D-8009

NOTE – a condensed version of this study was published as the lead story in the May, 2004 edition of Mission Critical Magazine.

WIRELESS HOMELAND SECURITY

And its Impact on First Responders Within the United States

440 local, county, regional, state, and other government agencies participate in helping assess challenges in wireless communication pre and post major disasters.

Westlake Research Paid for by WebLink Wireless, LLC.
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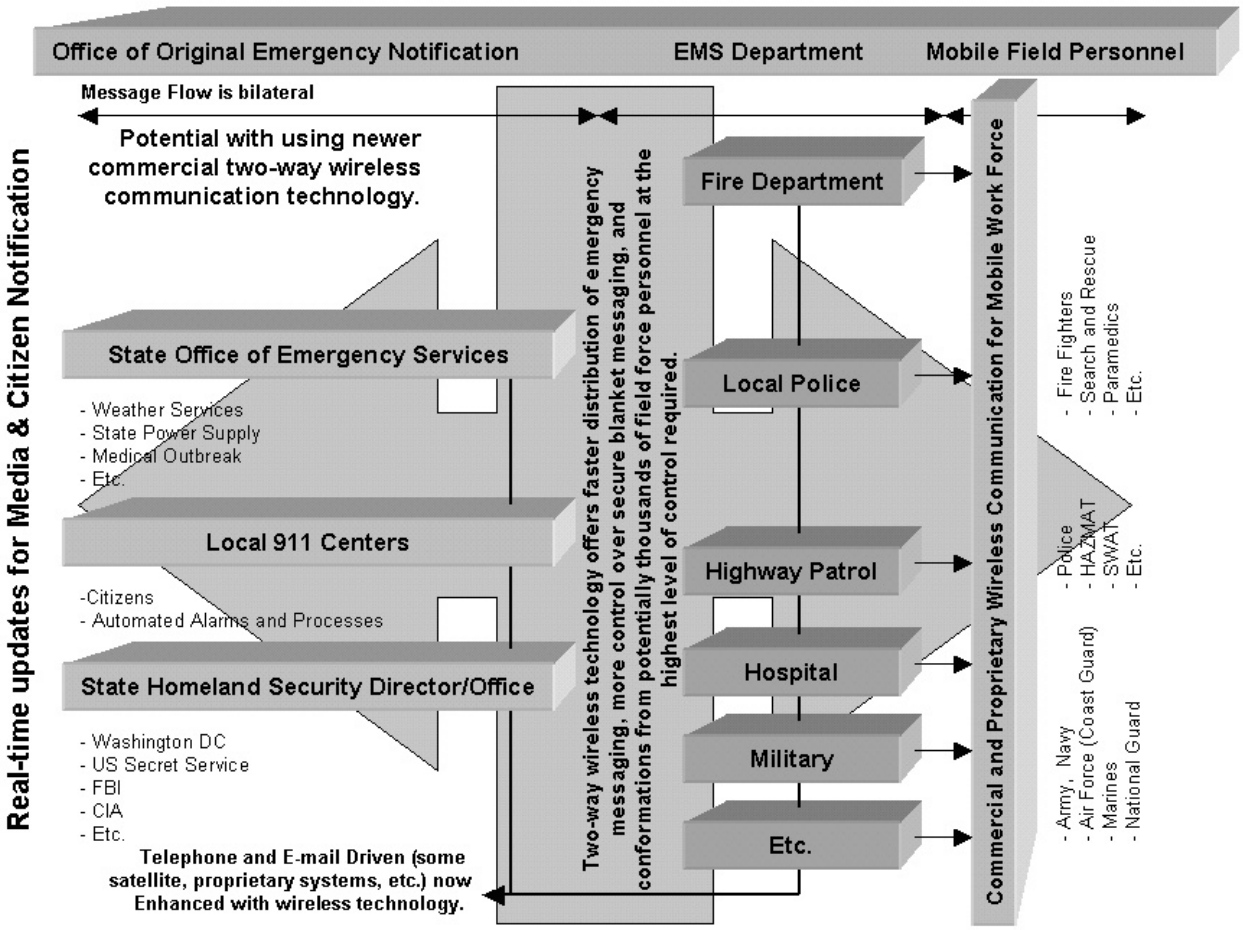
www.westlakesoftware.com

Partial list of 440 initial Respondents/Participants:

The New York Police Department, The New York State Federation of Search and Rescue Teams, New York State DEC Police, Los Angeles City Fire Department, New York Civil Air Patrol, City of San Francisco, Utah Department of Public Safety, Dayton County police Department, North Carolina Bureau of Investigation, New Jersey State Police, Northeast Region Civil Air Patrol, United States Secret Service, Sedgwick County Emergency Management, Connecticut Civil Air Patrol, Massachusetts State Police: Fire and Explosion Section: Dept of Fire Services, Violet Township Fire Dept., Sierra Madre Search & Rescue Team, Douglas County 9-1-1 Communications, Tacoma Fire Department, NC State Bureau of Investigation, Keizer Fire District, Arizona Wing, Civil Air Patrol-DOO, Northwest Fire District, EMTAC, Stamford Health Systems, Indiana Urban Search and Rescue, Michigan State Police, EM Division, City of Pasadena Fire Dept., Tri Community Ambulance Assn., Greensboro Fire Dept., MONOC Mobile Health Services, Mason County Fire District #2, Northeast Region CAP, Clark County EMS, Florida CAP, The Medical Center of Central Georgia, New Britain EMS, Inc., Texas-3 DMAT, GA-3 DMAT, Metro Boston DMAT MA-1, Getzville Fire Co., South Jordan Fire Department, Santa Fe Springs FD, Virginia State Office of Emergency Management Services, Worcester Fire Department, Oglethorpe Power Corp., GA Homeland Emergency Response Agency…

SYNOPSIS – 440 emergency service agencies respond to wireless homeland security study. Study reveals significant communication liabilities with national first responders. For example, 96% (X^2 [1, 439] = 370.95, [p< .01]) of emergency service organizations that responded to the study were unable to guarantee that their first responder field forces received information regarding critical emergency messages (i.e., wireless messages sent but with no guarantee that the messages were received). This study assesses and analyzes existing liabilities in wireless messaging for emergency organizations, offers a prototype solution addressing these liabilities, monitors and tracks field studies and results from prototype testing and offers a conclusion. The objective of this study is to accelerate the process of national emergency services moving away from antiquated technology in wireless messaging and toward newer, more powerful and reliable forms of communication. This study was driven by hundreds of requests over the last several years from emergency services organizations looking for an optimal method for communicating departmentally and across departments with widely distributed and mobile field forces in the event of a pending or unfolding disaster.



WESTLAKE SOFTWARE, INC. and its management are internationally recognized leading experts in the wireless data management and wireless consulting market. Westlake was recently featured as a guest on CNN Financial News, appeared in such prestigious publications as Mobile Computing Magazine, Computerworld and the Ventura County Register (headlining) for saving the state of California millions of dollars by using wireless technology to prevent rolling blackouts during the energy crises of 2001 and 2002.

Alan Gould, President and CEO of Westlake Software, Inc. is recognized as an early pioneer and innovator in wireless data, having founded the largest wireless software company in the world (Silverlake Communications, Inc.) prior to its acquisition in 1998. More than 500,000 customers used Silverlake's technology worldwide. These included several thousand police, fire, and emergency services departments throughout North America and abroad. Mr. Gould continues to support the longest running and most successful wireless carrier training programs for solution selling and return investment modeling in history; with over 25,000 wireless representatives, managers, and executives in attendance.

