successful response is communication and coordination at all levels of government from local municipal all the way up to the federal level. In every instance when communication and coordination breaks down, so then does the effectiveness of any type of response.

Hurricane Agnes and the Three Mile Island incident took place before the development of the Federal Emergency Management Agency (FEMA) in 1979; however the federal response in both incidents were highly criticized. FEMA was established in 1979 by the Carter administration in response to concerns that the federal government's disaster and emergency preparedness programs were too fragmented and had not functioned well after Three Mile Island and Hurricane Agnes. Hurricane Agnes was only a category 1 hurricane when it made landfall in Florida on June 19, 1972 however it proceeded slowly up the eastern seaboard dropping as much as 19 inches of rain on parts of Pennsylvania. Cities and towns along the Susquehanna River valley were forced to be evacuated and thousands of families were driven from their homes by flooding. Altogether seven states, Florida, Maryland, New York, Ohio, Pennsylvania, Virginia and West Virginia were declared disasters by the federal government, billions of dollars in damaged were caused and one hundred people were killed by this storm (Miskel, 2008).

The unique situation surrounding this storm was the lack of media attention that it drew. Virtually no attention was given to the growingly dire flooding situation as other political events dominated the news broadcasts. On day three of the rainfall, several of effected states governors had a meeting to discuss the lack of and need for a federal response. It was not until June 28, five days after President Nixon had declared disasters in the most affected states and six days after the rain had started to fall in the Middle Atlantic and Northeast region, that the vice president and a senior official from the Office of Emergency Preparedness toured the affected areas to asses the situation and ensure the federal agencies were cooperating fully (Miskel, 2008). During the Three Mile Island incident, although the actual effects of the incident on the public turned out to be slight, the incident generated high levels of public concern about the safety of nuclear power and the extensive effects that a future accident could have on the population (Miskel, 2008).

President Carter formed a commission and gave them six months to look into the government's emergency planning surrounding this type of event. The commission found that the emergency was dominated by an atmosphere of almost total confusion and there was a lack of communication at all levels (Miskel, 2008). Confusion and false reports based on misinformation dominated the response to this event. There was a response plan that was not approved leaving no response plan to be followed in place at the time of the event. The media response to this event was vastly different than that of Hurricane Agnes. The media reported on the potential for radiation release and created a freighting outlook on this disaster that was not based on factual information.   The results of these two emergencies caused the National Governors Association to realize that the federal government that deals with emergency response was too fragmented to be effective and that many of the states themselves were not as prepared to handle emergencies as they should have been. These two events lead to the creation and development of FEMA in an order to provide better coordination and communication during these types of events. (Miskel, 2008).

Hugo and Andrew

After nearly ten years of relative calm in regards to natural disasters, Hurricane Hugo and Hurricane Andrew changed that and once again forced challenges to emergency responders and tested the systems that were set in place. Once again James Miskel's book looks at many lessons that were learned and cries for reform that went out to help come up with a system that works. Hurricane Hugo made landfall in South Carolina near Charleston on September 22, 1989 as a category 4 and caused considerable damage before moving north into North Carolina (Miskel, 2008). FEMA officials arrived in Charleston before the storm to facilitate expected request from state officials and a state of emergency was declared a day and half before the storm made landfall. Despite these efforts there were problems in South Carolina with states requests to the federal government as well as organization of the local agencies. They went back and forth on the timelines of deliveries to the federal entities stating that they got exactly what was requested and that they should have been more specific in their requests. The root of the problem was there was once again a disconnect in communication between the state of South Carolina officials and FEMA officials. Part of this problem was due to the fact that the storm damaged many of the communications systems that the state agencies relied upon to communicate and coordinate during and after disasters. The second main problem was that the state emergency management/disaster relief agency head was an elected official and not appointed by the Governor so it was not as politically situated or as well funded as many others (Miskel, 2008). There were also very few elected officials statewide that had participated in emergency preparedness training or exercises (Miskel, 2008). This was very evident as many aspects of the response caused great confusion and hampered communication. Hurricane Hugo caused estimated 14 billion dollars damage and up until Hurricane Andrew was the most costly storm of our time.

