

NEW JERSEY'S MULTIMEDIA EMERGENCY PREPAREDNESS NETWORK: LEADING THE WAY

A CASE STUDY BY MUTUALINK, INC.

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OVERVIEW

Painfully, a series of large-scale disasters have made us all too aware that we remain vulnerable to the tragic impacts of catastrophic accidents and natural and man-made disasters. While preventing all catastrophes remains beyond our reach, these high profile disasters have invigorated efforts to improve methods, systems and procedures to better prepare for, mitigate, respond to and recover from emergencies. Effective real time information sharing, communications and collaboration among partner agencies, both within communities and across jurisdictional boundaries, is one area that is universally recognized as being a vital underpinning to achieving a more responsive, capable and resilient emergency response infrastructure. This paper describes how a number of public agencies and private enterprises in New Jersey have taken the lead in addressing this situation with an innovative solution that has dramatically improved the area's ability to respond to incidents. The system is continually expanding with more public agencies and private enterprises becoming willing and active participants for their good and that of the entire community.

INTRODUCTION

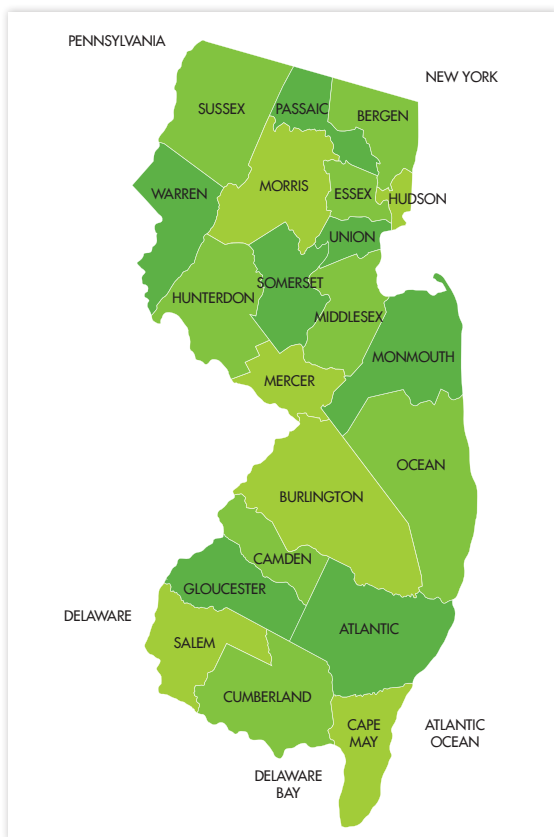
Quite often New Jersey is characterized as "the state next to New York City", or "the place where the Jets and the Giants play football" or even "the place made famous by Tony Soprano". Of course all of these characterizations do a great disservice to the State. New Jersey's state motto is "Come See For Yourself." The motto serves to call attention to its vibrant communities and important business environment. New Jersey is a populous, diverse and economically significant state with critical infrastructure that plays a direct role in sustaining and fueling the social and business structure of the east coast as well as the national economy. But, thanks to a number of New Jersey visionaries, perhaps the motto should be changed to "Follow Us"! Without a doubt, New Jersey is leading the nation in implementing a comprehensive multimedia communications, information sharing and collaboration solution that enables a multi-partner scalable and flexible planning and response environment to handle natural and man-made disasters of all types and sizes. New Jersey has taken direct, positive action and has implemented a system that is providing effective results today that impacts a major portion of the state and its residences. This case study is a description of the problems they faced, the solution they implemented, and the scope of their activities. Other regions and states can learn from their experiences and replicate their success - just "Follow Us".

THE ENVIRONMENT

Although covering a small geographic area, New Jersey has the 11th largest population in the United States making it actually three times as dense as its New York neighbor as well as being the most densely populated state. The population density is further complicated by the heavy commuter traffic between New York City and Northern New Jersey. As an example, Jersey City, the city "next" to New York City, sees more than a doubling of its 241,000 residential population during the business day. Within its 21 counties, there are 566 municipalities, most with their own public safety and fire departments.

In recent years there has been a significant increase in the number of companies and resulting employment in the financial services, chemical and pharmaceutical sectors within the state, especially in Northern New Jersey. Its close proximity to New York City has resulted in a large portion of the state (by population) being designated as part of the Department of Homeland Security's tier one Urban Area Security Initiative (UASI) regions.