CONFIDENTIALITY STATEMENT

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Westlake Software, Inc. is available for comprehensive wireless communication consulting for local, regional and national government organizations or private companies, providing assistance in navigating the right choices of the vast diversity of devices, wireless services and solutions available today. Westlake has specific expertise in supporting emergency services and sales/field force automation using pagers, cell phones, and other wireless data devices. Visit http://www.westlakesoftware.com or e-mail sales@westlakesoftware.com for more information.

WIRELESS HOMELAND SECURITY

And its impact on First Responders within the United States

By: Alan Gould, President and CEO - Westlake Software, Inc.

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FORWARD

On September 10, 2001, Our organization was consulting in Phoenix making a presentation to several of the local emergency services directors for the State of Arizona. The purpose of the meeting was to discuss the liabilities they face in every-day communication and ways in which commercial wireless technology could help increase their effectiveness as first responders. One of the most significant topics discussed was the transportation of chemical and toxic waste throughout the state, on Interstate 10 and other state highways. Of specific concern was the incredible amount of nuclear waste that was transported through Arizona to its ultimate destination in Nevada. Even with the many OSHA requirements for transpiration of volatile materials, there was much concern over what to do in the event of a serious accident or spill in a populated area such as Tucson, Phoenix, crossing Hoover Dam, etc. When my staff and I left that day, as with most meetings of this nature we had more questions than answers. It was our intent to present a comprehensive response to their wireless communication concerns in a few short weeks.

The next day: September 11, 2001 – Everyone's focus changed. Being a wireless software provider already focused on emergency services technology, we took some to try and look at a bigger picture of the impact of terrorism and disaster situations that would require a multi-agency response. For example, if terrorists are going to be tactical in how they attack, we need solutions that will also be tactical in preventing or responding to these actions. For example, terrorists did not smuggle missiles or bombs into the US on September 11, 2001; they used commercial airlines as their weapon of mass destruction. It is our opinion that it is more likely that a terrorist within the United States will, for example, use available volatile materials located here versus attempting to bring such materials into the United States from abroad.

Our thoughts quickly focused back to Arizona and Nevada and the conversation with the state. What would be the impact if a terrorist drove a car bomb up next to one of these transport trucks and detonated it near downtown Phoenix, or Tempe near Arizona State University? Or high jacked one of these

trucks? Clearly, to live as free as we do, we are exposed to certainly vulnerabilities that we can at best hope to minimize. Would it be too extreme to require inspections of all cars that want to enter our highway system? Where is the balance between the freedoms we take for granted and providing a safe environment in which to live relatively normal lives day to day? What type of security would be considered a waste of effort and money?

Most Americans agreed to substantially tighter security at our airports. Here in Los Angeles, when our national terror alert color system moves to Orange, the National Guard is deployed to LAX International Airport and covers the terminal and beach areas around the facility. It is not clear if this is to help calm the nerves of local passengers and the public in general or to guard against a potential ground to air missile attack as stated by the media. If it is the latter, the reality is that deployment would truly need to be achieved on every city block from LAX to Palm Springs twenty-four hours a day.

Over the weeks following September 11, 2001, many stories came out of New York, including many concerning communication. Since we pay particular attention to communication issues related to wireless technology, several stories caught our attention. One was about commercial paging technology. The one-way and two-way messaging systems such as WebLink Wireless were up and running that day, offering incredible in-building penetration (typically well beyond cellular providers), and would have made a significant impact in this type of disaster recovery effort. (This is not to say that cellular providers and their networks would not play a critical role moving forward; they will and do every day in local, regional and national law enforcement, which this study will show). In fact, most of these networks were operational as well, but due to massive consumer use, many of them became too jammed at times for effective emergency communication (I also read Nextel was an exception; there may have been others).

How valuable would it have been if every emergency worker or first responder could have been instantly queried as to his or her location and status (good, hurt, unable to respond, in need of additional help, special materials needed, etc.) by central command in a few short minutes (in some cases seconds).

What would have been the value of being able to track and manage communications for virtually every law enforcement and emergency service management agency from a local to a national level down to every field worker or field team using both human responses and GPS technology?

In late 2001, my staff and I set out to design a study of emergency services and mobile communication in crises situations, designed to significantly improve wireless communication strategies using existing commercial wireless technology. We wanted to know if emergency services could guarantee with certainty that field personnel had received critical messages and updates in an unfolding disaster. We wanted the study to benchmark current reaction times to emergencies to see if we could improve communication in the prevention of disaster situations and better coordinate personnel in an immediate post disaster environment. We wanted to analyze the benefits of extending the monitoring and tracking of emergency services to every department at every level. We also wanted to track the capabilities of new wireless devices and services from commercial wireless service providers of new and evolving technology that could significantly impact emergency response and management for the better.

It was not our intent to evaluate the hundreds of wireless applications currently being used by our national emergency service organizations, but rather to start the process of analyzing the benefits associated with making a transition from antiquated communication technology to the latest commercially available solutions. This study was intentionally and specifically focused on wireless messaging dispatch technology: the most widely adopted use of wireless technology by our emergency service organizations today.

We thank the following organizations and individuals for their generous investment of time, assets and money, which made this study possible. This study required significant cooperation between existing wireless service providers, their willingness to donate hardware and airtime for field studies and the willingness of emergency services to participate. This also required help from print and online publications

to help get the word out, a sacrifice of time from my staff, their families, and from participating emergency services.

Thanks should go to Ross Buckenham, President of WebLink Wireless in Dallas, TX who offered both devices and airtime to any emergency service organization who requested to participate as well as some working capital to help role this out nationally, the field staff of Arch Communications who assisted in helping find participants for this study (especially Mike Dubbs in California, Adam Hochfelder in Dallas Texas, PG Wist in Owings Mills, MD and John Murray in Houston Texas), Michael Lane of Metrocall for regional assistance and support, and the engineering staff at Nextel Corporate who helped work out several early incompatibility issues for many participants who made extensive use of Nextel phones and their data network in their day to day emergency operations.

Special thanks for helping distribute information about the study should go to the California Office of Emergency Services home page, Law Enforcement Technology Magazine, American Ambulance Association, Western Fire Chiefs Association, International Association of Fire Chiefs, Journal of Emergency Medical Services (JEMS) Magazine and Website, Ambulance Services Association, Nuclear News, Oregon Fire Chiefs Association, Firehouse.com and Oregon State Fire Marshall News Letter.

Internally, thanks should go to Mark Peter, Senior Engineer – Web Application and Server Development; Mark Fillmore, Senior Engineer – Wireless Device Applications, and Fred Kreger for all business development assistance. Additional thanks to Stacey Gould, Ph.D. for assistance with tabulating and running all statistics, and to all 440 local, county, regional, and national emergency service organizations that participated in this study.

Our staff, the organizations that assisted us, and the 440 emergency service organizations nationally who joined us in this study sincerely hope this data will help make a positive contribution to the ongoing communication enhancements happening domestically and around the world. The architecture of the study, its methods, results and discussion follow.

Westlake Software, Inc. is a nationally recognized consulting firm that specializes in assisting public, private, and government agencies in making educated decisions in their usage of all forms of wireless technology. This assistance has saved Westlake's customers and the customers they serve hundreds of millions of dollars since 2001. Our experience spans more than ten years in the wireless industry and has helped thousands of emergency service organizations worldwide improve their communication systems. If you have a need to build an immediate or long-term plan for implementing a strategic wireless initiative (devices, networks, servers, protocols, etc.), please review the final section of this plan (Ten Ways to Ensure Good Wireless Decision Making) or contact Westlake directly for more information and a free consultation.