Hurricane Andrew made landfall in Homestead Florida on August 24, 1992 as a Category 4 storm and the third strongest storm ever to make landfall in the United States (Miskel, 2008). Andrew caused 35-40 billion dollars worth of damage and claimed sixty

one lives and up until 2005 it was the most costly disaster in the history of the United States. Once again FEMA in trying to get ahead of the curve deployed agents to Florida prior to the arrival of the storm, the only problem this time is they went to the state capitol in Tallahassee, over four hundred miles away from the affected area. This was to ensure that requests from the Governor were met. Two days after the storm a forward command post was set up at the Miami Airport. A unique problem emerged with Hurricane Andrew as FEMA had set up a plan for accepting applications for disaster assistance via teleservice, the problem with that was cell phones were not ubiquitous and 150,000 people lost phone service, another 1.5 million lost power as a result of the storm (Miskel,. 2008). Problems began to arise once again as communications broke down and emergency management officials were only receiving a partial picture of the storm damage. People were refusing to leave their damaged homes and tempers were rising. Three days after the storm 500,000-600,000 were still without power, although 900,000 had had their power restored, 20,000 were in inadequate shelters; and food and water were still in short supply (U.S. General Accounting Office, 1993). The military played a huge role in the relief effort of Hurricane Andrew as it sent 23,000 soldiers to south Florida to assist with law enforcement duties as well as medical care, food distribution and clearing roadways. Once again accusations of a failed response towards FEMA were being made by county Emergency Management directors and FEMA was claiming that it was the states responsibility to make the assessments and requests to what they needed. Once again after the storm, FEMA was scrutinized by Congress and it was agreed that there was a need for a thorough study for a disaster relief system and contracted to conduct that with the National Academy of Public Administration (NAPA) (Miskel, 2008). The NAPA and General Accounting Office agreed that the principal problem in South Florida was that there had been no "timely and comprehensive system" for assessing damage and quantifying the needs of disaster victims (USGAO, 1993). Many of the problems that existed after Hurricane Andrew were very similar to those of Hurricane Hugo and the Three Mile Island incident and once again, new leadership was brought to FEMA and reorganization was conducted in an effort to change but the system still relied heavily on the private sector for many relief functions. (Miskel, 2008)

Katrina

In terms of the damage it caused and its long-term consequences, there truly has been nothing that compares to Hurricane Katrina. James Miskel goes to great length to examine just what happened in his book and discusses what worked and what did not work. There has also been nothing that compares to the extent of the failure of the disaster relief system in responding to this hurricane (Miskel, 2008). Hurricane Katrina skipped over Key West Florida before entering the Gulf of Mexico and building up to Category 5 status. There was plenty of media attention focused on the path of Katrina leading it directly into New Orleans. Alabama, Mississippi and New Orleans all put pre storm precautions actions in place and evacuated over a million people. FEMA and the Military also prepared by standing up response teams and forward staging water, ice and meals ready to eat (MRE's). Despite the measures taken by all forms of government, the sheer size of the storm overtook the preemptory measures that had been taken. On August 29, 2005 Hurricane Katrina made landfall just east of New Orleans as a Category

4 with a diameter of 200 miles and unleashed devastation on Louisiana and Mississippi that this country has never experienced before. A mandatory evacuation of New Orleans was only issued one day prior to the storm and over 50,000 people decided to stay in either the Superdome or the Convention Center at shelters partly due to the poor coordination of the cities transportation to get them out. Once the levees broke shortly after the storm, thousands of people were stranded in the flood waters in the neighborhoods surrounding the city. The rising water in the streets forced families to move to the second floors and roofs of homes where they had to wait for rescue by personnel from city, state, and federal government agencies (most notably, the Coast Guard which had deployed 4,000 guardsmen, 37 aircraft, and 78 boats of various size to the area) who had not even known which buildings were still occupied and, moreover, had limited transportation capabilities due to the high waters damage (Miskel, 2008). The stranded that were being rescued were also being taken to the Superdome and the Convention Center which was both on the verge of chaos as time went on. The cities plans were for sheltering only a couple thousand people at the Superdome for a short period of time before they could return home. The amount of people who were there were unmanageable as water, food, and sanitation conditions quickly deteriorated. Looting and rioting ensued shortly after the storm as there was a lack of law enforcement presence suitable for controlling that many people. Due to the flood waters the people could not return to their homes and the conditions worsened as the media captured it all and broadcasted the sheer chaos on the evening news. An important aspect to the response is pointed out by Samuel Loewenberg in his 2005 article from *The Lancet.* The failing emergency response was not due to a lack of resources, but a lack of coherent planning (Loewenberg, 2005). It was not until the National Guard arrived that order was reinstated and with their assistance people were relocated from the Superdome and the Convention Center to locations around the United Sates. The media spotlight of New Orleans overshadowed the destruction suffered by the gulf coast of Mississippi. The city of Biloxi was devastated as rescue teams from Florida arrived to assist. There was a distinct absence of federal aid and recovery in Biloxi possibly due to the national media attention that New Orleans was getting. Shortly after the storm the Mayor of New Orleans was on television making demands to the federal government as well was the Governor of Louisiana placing blame and making accusations of a failed response from FEMA instead of looking inward as a cause to the lack of preparation. All in all Katrina claimed 1,300 lives, was the most costly natural disaster our country has ever experience and affected three states and more that 900,000 square miles and once again left a black mark on a governmental response to a disaster citing lack of communication of damage assessments, coordination of local, state and federal resources, as well as the lack of timely response to those in need. The failed emergency response was not due to a lack of resources, but to a lack of coherent training. These complaints are the same as Hurricane's Agnes, Hugo, Andrew, Katrina as well as the Three Mile Island incident and once again led to a change in the leadership at FEMA. (Miskel, 2008)