The state's geographic location has made it a major transportation hub with a very large and active shipping port, rail lines, mass transit system, a major truck route to and from New England, an international airport and multiple bridges and tunnels linking it to New York City.



New Jersey and County Boundaries

in the hands of our professional and volunteer police, fire, and EMS first responders, the active involvement of other supporting agencies, non-governmental agencies and private enterprises is required to bring to bear the full spectrum of emergency support functions necessary to optimally handle response and recovery. Hospitals, transit, rail and port operators, arenas, shopping malls, schools and other places of mass gathering, electric, gas, and water utilities, other critical infrastructure companies/agencies and private enterprises can all be affected by an emergency and in many cases engage in primary and secondary emergency support functions.

Although many of these organizations utilize two-way radios (land mobile radio) for their day-to-day and emergency operations, many do not. Today, people and organizations rely on multiple communications media besides two-way radios. Conventional wire line and cellular telephone, video, intercom and public address systems are selectively used. The technologies used for these systems vary from twenty-year-old radio and intercom systems to state-of-the-art IP based voice and video systems and this was the case in New Jersey. We truly live in a "Tower of Babel" era when it comes to real time interactivity among agencies and enterprises.

THE PROBLEM

With such high population and transportation density and the resulting ever-present congestion, for the hundreds of different agencies responsible for responding to or participating in responses to accidents and disasters, the task of timely coordination can quickly become overwhelming. This situation is complicated by the fact that most of the responding and participating agencies have difficulties communicating with one another in a timely fashion. Historically, this problem has been referred to as the lack of radio system interoperability or in layman's terms, "public safety first responders cannot talk to one another". Over the years, agencies have partially addressed this problem with Mutual Aid Agreements, MOUs and procedures to address common incidents. However, these arrangements are not necessarily effective in dealing with unforeseen or wide spread incidents or those that involve private enterprises or non-public safety agencies.

Unfortunately, the problem has a far greater scope and impact. While core response functions remain firmly

THE CONSTRAINTS

Expecting all of New Jersey's public and private institutions to replace or add new common equipment and procedures to resolve this issue is a convenient but unrealistic approach due to technical, political, legal, and most importantly, a substantial cost issue. Today's solutions consist of a patchwork of agreements, one-off equipment and channel sharing arrangements and contingency plans that are activated when a specific type of pre-defined incident occurs. But, recent history has taught us to expect the unexpected. Pre-set, canned responses are no longer adequate alone. Flexible, scalable and seamless collaboration involving voice, video and information that spans disciplines, agencies and jurisdictions is essential to creating a situational aware and intelligently adaptive command, control and response capability.

Assuming the technical and logistical problems described above can be solved, there still remains a major stumbling block to cooperation and collaboration. It is probably the most significant factor in inhibiting progress in the area of emergency communications interoperability. It is "who is

in control?" The inability of different agencies to agree to relinquish control or yield to the discretionary control, objectives or interests of any other agency or governmental entity is the largest problem impacting effective incident responses. While one may be quick to ascribe such an issue to petty power and control squabbles, the reality is in many cases the tension is legitimate and driven by agencies having different duties, resource limitations and responsibilities, different stakeholders, and also differing legal restrictions and requirements being imposed upon them, which can be based on privacy, secrecy and liability laws as well as the actual or practical limitations of infrastructure resources. Additionally, the problem may not be that people cannot talk. Instead it may be either too many people are talking or the wrong people are talking with each person feeling fully justified in their communications almost independent of others.

Notwithstanding this background, the Department of Homeland Security has done an outstanding job in formulating and promoting a uniform system for incident management that seeks to create an interoperable framework of common organizational command. In order to minimize the basic differences among agencies, DHS, through the National Incident Management System (NIMS) and the Incident Command System (ICS) established procedural standards. However, during the initial response to incidents, people, with their own understanding and organizational structure and priorities, need to act quickly and decisively to gain control of the situation. In all but the most basic, small-scale incidents, communications collaboration and information sharing between organizations is required to establish good situational awareness and implement and adapt coordinated objectives. In many instances, it takes too long to establish effective communications and information sharing involving the right agencies and assets at the right time. The lack of effective communications and information sharing delays response, de-leverages assets, and can place responders in unnecessary danger.