Alan Gould
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PROJECT OVERVIEW

In 2001, Westlake partnered with several vendors to research and create an emergency based wireless solution to prevent rolling blackouts within the state of California. Although there were many businesses in California that would voluntarily turn off their power consumption when asked, the state had no strategic way to notify so many businesses, in so many areas, in a very short amount of time. Most importantly, to prevent blackouts, it was critical to know who had successfully received a notification and how many megawatts they could shed at any given time. Using a private Extranet designed by Westlake Software and commercial two-way wireless devices (cell phones, pagers, PDAs, etc.) on multiple wireless networks (WebLink, Nextel, Arch, Verizon, AT&T, etc.), Westlake was able to automatically notify as many as 250 of the largest power users in the state, guarantee that the message was received and how many megawatts could be shed, and free up power to over 1.4 million homes within minutes with the assistance of a local power aggregator. In addition, Westlake was also denoted as a communication point of potential black out notification for all businesses and consumers (wireless and e-mail) for the California's Office of Emergency Services (OES). We estimated that the state of California was able to save over $100 million in power costs and additional benefits received in keeping hundreds of thousands of people employed by not interrupting power to the local state economy.

This solution was widely covered within the wireless industry as well as CNN Financial News, Mobile Computing Magazine, and the Ventura County Register. Making a slight enhancement to existing commercial wireless technology, Westlake's solution helped prevent virtually all rolling blackouts in California in 2001 and 2002. This wireless software application proved to be a highly effective solution to a difficult and broad reaching communication challenge using existing wireless technology from multiple wireless providers. This study is a continuation of our research into mission critical wireless applications. This study identifies and assesses several liabilities found in using wireless technology by our nation's emergency services and first responders.

Wireless communication technology and services throughout the United States has gone through significant changes over the last several years. The largest fundamental shift in wireless messaging occurred at the time in which wireless network operators for paging (WebLink Wireless, Arch Communications, SkyTel, etc.) , cellular (Nextel, etc.) and data (Nextel, Motient, Mobitex, etc.) enhanced their networks to support two-way data communications with commercial hand held devices. The modification from merely sending out text alerts (messages, alarms, thresholds, e-mail notification, stocks, news, weather, sports, etc.) to an interactive environment (responding to and initiating mobile e-mail, responding to and initiating alerts or alarms, actual stock trading, etc.) created a fundamental shift in wireless text and data messaging.

For example, early wireless solutions enabled a computer network administrator to receive a simple page that would inform them if a particular server on their network was running low on disk space (1991). Today, a network administrator can receive the same messages via an advanced mobile device but now take virtual control over the server by sending back wireless commands to resolve the problem remotely (2001). These new capabilities by the wireless service providers were not overlooked by the investment community, who rushed to fund hundreds of start-up software companies focusing on virtually every aspect of Internet/Wireless interaction and technology. Applications were designed to enhance virtually every business software program on the market that had a mobile work force attached to it (including many emergency service organizations).

There are now hundreds of different wireless products in use by virtually every emergency service organization in the United States using a wide range of devices and wireless service providers. This ranges from the basic use of cell phones and one-way alphanumeric pagers for receiving alerts to proprietary advanced two-way messaging and voice portal technology applications. For example, the State Highway Administration of Maryland uses simple one-way wireless technology by paging groups of emergency service personnel with freeway exit numbers and the degree of emergency reported (Exit 210; Level =

High). Rapid development in local law enforcement has now made available handheld wireless technology (Hewlett Packard, etc.) as a means to look up public and private records of individuals or suspects while working in the field (pictures in full color).

One of the most underused wireless technologies that has been available for many years is the real time monitoring of remote asset tracking or sensor monitoring such as air quality, water quality, temperature, break ins, etc. Often referred to as telemetry, this will become an on going and critical function that all emergency service organizations will ultimately depend on over the next five to twenty years. This type of automated "early warning" "early detection" functionality could instantaneously serve to notify not only emergency service personnel but the media and the general public of many forms of potential concerns.

Given the diversity of wireless technology, devices, networks and software applications used today, the approach for this study was narrowed to assess the benefits and liabilities currently found in the most common and broadest use of wireless technology in emergency services: basic wireless dispatch as a starting point for all emergency services looking for solutions in wireless and for all vendors wishing to provide solutions in this market.

Basic wireless dispatch is defined as the ability to use Computer Aided Dispatch (CAD) software to send messages to a mobile work force. For example, a 911 center receives a message that an apartment is on fire. The 911 agent would typically use CAD software to enter in the emergency that would immediately trigger a message to the proper fire department in the field, send wireless messages to members of this fire department (especially if it is a rural department where personnel are not located at the station) and other local agencies as necessary (police, hazmat, ambulance, etc.). By focusing on enhancing wireless dispatching that is so broadly used, we believed we would have a higher probability of emergency service organizations adopting this new enhanced model to their existing dispatch methodology for this study.

It is our opinion, after the success in how wireless technology played such a critical role the California power crisis, that *communication* is going to be a key factor for emergency services agencies in moving forward with our homeland security efforts. Because our emergency services personnel are typically mobile, especially during a major crisis or disaster, wireless technology will play a critical role in how we communicate, now, and in the future. Solutions will (and some have already) reach well beyond just dispatching and acknowledgement, and provide many real-time capabilities in the field to assist every aspect of our emergency service organizations, and at every level. Today, many of the cellular providers are just now supporting the transmission of pictures over their networks. Nextel for example is already up and running with a GPS enhanced network with devises (cell phones with Assisted GPS [A-GPS] imbedded chips) for human asset tracking. Companies such as Microsoft (mappoint.NET), Dynamic Mobile Data, Airtrak.com and hundreds of others already support map and plotting services that compliment this technology. Tomorrow, even the smallest of agencies will be able to affordably set up multiple mobile video feeds so a central command can actually monitor events visually and in real time. This is an analysis of just an incremental step in a larger vision of the power and capabilities of wireless solutions to come.

As with most technology, the capabilities of vendors, and in this case both wired and wireless, are typically well out in front of organizations adopting the latest technology. This study will show that with emergency service organizations and first responders, this is almost always the case.

HYPOTHESES

Hypothesis 1 – Emergency services make extensive use of wireless communication products to communicate messages to their mobile work force.

Hypothesis 2 – There is a significant need to communicate emergency information across departments, potentially city wide, statewide, and in some cases nationally.

Hypothesis 3- Although wireless technology is in use, the latest advancements in two-way wireless technology and other advanced services, which could provide the ability of acknowledging that devices received messages, GPS, has not been implemented.

Hypothesis 4 – Due to the lack of adoption of this technology, most emergency service organizations are unable to confirm that their field force personnel have actually received critical messages ands are unable to identify the location of field staff.

Hypothesis 5 – Speed of messaging and reliability will continue to be a major concern now and moving forward for any form of mobile emergency messaging solution.

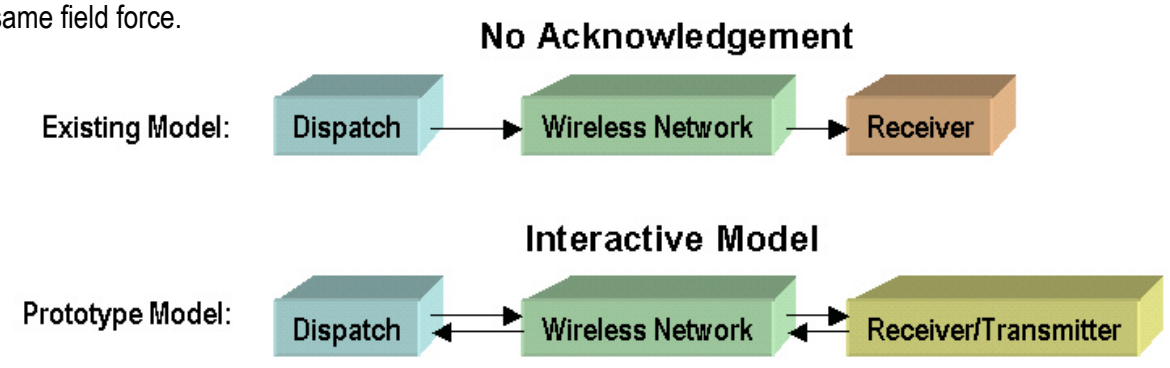
Hypothesis 6 – Traditional reasons for not adopting new wireless technology by emergency services (i.e. price, coverage issues, etc.) will continue to be prevalent.