Lessons Learned

One of the biggest questions that comes to mind when reviewing the lessons learned from all the above mentioned emergency response cases is why hasn't more

been done to change the procedures to improve the response procedures. (Miskel, 2008) It seems that time after time the solution has been to reorganize agencies or simply make a change in leadership, but the basic problems of communication and coordination seem to remain. As outlined in Stew Magnuson's article *Crisis Management* in National Defense, a vital part of crisis management is knowing what is available, where it is, and how it is going to get where it needs to go. When Katrina struck there was no tracking system in place. Once the truck with supplies left the warehouses, they were lost, arriving with MRE's, medical supplies, water and ice at the wrong places and at the wrong time (Magnuson, 2007). Stew Magnuson goes on to describe how the timely delivery of supplies immediately following a disaster is critical to not only meet the needs of the citizens but key in the acceptance of the public to the governmental response. David Paulison has served as the face of emergency management in the second term of the Bush administration, rehabilitating the beleaguered FEMA to the point where it earned praise from both sides of the aisle in Congress and where it acted decisively in the face of disaster, a far cry from the debacle in the aftermath of Hurricane Katrina (McCarter, 2008). The key to the improvements is in part attributed to the improved working relationship between the federal and local governments. The states have to face the facts that they are responsible for their citizens well being and that their efforts and preparation prior to the disasters will make the difference when it comes to meeting the needs of the affected people. Florida has experienced positive changes after being hit by four hurricanes from 2002 to 2005. Emergency management training and preparation have improved resulting in better communication on all levels, but still there have been issues. The states continue to work with FEMA as Texas did this past year in preparation for Hurricane Ike that hit the Texas coast. Texas opened 60 points of distribution sites for getting supplies out and FEMA officials worked closely with state and local officials to pre-position trucks to best serve these locations (McCarter, 2008). Hurricane Gustav hit New Orleans and the coast of Louisiana almost three years to the day after Hurricane Katrina but the difference in preparation and response seemed decades apart. As with Hurricane Ike, FEMA officials hit the ground running, getting into place far before the storm and working hand in hand with the Governor and the Mayor of New Orleans. There were several joint press conferences to ensure that there was a consolidated force to protect the affected region and evacuations and assets were set in motion far before the storm was even near. FEMA came to Texas and Louisiana as a wiser partner, learning from hurricanes Katrina and Rita but also from its actions during Hurricane Gustav and from tornados and flooding in Iowa over the summer (McCarter, 2008). As FEMA has improved their efforts over the past few years the public needs to understand that FEMA is not large enough to take care of every region during disasters, that responsibility falls squarely on the shoulders of the states and municipalities that are immediately affected. As Beverly Bell describes in the *Nation's Cities Weekly,* the development of the Emergency Management Assistance Compact (EMAC), formed after Hurricane Andrew, signed into law by Congress greatly assisted regions in the development of disaster preparedness (Bell, 2007). It became the first National Disaster Relief agreement to be ratified by Congress since the Civil Defense Compact of 1950 (Bell, 2007). There has sense been tremendous growth and support to the EMAC and to promote interstate and intrastate mutual aid around the country. This development of a nationally standardized system along with adequate financial backing is working to provide the highest level of

mutual aid and coordination throughout the nation in an effort to be better prepared. Great strides have been made across the United States in regards to preparedness of Emergency Management in maintaining a high degree of coordination with state, local and private sector partners nationwide (McCarter, 2008).