Although there is universal agreement on the need to address this issue, practical constraints have stymied the effort for many years. These major constraints include:

1. The lack of funding grants or budget priorities to pay for the system of sufficient scale and breadth to allow effective use.
2. The need to interconnect existing communications equipment instead of requiring the simultaneous wholesale replacement of equipment.
3. The ability to interconnect existing systems with new systems (such as P25 radio systems or wideband 700MHz) as they are implemented with minimal (or no) forced obsolescence.
4. The ability to interconnect various types of public agencies and private enterprises within the restrictions imposed by the FCC and other government regulations.
5. The need to automatically add users to the system with minimum (or no) impact on the existing users or their standard operations procedures.
6. The need to be able to quickly scale and subsequently selectively reduce the collaboration effort as the incident changes in severity, location, or character.
7. The need to be highly robust and not rely on centralized infrastructure equipment that may, in fact, not be available due to the incident itself.
8. The need to be highly affordable to allow organizations with limited budgets to participate when funds become available.
9. The need to be easy to learn and use by people of all skill levels from professional full time public safety dispatchers to school administrative staff personnel or building security guards.
10. And, most importantly, the need to provide each participating organization the ability to maintain control over their communications resources and pro-actively decide if and when they should become involved in a particular incident response.

● THE SOLUTION

Recognizing all of the issues listed above, a number of agencies and enterprises in New Jersey have implemented an ever-growing Community-Wide Communications Collaboration System that has proven to be highly effective both during emergencies and in daily use. Funding for the system came from a variety of sources with different participants joining the system at different times. The system utilizes Mutualink's real time Multimedia Communications and Information Collaboration Solution. At the present time, the New Jersey system consists of a network of forty-seven facilities over six counties representing 3.9 million people, or 39% of the State's population. Table One summarizes the breadth and depth of the current system.

Table One is limited to only equipment location facilities used by agencies and enterprises to coordinate their

operations. A number of facilities have multiple dispatch points that are used to set up, monitor, and participate in collaboration activities. There are total of 64 such points within those 47 sites. As will be described later in this case study, the system was not installed at one time under one program. Instead, the system was purchased and installed incrementally with new sites and participants being added on a regular basis.

Number of Facilities/Sites	Site Category
16	Public Safety Dispatch (Police, Fire, EMS)
24	Hospital/Medical Facilities
7	Community Sites (see discussion)
47	Total Number of Equipped Locations

Table One: Equipment Site Summary as of 8/15/2010

It should also be noted that the locations do not correlate to the total community-wide reach of the system. For example, Northwest Bergen County Dispatch is listed as one Public Safety Site. However this site dispatches for 15 communities and provides 9-1-1 services to 10 communities. Similarly, the Hospital category includes entities that dispatch and coordinate activities for multiple organizations and locations. The seven Community Sites listed above consist of shopping malls, schools, NJ Transit, the Prudential Center (arena) and two major financial institutions.

A total of 187 communications systems interfaces ("endpoints") are accessible through the 47 sites. As will be described below, any or all of the attached communications devices can be linked together to allow immediate, ad-hoc collaborative communications between the participants. Table Two shows the breakdown of communications devices that comprise the current network.

As an example of the utility of the system, a live video feed from a shopping mall or school could be automatically sent to a Police Dispatcher and simultaneously sent to a SWAT Commander in the field via a Smartphone. Or, an arena security officer could be connected to a local ambulance en route to the event to respond to an accident. Either of these multimedia collaborative sessions could be established in seconds.

The scope of the system and its reach is not obvious from the 187 end point total. For example, one radio channel

interface unit could be connected to a countywide P25 trunked system providing access to hundreds of first responders. Or, one video interface unit could be used to route the selected video signal of interest from a citywide video monitoring system.

Number of Endpoints	Infrastructure Endpoint Type
64	Interoperability Work Stations (dispatch points)
67	Radio channel interface units
33	Telephone and intercom interface units
23	Real time video interface units
187	Total Number of Endpoints

Table Two: Endpoint Summary as of 08/15/2010

● SYSTEM EXPANSION

The existing system is expanding in terms of depth of collaboration as the existing participants add additional communication endpoint devices to the multimedia network. The breath of the system is also increasing on an on-going basis as new agencies and private entities realize the value of the system and allocate funds for their own deployments. The system will be dramatically expanded in the near term with the addition of new participants that will more than double the size of the system. This expansion, through a variety of funding mechanisms, will bring in three more counties, many more hospitals, a number of public safety dispatch centers, and additional private enterprises. In total, fifty new facilities are planned to be added to the system in the near term with over 175 additional endpoints. With the addition of new departments in three counties, the expanded nine county systems will cover 60% of the State's entire population.