METHODS

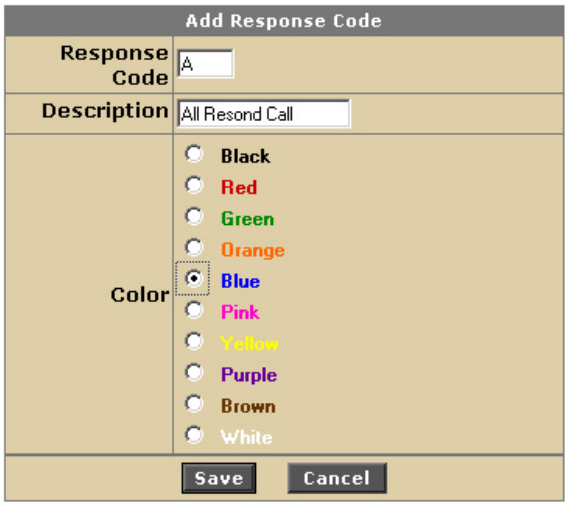
Initially, we contacted over 50 emergency service organizations with whom we currently conduct business and/or have conducted business in the past. Our objective was to build a comprehensive list of enhancements these organizations were looking for to improve dispatching and communication in consideration of the latest advancements in two-way wireless technology. These include (in no particular order):

1. Increased speed of dispatching and receiving messages in the field
2. Affordable
3. Ability to get messages to all departments on all shifts
4. Track who received a message and who did not with a large distribution of individuals (human responses to dispatching and GPS tracking)
5. Initiate emergency messages from the field
6. Seamlessly supports multiple protocols, devices, and commercial and private networks
7. Coverage
8. Compatibility with existing CAD systems

Technology – For control, centralization, and stability, it was decided that the prototype would be hosted on a Unix server on a private Extranet accessible from any Internet connection. Next, we designed an application that would accommodate as many as possible of the improvements requested from these initial interviews. For example, each individual organization in the study would be able to custom configure response codes and denote the color in which these responses would display in a "track responses" page on the Extranet. In a traditional wireless dispatch environment, one-way alphanumeric pagers would be used to send messages to a widely distributed field force. In this new model using wireless two-way devices, the dispatcher of the message would be able to track a set of responses (interactive) from this same field force.



In the screen shot above, the letter “a” would denote “accepted” (displayed in green) to the dispatcher, the letter “n” as “not available” (displayed in red), and the letter “s” as “stand by” (displayed in yellow). As show in the graphic below, each organization would now be able to set their own response codes, each with an associated description and a selected color.



This particular function would enable a dispatcher to send a message (for example) to 1000 emergency service personnel, to multiple departments, on multiple shifts using virtually any mix of

commercial wireless service providers in their area and be able to instantaneously assess virtually any aspect of their field force and their associated status.

For example, a potential evolving crisis needs to be broadcast to all law enforcement, fire departments, HAZMAT, Swat, and Homeland Security personnel. One department uses WebLink Wireless two-way units and another department uses Nextel phones with two-way text messaging enabled. Within a short amount of time (seconds, minutes), the dispatcher would receive confirmation from every field worker via all departments across both wireless networks along with short status responses for each message sent.

Incident #44 – Chemical fire at 1234 Main St. Response Required					
Dispatched Message at: 2:30 AM		Time Now: 2:35 AM			
Name	Response Time	Acknowledgement	Phone	Secondary	Modify
David Johnson	-	-	301-555-1212	301-555-1217	Update
Mike Davis	1 Minute	Accepted	301-555-1234	301-555-1237	Update
Lisa Smith	1 Minute	Accepted	410-555-2345	410-555-2347	Update
Jenna Dannielle	1 Minute	Accepted	301-555-2323	301-555-2328	Update
Mike Murry	1 Minute	Stand-by	410-555-1212	410-555-1218	Update
John Dubbs	2 Minutes	Accepted	310-555-5678	310-555-5679	Update
Michelle Margo	2 Minutes	Not Available	704-555-4567	704-555-4568	Update

The database would also hold field worker primary and secondary phone numbers, as a back up to the dispatched message, since it is always possible that a device has a dead battery, the device is broken, or is out of coverage at that time. Messages not responded to migrate to the top of a distribution list to enable the dispatcher to quickly and easily follow up as necessary.

The benefits of this type of enhancement are multi-fold. The flexibility of offering unlimited custom responses provides the originator of the emergency message significantly more control over an unfolding emergency. Even more critical, the dispatcher can quickly assess which individuals (if any) *did not* acknowledge or receive the message.

If a toxic waste spill occurs during transportation, OSHA currently requires five methodologies of communication for all first responders. This typically includes pagers, cell phones, two-way radios, e-mail, and a home phone number. OSHA's intent with this is to ensure that all responders have the highest

possibility of being reached in the event of an emergency. However, this is a daunting task for a dispatcher that has to notify potentially hundreds of individuals in a short amount of time. Time is of the essence for this type of emergency response. Not only is there a potential direct impact on the environment and local community, but organizations who manage these types of materials also have to contend with compounding fines imposed by OSHA with each passing hour (As much as $100,000.00 per hour). This new function with two-way technology could provide the dispatcher a significantly faster way of being able to confirm notification from their first responders. Oil transportation management agencies in the United States alone report as many as 20,000 incidents of oil spills or similar accidents annually.

Another request was to increase the speed of messaging to individuals in the field. Many of the wireless service providers offer proprietary ways in which developers can send messages into their systems and are making improvements in this area on an on-going basis. We opted to support the most common forms of messaging for this study, which were/are the SMTP protocol, WCTP protocol, and the SNPP protocol. Some customers were interested in participating with the study using one-way alphanumeric pagers, with a dial-up connection utilizing the TAP protocol (members would call into central and confirm the receipt of the dispatch for the study). This prompted us to add a manual update for these one-way users so they could record responses if needed. In addition to these functions, we added multilevel security, the ability to send messages to an unlimited number of groups and individuals, a log file, message response tracking, pre-defined messages, etc. This was all placed into an easy to use interface for interactive wireless dispatching. Although the application was designed to be used mainly on our own Extranet (www.respondnow.net), the application could also be installed in-house on a computer server running Windows NT, Windows 2000, Windows XP, or Unix for organizations that wanted to host the application themselves.

Carrier Cooperation – WebLink Wireless, an International wireless paging and data company offered to supply commercial two-way messaging devices from Motorola and their own airtime for the

study. We also solicited the cooperation of Arch Communications and their field staff to help us find additional participants for the study. Cooperation was also received from Nextel engineers early on who assisted in some compatibility issues with existing customers. Regional assistance was also provided from Metrocall.