New Technology

The consistent key points to all the problems experienced by emergency managers are communication and coordination breakdowns. That is a dominating factor that comes out of all the after action reports of failed responses throughout our history. One option to alleviate that problem today is the use and development of available technology. Lakshmi Sandhana looks into how technology is helping to develop a resource tool for emergency responders in his article *Assets at a Glance* in the August 2008 issue of Homeland Security Today. There are several programs, devices and tools that are being developed that could shore up some of the gaps in emergency response that have historically broken down. One of the most obvious goals is to achieve Total Asset Visibility (TAV) during emergency response procedures. TAV is an overarching requirement for any response or recovery agency. It is having situational awareness of your assets, teams, equipment, personnel and facilities (Sandhana, 2008). Having a real time picture of where all of your assets and personnel are will greatly assist emergency managers in making real time decisions that are effective. This can be achieved by outfitting emergency vehicles and personnel, supply vehicles and equipment with Global Positioning Transponders to transmit current locations back to a command center and feed it into a geo mapping program that will give a real time picture of everything that is going on in the response arena. GIS software can be used to generate thousands of maps for both "big picture" decisions support and ground level response (Morgan, 2005). Researchers at the Georgia Tech Research Institute (GTRI), Atlanta Georgia are developing a collaborative mapping tool to help officials identify, activate, track and coordinate response assets in real time (Sandhana, 2008). The program would facilitate numerous data layers and could track everything from responders to shelter and hospital locations and could be adapted for use during all types of incidents. This type of tracking and data system could also be beneficial in pre emergency preparations for forward staging of assets, command posts, and emergency response personnel.

Integration of technologies such as Geographic Tools for Visualization and Collaboration (GTVC), and communication technologies would provide for superior decision making for incident commanders across the nation. Communication is a key component to this piece as we have seen throughout history. A lack of communication between levels of government, the private sector, field response personnel and volunteers can cause the entire system to break down. As in some of the major disasters previously discussed, the problem was not always having the assets needed to respond, it was communicating the need to get them to a specific location at a specific time. With today's technology, teenagers are texting messages, photos, and streaming videos back and forth on hand held devises yet law enforcement and emergency personnel are for the most part still working of an antiquated system of a voice conduit. The Los Angeles regional common operational picture program has bought into this

concept and purchased the program from a company called Antares X Command and Control System in order to process, filter, and organize information instead of just transmitting it (Magnuson, 2008). The plan is to put all of the emergency responders located in Los Angeles County on this system to achieve interoperable communications between all emergency response disciplines. Interoperability is another key component to a successful response to emergencies; especially one that covers a very diverse area with several jurisdictions crossed such as hurricane Katrina.

The further development and implementation of these communication, data coordination, and tracking systems will greatly facilitate total asset visibility and ensure that decisions that are made in command centers around this nation are efficient and standardized leading to successful response at all levels. The state of Florida has begun the process of implementing this type of system and it has been named the State Emergency Response Management Network (SERMN). This system is a collaboration of several different private sector companies all working together with a government agency (Division of Emergency Management), to provide the best tool available for responders and the citizens of the state of Florida. The SERMN is a logistics focused hub to assist emergency managers in: incident management, resource management, personnel credentialing, situational awareness and geo mapping, logistics and shipping/transportation, inventory management and training. The SERMN will work to bridge the gap that existed previously in emergency response will aid in interagency collaboration, interoperability and creating a common operating picture across all disciplines to provide the best possible service to the public. The formation of this system is the result of several private companies working together with government in order to meet the needs of emergency management personnel. The companies working together with the Florida Division of Emergency Management are InMotion Global TMS, CH2M Hill, Emergency Visions ScanLynx, and Numerex (formerly OrbitOne). All these private companies brought their own area of expertise to the program and are utilizing the latest technologies in order to create a network that coordinates every element of emergency response. This highlights the importance and significance of different entities working together to accomplish a common goal setting the example for all governmental entities to follow in order to avoid the failed emergency responses of our past. Florida is working hard to get in front of this problem and tackle it head on to ensure the citizens get a timely and unified aid when in need. (Miskel, 2008)

Methods

The purpose of this research is to determine both the needs and benefits of an emergency resource tracking system that could provide total asset visibility during emergencies. A survey was conducted of all five states bordering the Gulf of Mexico and six Atlantic Coast states with two other random states included. All emergency management department heads or their representatives in these states were contacted prior to the distribution of the survey instrument to explain the purpose of the research and to identify points of contact. These states were selected as they are all coastal states that are prone to direct hits from hurricanes forcing their emergency management personnel to prepare for such a disaster response. A portion of the survey was to identify

what resource tracking system is currently utilized by each State Emergency Management Department.

Each State Emergency Management Department is responsible for coordinating the efficient and effective response to all types of disasters or events that occur within their respective states. Creating Total Asset Visibility (TAV) and integrating that with a situational awareness tool will greatly assist unified command and control efforts. Also examined in this survey was how a unified system that would create a common operating picture and seamless integration between incident management, resource management, logistics, shipping, and inventory/ warehouse management would better prepare each identified State Department of Emergency Management for response to such disasters.