In addition to the committed expansion plans described above, a number of private enterprises are either involved in pilots or planning their participation. Aside from their ability to actively participate and help their employees and their families, their customers and the community, and optimizing the response to incidents, the system can also help their commercial businesses. By optimizing responses, the right level of resources can be made available at the right time which in turn can help the enterprises maintain the orderly flow of business with the ability to call out or stand down first responders at a moment's notice.

◉ FLEXIBILITY, DIVERSITY & SIMPLICITY

The number of organizations and the ability to interconnect a large number of communications resources is impressive but must be managed carefully to maintain timeliness and orderliness in applying the correct level of resources to the situation at hand. Each agency and communications channel can be thought of as an arrow in a quiver ready to be selected and fired at the target as required. Clearly, not all arrows are needed and certainly most are not needed at the same time. A flexible system must be available to accommodate the wide diversity of available resources used to respond to the wide range, size, and scope of possible incidents. In New Jersey, with the hundreds of jurisdictions and its high density, selecting the correct resources can be difficult. Typically ONE person must make the initial assessment and start the process and either transfer command or muster other resources as required. Most past and many currently available systems simply cannot accommodate the "any-to-any" potential combination of multimedia resources that may be required to interconnect in response to any given incident. In the current New Jersey system, the potential combinations of the 187 endpoints approaches 187 times 186 times 185...Mutualink has solved this seemingly overwhelming task with a unique state-of-the-art "drag and drop" graphical user interface that is intuitive and can be effectively and easily used with less than ten minutes of training. It helps ensure that the right resources at the right time can be made available.

Pre-assigned communication groups can be stored in the system based upon certain scenarios. Of greater importance is the system's strength, which comes from its ability to formulate incident responses on an ad hoc basis, which can be accomplished in seconds.

In most every case, public safety entities, police, fire, and EMS, will be the common elements in emergency incidents. From this base, other organizations can be called upon to aid in the operation. Figure One depicts this concept. Police, fire, and EMS organizations each serve as an axis for virtually all responses; activities center on these three primary functions. Other organizations, grouped by functions, revolve around these common axes. The involvement of these other "functional layers" either in whole or individually can be called upon to aid in the response.

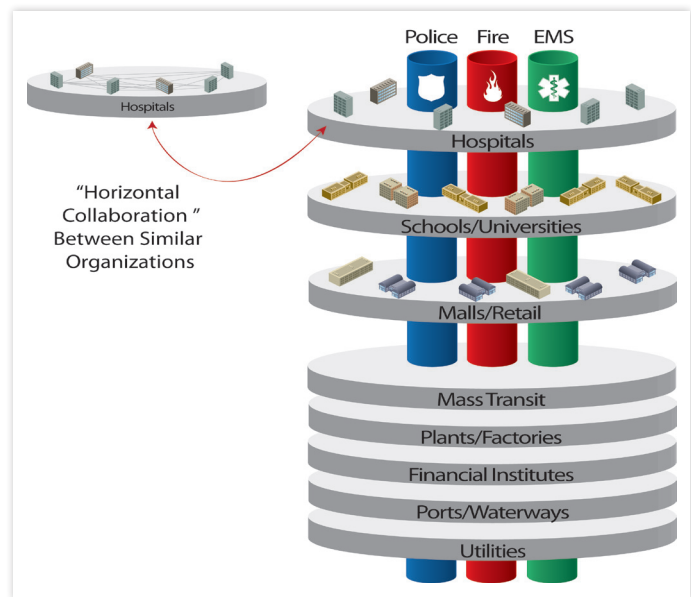


Figure One: Different Responder Groups

◉ "HORIZONTAL" COLLABORATION

The fundamental purpose of the entire system is to allow collaboration during an emergency situation, yet the same system can be used on a daily basis to coordinate normal operational issues. Brian Dolan, Director of Disaster Preparedness for The University Hospital; part of the University of Medicine and Dentistry of New Jersey (UMDNJ), described a good example of this usage.