Participant Criteria - Participants needed to be emergency service organizations that included first responders from local, regional, statewide, or national public agencies or any private agency or organizations needing to respond to critical emergencies (i.e. oil refineries, nuclear power plants, OSHA regulated firms, etc.), Internet access was required as well as having ample wireless coverage from their existing wireless provider or from WebLink Wireless. Participants were also required to sign two agreements. The first was a mutual non-disclosure agreement (Appendix C) and a hardware liability form from WebLink Wireless when opting to use their devices. This form simply placed the liability of the replacement cost of the equipment on the user in the event of a lost or stolen device.

Initial Survey – The initial survey for participants was placed as an electronic form at: http://www.westlakesoftware.com/whsproject.htm. This included contact information and several questions up front to gather additional statistics (see Appendix A; Results section Table 1).

Promoting and Marketing the Study for Participants – The Internet was extensively used to drive potential participants to the study. First, over 1000 e-mail addresses were mined from hundreds of state emergency service websites. These included fire department organizations, police department organizations, ambulance services, etc. The request for participation in the study was covered in many state newsletters, placed as a link on Intranets, etc. Extensive use of media outlets were also used to publish our request for participants (i.e. Law Enforcement Technology, Journal of Emergency Management Services [JEMS], Nuclear News, etc.). This strategy was highly effective in driving more than 600 submissions to the study within the first 90 days of our initial promotional efforts.

Qualifying/Testing/Study Phase/Exit Survey – All potential participants received an initial interview and a written overview of the study to see if they were interested in participating, were checked for wireless coverage issues, and then received active two-way wireless devices for the study (when needed). Participants were given up to 200 days to use the devices and airtime along with the wireless software to use. Once the testing phase was completed, participants were directed to return the devices and complete an exit survey online located at: http://www.westlakesoftware.com/wirelesshomelandsecuritystudy.htm (Appendix B)

Compiling the Study - The final step was to finalize the data collected and write up the study.

RESULTS

Partial list of 440 initial Respondents/Participants: The New York Police Department, The New York State Federation of Search and Rescue Teams, New York State DEC Police, Los Angeles City Fire Department, New York Civil Air Patrol, City of San Francisco, Utah Department of Public Safety, Dayton County police Department, North Carolina Bureau of Investigation, New Jersey State Police, Northeast Region Civil Air Patrol, United States Secret Service, Sedgwick County Emergency Management, Connecticut Cival Air Patrol, Massachusetts State Police: Fire and Explosion Section: Dept of Fire Services, Violet Township Fire Dept., Sierra Madre Search & Rescue Team, Douglas County 9-1-1 Communications, Tacoma Fire Department, NC State Bureau of Investigation, Keizer Fire District, Arizona Wing, Civil Air Patrol-DOO, Northwest Fire District, EMTAC, Stamford Health Systems, Indiana Urban Search and Rescue, Michigan State Police, EM Division, City of Pasadena Fire Dept., Tri Community Ambulance Assn., Greensboro Fire Dept., MONOC Mobile Health Services, Mason County Fire District #2, Northeast Region CAP, Clark County EMS, Florida CAP, The Medical Center of Central Georgia, New Britain EMS, Inc., Texas-3 DMAT, GA-3 DMAT, Metro Boston DMAT MA-1, Getzville Fire Co., South Jordan Fire Department, Santa Fe Springs FD, Virginia State Office of Emergency Management Services, Worcester Fire Department, Oglethorpe Power Corp., GA Homeland Emergency Response Agency…

TABLE 1

Initial Survey Responses

440 EMERGENCY SERVICES RESPOND

Question 1 - Does your organization have a system to effectively communicate emergency messages to agencies outside your organization?:		
Yes. Significantly more emergency response organizations reported that they had a system to effectively communicate emergency messages to agencies outside their organization than those who did not have such a response system.		
Yes = 82%	No = 18%	$X^2(1, 439)= 183.31, (p<.01)$.

Question 2- Does your organization have multiple departments that need to be notified in the event of an emergency?		
Yes. Significantly more organizations reported that they had multiple departments that need to be notified in the event of an emergency than those who did not report such a need.		
Yes = 84%	No = 16%	$X^2 (1, 439) = 226.95, (p< .01)$.

Question 3-Do you have an effective way to guarantee that wireless devices received messages today?:		
No. Significantly more organizations reported that they did not have an effective way to guarantee that wireless devices received their messages today than those who reported having a guarantee.		
Yes = 7%	No = 93%	$X^2 (1, 439)= 328.18, (p< .01)$.

Question 4- Do you have an effective way to guarantee that a person received a message via a wireless device today?		
No. Significantly more organizations reported that they did not have an effective way to guarantee that a person received a message than those organizations who reported having a way to guarantee message delivery.		
Yes = 4%	No = 96%	$X^2 (1, 439) = 370.95, (p< .01)$.

Approximately 30% of all respondents were located in either rural areas in which wireless coverage was too limited or in areas in which an agency was unable to get cooperation from their local wireless provider that did have coverage to assist in the study with devices and airtime. Several hundred respondents were discarded due to not being emergency service organizations, even though they did want to participate (Universities, Private research firms, other wireless consultants, International respondents, etc.). 440 emergency service organizations were ultimately added to the study.

TABLE 2

Portions of Exit Survey* (Complete Sample Exit Survey: Appendix B)

SURVEY QUESTION	RESPONSES
Prior fastest time:	Average = 5 minutes; ranging from instant to hours
Prior slowest time:	Average = 15 minutes; ranging from 4 minutes to days
Project fastest time:	Average = 2 minutes; ranging from 10 seconds to hours
Project slowest time	Average = 5 minutes to days
Wireless Networks Used	Mix of all wireless providers (cellular, paging, data, private networks, etc.)
Service improvements	Some comments used in Discussion and Conclusion section
Additional functions/services	Some comments used in Discussion and Conclusion section
Prevent from being viable option	Some comments used in Discussion and Conclusion section
Did new model enhance communication within department	Yes = 86% No = 14%

* Many questions on the exit survey were for internal and marketing use (how did you initially hear about the study, what magazines and websites do you read, what protocols did you test within the software, etc.)