While measuring efficiency can be quite difficult, the purpose of this survey was to identify the potential of utilizing a common effective management system in multiple states in order to facilitate response and tracking for emergency managers in the Southeast United States providing a better, more timely response to those in need. Participants in this survey may feel pressured to answer in favor of their current method of tracking and response however the purpose of this study is to identify the most efficient and effective resource systems available.

Additional information was gathered to indentify what type of interoperability communications each state utilizes to connect all of the responders with those coordinating the response. These surveys gathered information surrounding the current capability of interoperability as well as resource management of these responders. The results of the surveys and interviews helped to give a picture of what management systems are currently in use as well as the variety of the management systems. The survey results will be a valuable tool for emergency managers to identify a system that is universal and can be utilized by emergency managers across this nation.

Results

There are several states that are vulnerable to frequent direct hits from hurricanes along the Gulf of Mexico and the Southeast United States. Of these states, thirteen were selected and included in a survey of what resource management systems are utilized during natural disasters and hurricanes in their respective states. Two non gulf coast or coastal states were also selected at random. Ten states responded giving a 77% return rate. The ten states responding to this survey are shown below.

- Texas Division of Emergency Management
- Louisiana Office of Emergency Preparedness
- Mississippi Emergency Management Agency
- Alabama Emergency Management Agency
- Florida Division of Emergency Management
- Georgia Emergency Management Agency
- South Carolina Emergency Management Division

- North Carolina Division of Emergency Management
- Tennessee Emergency Management Agency
- Delaware Emergency Management Agency

Each state has a dedicated agency or division responsible for the management and coordination of emergency resources during natural disasters. A survey was sent to each respective agency. The survey consisted of seventeen questions in an attempt to ascertain what types of resource management tools are utilized for resource management during response to natural disasters. I received a response from ten of the thirteen states surveyed through electronic mail, facsimiles, and telephone calls with agency representatives. Virginia, Maryland and Kentucky were sent surveys but never responded. Although most of the surveys were filled out and returned, several questions from the surveys were not completed from various states.

All of the states that were surveyed were asked to list what kind of computer based technology system that their state currently utilizes for resource management during a disaster response effort. Six of the states listed utilize a web based software program called Web EOC. These six states are Texas, Louisiana, Mississippi, Tennessee, South Carolina and North Carolina. Each of these states has some version of Web EOC. Some are more developed in the capabilities than others but they are all based on the same program. Of the remaining states surveyed Alabama, Florida, Georgia, and Delaware each have a different system in place. The state of Florida utilizes a system that has been named S.E.R.M.N. (State Emergency Response Management Network). This system is currently in Phase II implemented in 2008. Phase III of this network tool is expected to be implemented by 2010 and will include both feature and integration enhancements. The state of Alabama utilizes a system named E.M.I.T.S. (Emergency Management Information Tracking System). This system was formally called EM2000 originally purchased in 1994 and was updated into EMITS in 2005. The state of Georgia utilizes a web based system named E-Team. Seven states are currently using the same system but various versions of that same system. Only one state is utilizing a system that was implemented in the past year or two. The state of Delaware utilizes a system called Incident Master. This is a web based technical system that is provided by a vendor called Environmental Support Solutions (ESS). This system is currently being developed and they are hoping to be fully functional within the next year. Web EOC is the most common program that is utilized however the variations of that program give different capabilities depending on what version is utilized. There is no one unified system that is utilized by all the states that were surveyed.

Of all the states surveyed Alabama, North Carolina, South Carolina, Tennessee, Delaware, Florida and Texas have some type of capability for centralized communication to be utilized during emergency response. There are various versions of centralized communication available such as the Palmetto 800 megahertz radio system in South Carolina, an 800 megahertz system in Delaware, Viper in North Carolina, Mutual aid channels pre designated in Tennessee and Texas, and the state of Florida utilizes the Statewide Law Enforcement Radio System (SLERS) to provide State law enforcement officers with a shared 800 MHz radio system. This digital system serves over 6,500 users with 14,000 radios in patrol cars, boats, motorcycles, and aircraft, wherever they may be

located in the state. This is in addition to the Florida Interoperability Network (FIN) which links all local resources through mutual aid channels. Georgia has two systems that they utilize for interoperability. There were only two states that either stated that they did not have centralized communication or simply did not answer the question. Once again, a very diverse range of centralized communication from all of the states surveyed.