"Although the system's primary purpose is to help us coordinate our responses to local and mass casualty or pandemic incidents, we have found the system to be an excellent, inter-hospital communications tool. We have the ability to use the system to coordinate daily operational activities such as checking availability of specialized equipment or supplies. The system can also help us coordinate incoming patients with the EMS and the Regional Emergency Medical Communications System and special patient requests in a highly efficient manner."

Other examples of the horizontal collaboration capability include allowing one shopping mall security office the capability of monitoring other malls security systems during off-hours. Schools can also quickly set up a "school-net" to coordinate their activities such as weather alerts, traffic situations, or even security breaches. In this example, if the situation escalates, any participant could, within a few seconds, "invite" the appropriate police, fire, or EMS agency to join the incident.

Figure Two depicts an incident, in this case, a fire at a chemical plant, and the organizations that might need to become involved. Perhaps the plant would first involve its own people or those from an adjacent operation. If response escalation is required, fire, police and EMS personnel could be quickly added to the incident.

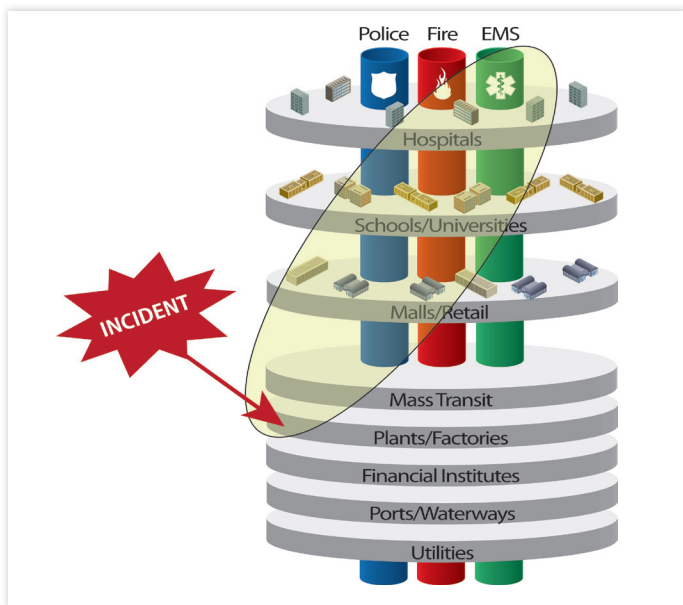


Figure Two: Groups Involved in an Incident

Finally, local area facilities such as shopping malls, other businesses, and schools could be alerted to the situation, and instructed on what to do. If for example, evacuation were necessary, this would then be coordinated as an additional incident on the system.

THE DETAILS

Mutualink, a Connecticut based company whose lineage in interoperable communications can be traced back to the early 1990s, supplies the underlying technology that makes this human collaborative communications possible among all of these organizations. Mutualink's solution consists of three major elements, all of which build on each other to provide the foundation for personnel across a wide variety of organizations to communicate and share voice, video, images, and data in real time as required. Figure Three is a high level view of the system components.

The foundation of the solution is a highly robust private IP data network that is used to connect all of the endpoint devices together in a true peer-to-peer arrangement.

With redundant broadband connections and fully encrypted IP infrastructure, the Preparedness Network, as it is called, connects all of the facility sites together with either dedicated bandwidth connections from the customers' private networks and/or through a VPN on the Internet. Through state-of-the-art authentication and authorization protocols, access to the network is restricted to specific participants; the pre-authorized members of the Preparedness Network. With a peer-to-peer architecture, any participating agency can initiate communications with any other agency through a unique and patented invitation request process. The invitee, at the other end, always has the option of accepting the invitation or not. Further, the invitee then can decide if they choose to contribute their communications resources (radio, video, data, etc.) to be involved in the incident itself. Hence, participants always maintain control over their field communications resources.

The Preparedness Network provides IP connectivity for a variety of infrastructure devices (endpoints). These endpoints consist of a number of different types of Interoperability Workstations (IWSs) and a variety of Network Interface Controllers (NICs) that are used to connect new and legacy communications equipment and convert their protocols to standard IP packets. The IWSs use security-enhanced Linux and are available in desktop, rack mount and ruggedized laptop PC form factors. A recently released version of the IWS, referred to as the Smartphone Commander® runs on an Android Smartphone allowing incident commanders to set up, monitor, and participate in collaborative voice and video sessions while en route to the incident or dispatch center. A new user can be taught to use the IWS collaboration application in less than ten minutes and yet it is powerful enough to simultaneously handle multiple incidents of virtually any scale.