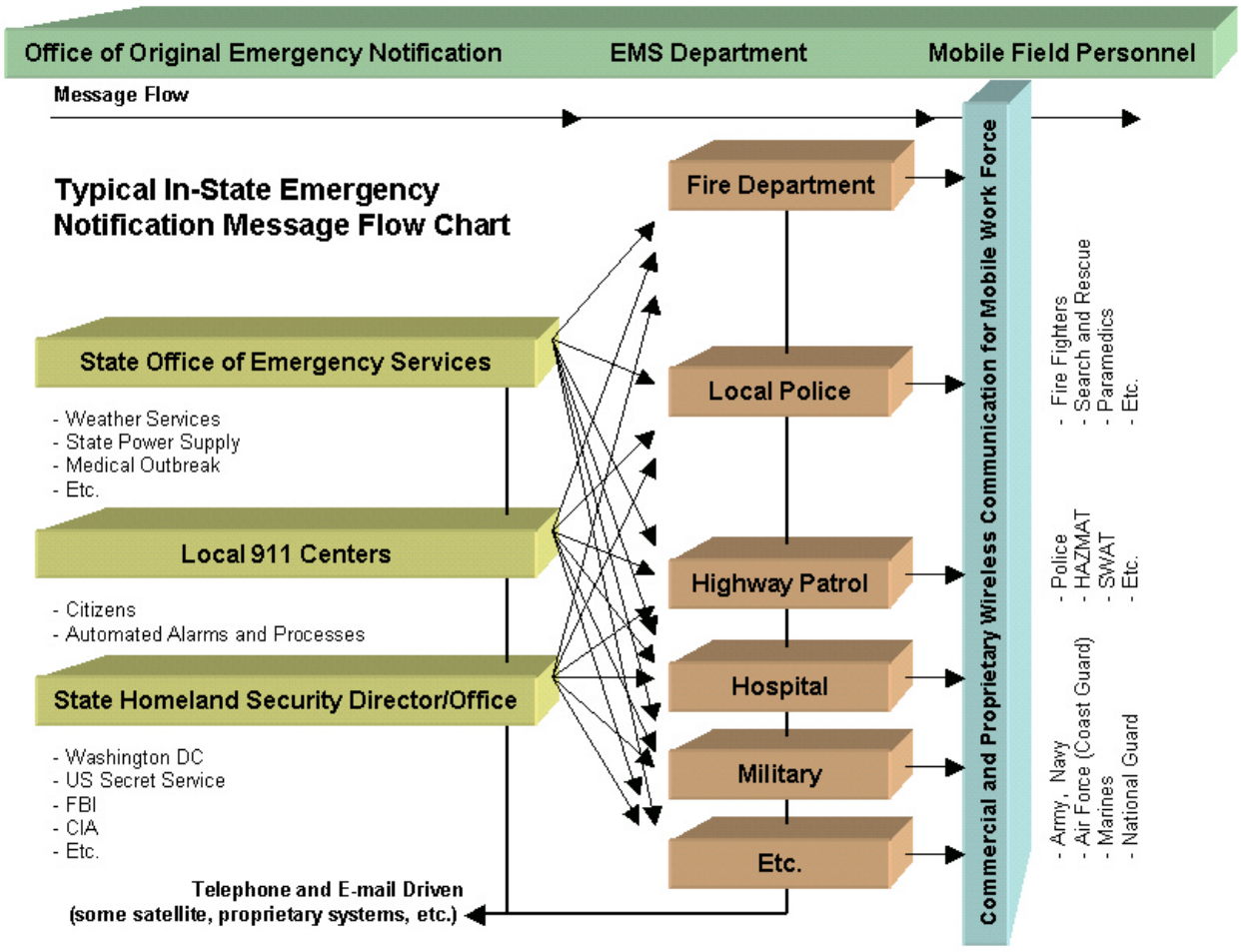
DISCUSSION

It was immediately clear that emergency service organizations rely on many forms of wireless technology to do their jobs day to day. Extensive use of pagers, cell phones, and two-way radios were found. In addition, there were a wide variety of vertical applications being used by several early adopters, for instance using Personal Digital Assistants (PDA) capable of looking up criminal records for mobile police officers or Wireless Application Protocol (WAP) phones enabling managers of toxic waste to quickly look up what materials may be in a container or building.

Virtually all emergency services and first responders used some form of wireless technology for emergency service dispatching. There was an inverse correlation found between the size of the field force and the cost of the solution for these services. For wide scale deployments, agencies appeared to place less importance on the latest technology than on other aspects of their services (most often claiming budget restrictions on deployment of advanced technology with a large field force). Given that all commercial wireless service providers charge on-going and recurring airtime fees, less expensive options such as numeric and alphanumeric pagers were seen as minimally acceptable forms of additional communication with many of the larger field forces.

Most agencies reported a need to communicate across departments and across agencies as well as down, across and up existing hierarchies. Westlake has seen, in its wireless consulting business, a recent increase in emergency service requests for proposals (RFP) for solutions to accommodate a much wider capability of communication with special focus on cross-departmental communication. However, the cross-departmental communication layer shown below (Chart 1) was typically managed by more traditional forms of communication and not managed with wireless technology. These included voice (phones), internal proprietary communication systems, two-way radios, Nextel Direct Connect wireless phones and traditional e-mail systems. This traditional model shows a strong message flow of information down hierarchies.

CHART 1



In most cases, there appeared to be little cooperation between agencies in standardizing on any particular technology. Rather, each department or agency would have a formal way to receive communications centrally, but how that agency or department distributed information to their field force varied almost as much as the number of departments.

For example, if a Homeland Security Director needed to have HAZMAT, fire, and police respond to and coordinate a potential crisis, the Director of Homeland Security of that state would depend on each agency to respond and deploy staff according to whatever specifications were requested. But the Homeland Security Director would not be able to see the individual responses and status updates by every

responder of that emergency from the field, department by department.

As our participants adopted this new model of two-way communication, 86% that reported in the exit survey stated they saw increases in communication and productivity in virtually all aspects of an unfolding disaster situation.

> ***"We have been working with Westlake using this new model of messaging with the acknowledgement function for about a year now. It is a vital part of our operation every day to now be able to monitor and track emergency messages and their responses for our mobile work force both within our department and across other departments."***
>
> **Sergeant Mark Bowron**
> **9-1-1 Coordinator**
> **Dayton, Ohio Police Department**

> ***The premise/functionality of the new system is excellent. The devices became an added device to everyone's belt.***
>
> **Tom Ruffini, Captain**
> **College Park Volunteer Fire Department.**

93% of participants reported that they were unable to guarantee a wireless device received a message (X^2 [1, 439]= 328.18, [p< .01]); 96% of all respondents (X^2 (1, 439) = 370.95, [p< .01]) stated that prior to participation in the study, they were unable to track and confirm that field personnel received emergency messages. Although both of these statistics are significant, there is a difference between guaranteeing that a device received a message, and that an actual person received a message.

Many of the larger wireless service providers that support two-way messaging offer the dispatcher the ability to track that their devices (phones, pagers, PDAs, etc.) have received a message. This works via a capability for the device to send a small acknowledgement message back indicating that a particular message was received. Our experience has shown that in emergency based responding, this is a much less valuable function than actually having the person holding the device respond (sometimes with additional information).

Although many police and emergency service personnel stated they carried two-way radios, this approach did not guarantee that they heard or received a given message. Participants virtually all

confirmed the value of being able to use technology that supported this capability, with several services stating a dependency and desire to continue using the system beyond the trials.

> ***This is a great tool and we would like to continue with the service if the costs of such a solution could be addressed***
>
> **Raymond Gordon, Battalion Chief**
> **City of Pasadena Fire Department.**

The message of cost constraints by Battalion Chief Gordan was repeated by almost half of the participants.

> ***We have become quickly dependant on this new communication methodology; our concern now is how to keep leasing and rental costs/charges to the bare minimum***
>
> **LTC Gene Pfeiffer. Deputy Chief of Staff**
> **Communications USAF Auxiliary**
> **Civil Air Patrol**

Speed of messaging and reliability will continue to be a major concern for any form of mobile emergency messaging solution. Respondents largely reported an increase in wireless messaging speed with the new prototype. However, there were a few respondents that stated that they would never be able to rely on a system such as this. They reported an overwhelming need to be able to get voice responses from individuals in the field. These departments were typically HAZMAT and bomb defusing agencies, where talking to individuals in real time (cellular phones or two-way radios) was critical in how they handled crises.

> ***We have a need to communicate verbally. Despite the ability of this device the technicians still prefer to communicate directly. This does not mean that other Units within the Department could not benefit from this type of communication.***
>
> **Richard Lane, Lieutenant, Bomb Squad Commander**
> **Mass. State Police**

Many of the more rural agencies reported wireless coverage issues. This was expected, as the need for emergency service organizations and their coverage requirements typically extend beyond the most populated areas in which commercial wireless providers position their coverage zones.

> ***Our team regularly functions in areas where traditional 2-way wireless devices do not work***
>
> **Blair Miller, Acting President**
> **Northern Virginia Search & Rescue Dogs.**

Need to use in more diverse areas of the county.