Total asset visibility is a key element to assist command and control with directing resources during an emergency response. Each state surveyed was questioned on whether or not their response systems provided total asset visibility during emergency response. Of the ten states that replied to the survey only three advised that they had total asset visibility. Those states are Florida, Mississippi and Tennessee. North Carolina advised that they have partial asset visibility for their emergency response management. Florida attains this through the use of Numerex Satellite Transmitters to transmit the real time location of an asset that can be viewed within the various user interface areas of SERMN. Mississippi accomplishes this through texts and spreadsheets and is backed up by asset transfer forms. North Carolina achieves partial asset visibility through the Map Tac Module. Several of the states that answered that they did not have the total asset visibility, advised that the systems that they use offer the capability, but they have not added this option to their package. The state of Delaware advised they are currently working on attaining this capability.

One question, requested information on whether the resource management system that is in use, provides a geographic tracking system for asset deployed during the emergency response. Only one state has this capability available at this time. Florida is the only state that has this capability available for use at this time. Florida uses the "GTVC" module that manages this aspect and provides a location interfaced with a geographic map for real time viewing to aid in command and control. GTVC is the geographic tool for visualization and collaboration developed and licensed by the Georgia Tech Research Institute. The state of Texas does not currently have the geo tracking capability but is working on an interface from Web EOC to Google Earth to give them this capability. Louisiana advised their state does not have this capability, but advised that their system, Web EOC is capable of accomplishing this function. South Carolina also added that Web EOC capability to geo track is limited, and it is not very functional. They are going to look into integrations with other companies to obtain this capability. Alabama advised that they do not have the geo tracking capability at this time, however the capability from their EMITS system (Emergency Management Information Tracking System) offers them the option to add this capability. North Carolina advised that they do not have this capability, but only because the RIMS module of Web EOC in not implemented at this time. The state of Tennessee advised that they also do not have this capability at this time, but are installing the Web EOC "tracker" this month, which should give them this capability. The state of Delaware advised that their system does include a geo tracking aspect; however, it does not display the resources on a map in real time. They are currently working on a new system that will provide this through a geographical map with icons to track resources. Two states simply advised that they do not have this capability, and did not advise whether or not they were trying to acquire it. Although only one state has a full operational geo tracking capability, all but two seem to be getting close or working towards obtaining this important tool for emergency response command and control.

Another question, requested information as to whether or not the emergency management systems which each state had in place was accessible on smaller electronic devices such as laptops, Blackberries and PDA's. This would enable mobile access to information in the field of operations during the disaster repose. Seven of the states, reported that their systems were accessible through the use of smaller electronic devices. These states are Alabama, Louisiana, South Carolina, Tennessee, Texas and Mississippi. Several states expressed a few issues being that of limited viewing capability on the small devices as well as it being view only in this mode.

There were four survey questions that were answered unanimously amongst all the states surveyed. These questions were: does your state conduct training exercises on a regular basis; does your state have identified strike teams available for deployment to areas impacted during disasters; does your state actively involve state agencies with special capabilities in your response planning; does your state resource protection or marine and wildlife entities play an active role in the emergency response protocol? These questions were all answered yes by the states that were surveyed except for one state which did not answer this question.

Of all the states that responded to the survey except for one advised that they currently had at least one person or groups of people assigned to research the latest technological options available for emergency responders. Of these states that indicated they had someone currently assigned, Florida advised that they have a user group assigned to this task; Alabama utilizes agency representatives and information technologies personnel. Mississippi stated that they have many personnel assigned to this task. South Carolina has one person assigned to this task. Texas leaves this task to each respective agency within the state to conduct this research. Tennessee, North Carolina, Delaware and Louisiana all stated that they did have someone assigned to this task but did not elaborate on what type or how many personnel.

The final question on the survey questioned if each state is looking to change, enhance or update the current emergency response system that is in place. Of all the states surveyed, seven advised that they were currently looking to enhance or update their states emergency response system. Florida advised that they were moving into Phase III of SERMN within the next sixty days of the time of the survey. Mississippi advised that they had just completed a major upgrade to the Web EOC and the state GIS system. Texas and Alabama advised that they would be doing upgrades based upon available funding, with Texas targeting 2010 and Alabama within the next three to five years. The state of Delaware advised that they were in the process of building a new emergency response system that should be in place by the last quarter of 2009. The state of Georgia advised that their state emergency response plan is currently in revision but they have no plans to replace the utilized technological systems. One state did not answer this question on the survey when returned.