A variety of Network Interface Controllers (NICs) are available that are used to connect to radio control stations, radio base stations, the Nextel network, analog or digital video systems, public address and intercom systems, telephone systems using a variety of techniques as well as IP based sensor systems. The intelligence in the NICs makes them far more sophisticated than a simple IP packet converter. For example, when connected to a trunked radio system, the NIC will store and then forward voice transmissions after a "handshake" with the trunk system and the reception of a channel assignment signal.



Figure Three: System Components

The third and final element in the system consists of the communications devices themselves as listed above and shown on the diagram. With six different varieties available, connections to virtually all types of devices are possible. Land mobile radio system interfaces are by far the most diverse. Mutualink has successfully connected to conventional radio channels in all frequency bands and configurations, to analog and digital trunked systems, the Nextel network, and even secure military radios from different manufacturers. The devices support local, hard wired connections or remote connections through EIA standard tone remote control connections. NICs also support analog or IP based video. Each Video NIC can support up to four separate video signals and forward real time video provided directly by connected cameras or can accept a common video feed from a large video system that may be monitoring an entire facility or community.

The above description is only a high level view of the Mutualink Collaboration System. All of these features plus many more are in daily use throughout the New Jersey Collaboration Network.

THE BEGINNINGS

It would be nice to think that public and private agencies could come together all at the same time, recognize the common need and be able to fund, rollout, implement, and then use a common system. Clearly, this seldom happens. In today's budget constrained climate and with all of the different plans and individual organizational and

personal priorities, this "perfect confluence" is virtually impossible. The New Jersey communications collaboration system was no exception.

What made the New Jersey Preparedness Network happen was the work of a number of visionaries who recognized the serious problems caused by a lack of effective communications and took action, but not all at the same time. After a few successful agency installations, others quickly saw the value first hand and proceeded with their own implementations. Colin McWay, President and CFO of Mutualink readily admits:

"The company presented the concept and provided a number of demonstrations of the system's capabilities. However, the customers, prospects, and state and local regional administrators became our greatest advocates. They introduced and promoted the system to their colleagues understanding that the value of the system would grow exponentially as more organizations joined the network. They recognized that Mutualink solved a problem that all of them faced with a solution that was very affordable, flexible, easy to use and allowed each agency control over their resources."

Former Chief Bob Greenlaw of Ridgewood (NJ) Emergency Services and the Director of Northwest Bergen County Central Dispatch heard of the Mutualink system from one of his subordinates. Chief Greenlaw, at the time, was looking for a solution to implement his plan to provide disaster backup operations for their E911 Center. Although arrangements had been made to transfer E911 calls to another facility, the other facility had no means to dispatch personnel in response to the calls. Chief Greenlaw saw the Mutualink system as an affordable solution to this problem by equipping the alternative E911 Center with Mutualink creating radio control of their dispatch channels. Chief Greenlaw traveled to Mutualink's Connecticut facilities to witness a live demonstration of the system with members of his staff. After that trip, Chief Greenlaw's staff and colleagues from other organizations began to explore the Mutualink solution in detail. Chief James Sheehan of the Paramus Police Department and his peers from Ridgewood and Palisades Park immediately recognized the value of the Mutualink solution and spearheaded its implementation in the public safety sector. According to Chief Sheehan:

“We were able to integrate the Mutualink system into our dispatch center and significantly expand our inter-communications reach to a number of agencies and organizations to help us better respond to local and regional incidents. Not only does the system expand our reach to other public safety agencies, we can also communicate with a number of hospitals, shopping malls, and other public and private organizations around New Jersey helping us more effectively respond to the wide variety of incidents that we regularly encounter. Our personnel quickly embraced the system and recognized its immediate effectiveness.”

Figure Four shows the Mutualink Interoperability Workstation (IWS) in the upper right hand area of a dispatch position at the Paramus Police Department Dispatch Center.