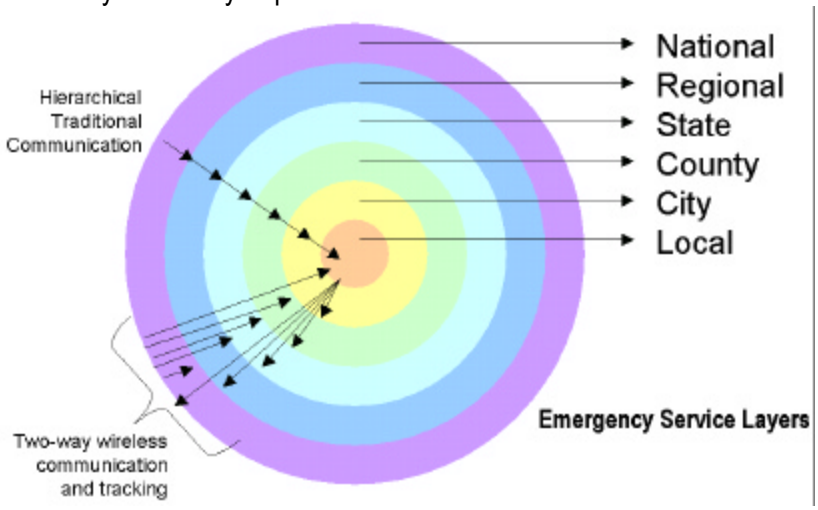
Karl Munninger, Director of Administrative Services
Clark County Health District

Smaller agencies found that the system significantly increased the time in which they can notify their staff. Using traditional cellular phones and making a few phone calls was preferred with smaller field forces. Several smaller agencies appeared to make extensive use of Nextel's Direct Connect functionality such as the Getzville Fire Company. (This service by Nextel is similar to the functionality of two-way radios, but works over a commercial wireless data network).

We have been using Nextel phones to communicate with many officers within our department. The "Direct Connect" feature has proved to be very reliable for notifying our personnel. Also, several other neighboring fire departments have purchased these phones. We have had tremendous success using these devices to contact them as well. The Nextel "Direct Connect" system has given us a greater flexibility and also provides us with instant communication

Irv Isenberg, Assistant Chief
Getzville Fire Company

The new wireless communication model had several usage implications beyond what we had expected. First, there is now the ability for any layer of emergency services to track emergency messages sent to every individual in the field; department-by-department. For example, if a message was originally initiated by a national law enforcement agency, the new system would enable that agency to login in, and centrally monitor and track messages (and message responses) related to a potential or unfolding disaster down to the individual in any and every department.



For example, if a credible threat is determined by a national agency such as the CIA, this information is currently distributed down to whatever level of emergency agencies is deemed appropriate. However, with this new wireless communication model, the national agency who initially triggered the event can track the number of respondents that have been deployed to the situation as well as the actual message flow (including message content) sent by every agency on every level.

There was also value discovered in enabling out-of-department personnel to monitor and track messages sent to/by another department. For example, a state police agency could monitor and track messages that were deployed and confirmed by local HAZMAT and Fire Departments from a central software location.

Some of the testers suggested the addition of an "incident form" to be placed on the wireless hand held device. This would be used as a "field initiated" solution for updating the status of an unfolding event close to real time. Management would then not need to call multiple managers in the field but rather could bring up a report that is updated from multiple field force personnel. For example, an on-site police coordinator could send in the following example:

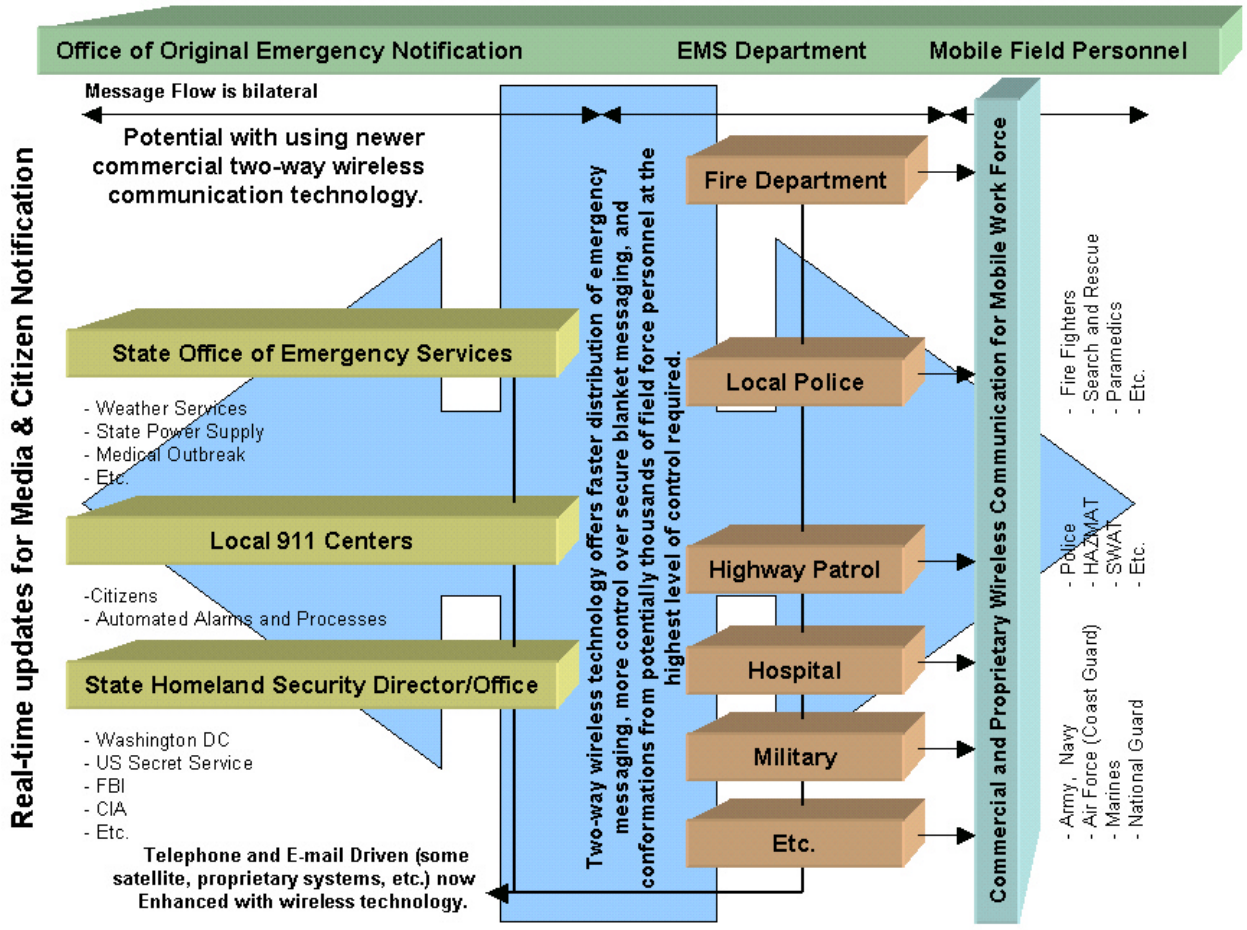
Incident 1124 – 1234 Main Street, Down Town: Reporting: Sergeant Mark Davis		
TIME	UPDATE	STATUS
1:00	50 EMS personnel on site; staffing looks to be appropriate	Green
1:20	Initial fire out; in building looking for possible casualties	Green
1:25	Four casualties found; one critical, one deceased; ambulance services on site	Green
1:30	Explosion erupted from what looks like to be an oil or gas fire – critical; injuries, etc.	Yellow
1:31	Dispatching two more fire departments; 5 crew in need of emergency assistance	Red

In this type of reporting, any agency at any level could log in and monitor the events as they unfold (from home, office, on the road, have it resent as a wireless text message, etc.), print and keep records, etc. The value of this type of system could prove to be even more critical if multiple incidents were to break out from multiple locations in any city or state at a single time.