State Emergency Response System Analysis

Participating State	System Name	Geotrac Capable	Includes all levels of emergency response	Centralized Comm.	Total asset visibility	Research assigned for new technology	Seeking to enhance system
Alabama	EMITS	No	Yes	Yes	No	Yes	Yes
Delaware	ESS	No	Yes	Yes	No	Yes	Yes
Florida	S.E.R.M.N.	Yes	Yes	Yes	Yes	Yes	Yes
Georgia	E-TEAM	No	No	Yes	No	No	No
Louisiana	WEBEOC	No	Yes	N/A	No	Yes	N/A
Mississippi	WEBEOC	No	Yes	No	Yes	Yes	No
North Carolina	WEBEOC	No	Yes	Yes	No	Yes	Yes
South Carolina	WEBEOC	No	Yes	Yes	No	Yes	Yes
Tennessee	WEBEOC	No	Yes	Yes	Yes	Yes	Yes
Texas	WEBEOC	No	Yes	Yes	No	Yes	Yes

State Emergency Response

Participating State	Emergency response training	"Strike Teams"	State agencies with special capabilities	Resource protection and wildlife entities
Alabama	Yes	Yes	Yes	Yes
Delaware	Yes	Yes	Yes	No
Florida	Yes	Yes	Yes	Yes
Georgia	Yes	Yes	No	Yes
Louisiana	Yes	N/A	N/A	Yes
Mississippi	Yes	Yes	No	Yes
North Carolina	Yes	Yes	Yes	Yes
South Carolina	Yes	Yes	Yes	Yes
Tennessee	Yes	Yes	Yes	Yes
Texas	Yes	Yes	Yes	Yes

Discussion

After reviewing the results of the states surveyed seven of the ten states surveyed have the same base emergency response system however those that have the same base system have different versions of that system. Each state seems to be unique with the emergency management system that they utilize. Some are further developed and advanced than others due to various factors. With the ideal situation being every state operating on one universal system that is effective across the nation, the results of the surveys sent out reveals that we are still a long way from that occurring. Even though it does not exist today, there is hope that one effective and efficient system is identified and implemented across the United States. The benefits of this would be a vast improvement in the effectiveness and efficiency of emergency response nation wide. This would drastically improve the responders abilities to save lives, restore order faster, and limit the overall economic impact that disasters have on our citizens, economy and infrastructure.

Seven other states are all on another very comprehensive emergency response system called WebEOC. On the surface it appears as if all seven states would have the same capabilities however through the results of the surveys it is apparent that there are different levels of the WebEOC program. Of the seven states surveyed that utilize this program, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee and Texas each cited different capabilities and limitations of the WebEOC system. Of these seven states that are utilizing WebEOC, only Mississippi and Tennessee have a total assets visibility capability. The reasoning behind this may be linked to funding available by each respective state to devote to the emergency response management systems or to when the system was implemented in the respective states. There are different versions and capabilities within WebEOC itself that can affect the capabilities of the systems. This appears to be determined by the year it was implemented or upgraded. It is promising that all states except for Mississippi, who has just upgraded their system, are seeking to enhance the capabilities of the system they are utilizing.

One of the states that stand out as far as innovation in this field is the state of Florida and its State Emergency Response Management Network. This system is very complex and diverse and spans to include all levels of government as well as the private sector. The program itself is developed by five different private companies working collectively to establish one system that does it all. This system includes all of the necessary components to effectively manage an emergency situation from all aspects. It allows managers to the have the most essential aspect of managing any response: total asset visibility, real time situational awareness, coordination and communication between multiple agencies, and the logistics capability to quickly and efficiently move assets in the theater of operations. When those in command and control are able to actually view exactly where all their assets are from emergency responders to relief supplies, then they are able to make accurate and quick decisions in real time as to where to send these critical resources in a timely manner. This program also allows and incorporates the private sector to participate and contribute to the response in an effort to facilitate those needs. GPS tracking beacons are utilized by all of the trucks that are transporting these essential relief supplies which gives those with command and control the ability to constantly evaluate where their assets are going and if the needs of the affected region are being met. This system also tracks all levels of governmental response so once

again those in command and control will be able to coordinate those efforts and centrally direct them to where they are needed. The system also includes a vital component for any response effort, which is a transportation management system (TMS) to actually move assets via a multi-modal network of state/county/municipal vehicles and equipment, common carriers and third party logistics providers. Evidence of the success of this program development and implementation is the recent appointment of Florida's Director of Emergency Response Craig Fugate to be President Obama's FEMA Administrator. Perhaps Director Fugate will leverage the experience and success which he has gained working with Florida's State Emergency Management System Network consider expanding this program nationwide.

During emergency response or disasters it is essential to properly identify trained personnel and deploy to each incident as needed. The results of the survey revealed that every state surveyed conducts emergency response training on a regular basis. Many of them do several times a year as well as different types of training or exercises. Texas conducts five state hurricane exercises per year and two nuclear power plant exercises. Florida conducted statewide hurricane response training in 2007 and 2008 and now has training and quick reference guides available on line. North Carolina has monthly exercises on WebEOC, quarterly logistics exercises, and yearly state exercises. It was clear by the results how important the training for such emergencies is taken by all of the states surveyed. Every one of them listed very thorough training exercises that are conducted throughout the year. Every state also identified that they have selected "strike teams" or identified personnel to deploy to these emergencies in time of need. It is evident that a key to a successful emergency response is to have pre identified teams of personnel standing by to respond when needed.   All of the states surveyed also acknowledged that they utilize their resource protection or Fish and Wildlife Protection agencies during such emergencies or disasters. This is most likely due to the unique capability and equipment that are standard with these types of agencies.