Figure Four: Mutualink IWS Integrated with Other Equipment

In parallel with the Mutualink public safety initiatives that were underway, a number of the area hospitals and medical facilities also saw the value of the system. These efforts were led by Mary Danish, the Corporate Director of Emergency Preparedness for Saint Michael's Medical Center and the Chairperson of the Urban Area Security Initiative (UASI) Hospital Committee. After seeing a demonstration of the system at a Local Emergency Planning Meeting, Mary and some of her colleagues proposed a ten-hospital trial funded by the Northeast Emergency Preparedness Grant Partnership program. After the success of this trial and with funding from the US Department of Health and Human Services under the

Pandemic and All Hazards Preparedness Act, the system was expanded to include a total of twenty-two hospitals. Brian Dolan, Director of Disaster Preparedness for The University Hospital, part of the University of Medicine and Dentistry of New Jersey (UMDNJ) was also an early advocate of the system and saw its potential to assist, not only in large scale incidents, but for daily use to coordinate activities at the UMDNJ as well as with other members of the (Mutualink) Healthcare Network.

“Before the implementation of the Mutualink system, we had to rely on a number of different communications channels and techniques to coordinate our activities. In many instances we felt we were the last to know about critical incidents. All that has changed. Being able to share live video as well as voice has enhanced our understanding and responsiveness. The addition of the Smartphone Commander® allows me to become an active participant in incidents, be kept up to date, and make command decisions independent of my location.”



Figure Five: the Smartphone Commander®

Figure Five shows the Smartphone Commander's® screens and graphically illustrates the power of this component of the Mutualink system offering. It can greatly enhance the effectiveness of en route or on-site personnel and provide them with real time multimedia awareness and collaboration.

W. Greg Kierce, Director of the Jersey City Office of Emergency Management & Homeland Security and member of the Jersey City/Newark/ UASI Executive Board, also echoed the utility of the Mutualink system. Under Director Keirce's lead, Jersey City, located across from New York City on the Hudson River with challenging population density, traffic flow, and infrastructure diversity has built out a large emergency response center that is the central response nerve center for a number of local, state, and federal agencies.

"The Mutualink system is a force multiplier that allows us to quickly muster the proper resources from the dozens of participants that are active members of our local and regional response partnership. By deploying Mutualink's Interoperability Workstation in both our Emergency Response Van and our Hudson River Operations Vessel, we can extend our multimedia communications capabilities where and when they are needed."



Figure Six: Director Keirce in the Command Vehicle

The River Operations Vessel, shown in Figure Six, connected through the city's wireless mesh network, allows radio, cellular and telephone voice communications, video, and data to be both transmitted and received from the boat to any agency connected to the Mutualink Preparedness

Network. The Mutualink solution was used by the Jersey City OEM Center and UMDNJ Medical Center in Newark during the "Miracle on the Hudson" US Airways Flight 1549 incident.



Figure Seven: Jersey City's River Operation Vessel



Figure Eight: Mutualink IWS in River Operations Vessel

HOW DID IT HAPPEN?

The visionaries mentioned above plus many more equally dedicated and resourceful personnel have been the key ingredients to this successful and continually expanding endeavor. The underlying technology developed by Mutualink with significant contributions from experienced first responder personnel from a number of different agencies was also a key ingredient. However, the catalyst that made it all possible was the availability of funds from a variety of federal, state, and local sources as well as the allocation and re-allocation of individual agency and enterprise budget funds. There was no single "deep pocket" funding source available. Each constituent group developed their own funding strategy, all sharing the same common goal...

A description of the term synergy is: "where different entities cooperate advantageously for a final outcome. If used in a business application it means that teamwork will produce an overall better result than if each person was working toward the same goal individually."

This definition perfectly describes the New Jersey Emergency Preparedness Network: People, organizations, and funding sources coming together for the common good. Indeed, the whole is far greater than the sum of the parts. Those involved in New Jersey have led the way with a vision, plan, proven execution of an operational system that is nationally needed, and now can be replicated across the country with equal success. All of the parts are now in-place. Thanks to New Jersey's leadership, an implementation template is available. All that is needed is for some like-minded visionaries in other regions of the US in both the public and private sectors to step up and spearhead the efforts in their locale. Mutualink is ready and willing to help.

ABOUT MUTUALINK

Mutualink, Inc., is a privately held, five year old company with corporate offices in Wallingford, CT, and research and development facilities in Westford, MA, and Mayagüez, Puerto Rico. The company's focus is on providing affordable multimedia collaborative communications platform products and systems for public agencies and private enterprises using innovative and patented, state-of-the-art techniques. For more information:

Visit: www.mutualink.net for product and system information, technical papers, and an on-line system simulation.

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