The greatest degree of variance between the states seemed to be in the ability to actively geo-track assets while deployed during an event or emergency. This capability was held only by the state of Florida. This can be a very advantageous capability for command and control during these emergencies and disasters. The benefits of being able to geographically track your assets can lead to more effective and decisions by commanders and lead to a safer and more effective response.

It is very apparent after studying all of the previous discussed disasters that have impacted the United States over the years, the country would only benefit from having one universal response management system. The degree and capability of responders fluctuates from state to state, having said that there have been marked improvements by many of the states over recent years. The importance of having a fully capable system to effectively manage and respond to disasters has been highlighted by media outlets brought to the highest levels of Government. This added attention has aided in the development and improvement of many emergency response management systems across the United States. History has documented and shown us the unacceptable consequences of not being prepared to respond to such disasters and state governments are working hard to improve their systems to ensure that does not happen in their states. As seen throughout history, especially when dealing with hurricanes, these events are seldom restricted to one state. Often times the response is spread across state and

jurisdictional boundaries creating a multi state coordinated response. These events highlight a need for all states to be working on a common operating picture with the same capabilities. With all of the technology out there available today, it is only a matter of time before a system is put in place that can do all the necessary tasks that the ones who are commanding and controlling an emergency response will greatly benefit from. Ultimately it will be the citizens of the effected area as well as the first responders who will be the ones that benefit from the advantages that this type of technology can bring.   A day when all states that are affected by hurricanes or natural disasters can utilize the same technologies and response methods would only drastically improve response and improve effectiveness and ultimately save lives and infrastructure.

Recommendations

The results of this research show that while there are several states on one type of resource management system, there is only one that has a complete, technologically enhanced system that gives those in control complete command and control of the response they are managing. While many states are rapidly approaching this capability each one seems to have uniqueness to its system. Having one response system across the United States with all of these capabilities would only benefit all of the managers and responders to these types of incidents.   Collaboration and sharing of current systems and technology by all of the states to come up with one common resource management response network could lead to the prevention of repeating history when it comes to disaster response and better equip everyone to better save lives and protect infrastructure.

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State Emergency Management – Technology Survey

1. Currently, does your agency (Department of Emergency Management) utilize any kind of computer-based technical system for resource management during a disaster response effort? (software, web-based application, client/server application, mainframe application)

2. If no to #1 above, what kinds of tools, standards or processes are being used for resource management during a disaster response?

3. If yes to # 1 above, what is the name of the technical system and the name of vendor who provides it?

4. If yes to #1 above, what kind of technical system is it? (client software, web-based application, client/server application, mainframe application, other)

5. If yes to #1 above, does your system include all levels of emergency response; local municipal, county and state?

6. If yes to #1 above, does your system include a geo-tracking aspect that has the capability to track resources in the field during an emergency response and display them on a graphical map in real-time?

7. If yes to #1 above, does your system provide for "Total Asset Visibility" of all deployed resources in real-time during the emergency response? If so, how is the information displayed? (text-based listings, spreadsheets, displayed on a graphical map with icons, etc.)

8. If yes to #1 above, does your technical system include access for the private sector in the planning and response to emergencies?

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9. If yes to #1 above, does your technical system allow access to system information through devices other than personal computers? [Laptops, Personal Digital Assistants (Treo, Blackberry, Palm Pilot, iPod, etc), web-enabled cellular phones, landline phones, etc]

10. If yes to #1 above, does your technical system support the financial reimbursement process for resources that were provided to your agency by outside entities or agencies during an emergency response? (federal, state, county, city)

11. Does your state have a method of centralized communication for all different levels of responders? For example, local, county and state law enforcement units? If so, please describe.

12. Do you conduct training exercises on a regular basis? If so, please describe.

13. Do you have identified "strike teams" available for deployment to areas impacted by disasters? If so, please describe.

14. Do you actively involve state agencies with special capabilities in your response plans? If so what agencies?

15. Does your state resource protection or marine and wildlife entities play an active role in the emergency response protocol in your state?

16. Does your state currently have someone assigned to research the latest technological options available for emergency responders?

17. Are you currently looking to change, enhance, or update your state emergency response system? If so, in what timeframe?

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