For example, a Governor or Homeland Security Director of a state could track 20 incidents at a single time, unfolding in virtual real time, with data to which they would not otherwise have access. This

also has implications for consumers and media personnel being able to monitor events from the field. As shown below, using two-way wireless technology significantly enhances and expands communication between departments, across departments, and across local and ultimately national reporting and response agencies.

CHART 2



This technology could also provide critical feedback for media and local citizens to receive updates of unfolding disasters in their area. In some cases, the media could receive much more timely information to assist emergency organization in distributing correct information.

STUDY CONCLUSION

This study was designed to be just the beginning of the process of analyzing wireless communication technology with our national emergency service organizations. This study revealed the need and demand for ongoing improvements of mobile communication solutions in a dispatch environment, a critical need for increased budgets, and concerns about communication within and between emergency service agencies. There are hundreds more capabilities of wireless technology that can impact emergency service organizations. For instance, applications that can provide instantaneous medical histories in the field for paramedics, or crime fighting applications that can automatically scan codes from license plates and query remote databases that would alert officers of stolen cars.

Telemetry devices and applications will also play a critical role in automating the monitoring remote assets. Beyond just human assets, wireless technology can be used to monitor in real time air quality, water quality, break ins, temperature, pressure, power, motion, noise, and more without the need of dedicated phone lines. In these cases, virtually any unlimited number of possibilities exist by using existing commercial and proprietary networks designed to help manage and monitor these assets.

These are all forms of advanced wireless solutions that would significantly increase the effectiveness of our emergency service personnel and provide an incredible amount of leverage as well as an increase in productivity. However, advancements such as these will require significant investments in the government, public and private sectors in order to be achieved. It is our opinion that cost of these solutions will be the largest inhibitor moving forward. There is also an expanding costs of fees associated with each incremental add-on of services your require. For example, expect a carrier such as Nextel to charge slightly more for a more phone supporting GPS, GPS and other messaging fees on top of cell time or direct connection services, fees from either Nextel or third party vendors such as Microsoft, Airtrak.com, and Dynamic Mobile Data to name just a few. This can become significantly more expensive that just basic or advanced paging services.

Respondents to this study were quick to provide a list of additional functions and services they believed they would need to make this a viable solution for their departments. First, wireless coverage is an issue. Public wireless service providers (paging, cellular, and data) focus primarily on excellent to strong coverage in the most densely populated areas. For example, all carriers will have good coverage in Las Vegas or Phoenix, but will typically not have coverage in most of the state of Arizona and Nevada respectively. Financially, building up wireless networks for more rural areas is typically not feasible for commercial wireless providers. Respondents that have needs requiring expansion into more rural areas reported less effectiveness with the solution than did respondents whose needs remained within more densely populated areas.

Given there is not a sufficient financial incentive for a wireless service provider to expand coverage into these more rural locations, the only way in which these build-outs will happen is through private/public businesses as a means to better protect and monitor their remote assets. In a conversation with Ross Buckenham, President of WebLink Wireless, he revealed that larger organizations do make investments for strategic and expanded coverage for just these purposes on their network. However, the typical emergency service organization is unlikely to have the budget for these types of expansions regardless of how critical a need wireless service coverage may be in certain areas.

> ***The system did a good job of automating and expediting our notification process. It would appear, that unless you are within 10-15 miles of a major metropolitan area in New York, 2-way wireless communications infrastructure is just not in place to support this application.***
>
> **Roger Fox, Chairman**
> **NYS Federation of Search and Rescue Inc**

> ***While the coverage area for your wireless device was comparable to the other wireless devices we have, there were still areas of the State where the unit was "Storing Messages".***
>
> **Fred Patton, Assistant Special Agent**
> **North Carolina State Bureau of Investigation**

In our opinion, there is a case to be made for using government funds to help carriers expand their wireless services into critical or strategic areas around the nation identified by local and regional emergency service organizations.

Although there are serious concerns nationally related to coverage issues for wireless services, several companies have made available technology that can extend wireless coverage to virtually any location in the world. For example, TGA Technologies, Inc. (www.tga.com), located in Atlanta, Georgia offers a "mobile" wireless network in their transportable RD1000 technology. This system enables its users to set up a two-way wireless messaging network anywhere it is needed.

TGA has gone one step further in making their equipment compatible with all commercial providers of ReFLEX technology such as WebLink, Arch and SkyTel to extend beyond just the coverage of a local area wireless messaging network. If it is unlikely that commercial network providers will ever provide coverage for more rural areas, a more permanent system of this type can provide an extremely robust alternative.

It is our belief that in light of limited budgets available for any new technology with many of the agencies we spoke to, there is a strong case to be made for emergency service organizations within a state or region to pull resources to invest in this type of technology. As needed at an existing or unfolding emergency, the RD1000 could be set up and running literally in a matter of seconds once deployed to the needed location.

A variety of other features were requested by participants. For example:

> ***Ability to have the Reports sent to an e-mail or Fax during the Call-out .***
>
> **Bill Dunn, Communication & Information Resource Office**
> **Metro Boston Disaster Medical Assistance Team MA-1**

> ***There needs to be a way that you can check status of the transmit capability right away either by a button or a menu item on the vital signs menu. Difficult to open the wireless device with one hand, if carrying briefcase, driving etc. Flip-open screen could break if dropped on a hard surface.***
>
> **Thomas Newell, Facilities Engineer**
> **MI State Police, Emergency Management Division**

> ***Use of the equipment to interface with other emergency dept equipment. Use of the equipment in remote areas, to include x miles out to sea. Use of this equipment to interface with US Mil MSE system, Data over Tactical Radio (Sincgars), Data over Mil Sat, and use of Encrypted 802.11b/a systems.***
>
> **Christopher J.Samp**
> **MSG, Intelligence NCO**
> **S-2/ 3rd BDE/ 40 ID (M), Calf Army Nt. Grd.**

Price of the system was also a recurring theme with respondents. Many agencies stated that they currently had no ability to find funds for this or any other system. However, the exit survey showed, on a scale of one to ten, an average score of 8.4 (lowest 4; highest 10) reported they would pursue a system such as this if government funds became available either directly or in grant form.

> ***This has several good uses for us within the emergency and homeland security venues... but again cost is a primary factor for us.***
>
> **Chip Maher, Director of Emergency Services**
> **Florida Wing Civil Air Patrol**

In reporting these findings back to wireless service providers such as WebLink Wireless and Nextel, there was an expressed interest in assisting all emergency service organizations in price constraints and a willingness to discuss coverage expansion on a case-by-case basis. This would likely be implemented in the form of nationally negotiated contracts with minimums required to assist a much broader base of emergency service organizations. In addition, there was an interest in expanding coverage to critical areas if: 1) costs of these expansions were shared, or 2) there were sufficient wireless devices and airtime to justify the added costs.

Regardless of the willingness of carriers to assist in the areas in which they do have control, there appears to be a significant shortfall in many emergency service organizations to stay current with the latest technology (wireless or otherwise) mainly due to budget constraints. Our assessment was only focused on their current use of wireless technology but there is clearly a larger problem of funding projects of any kind.

The implications of this under-funding and the inability of our emergency services to better manage their mobile personnel are expanding. Cutbacks in state budgets are inevitable due to shortfalls in tax revenues in a difficult economy. Some states, such as California are facing some of the most challenging

economic climates in history. The Los Angeles Times recently reported (April 13, 2003) that the state is expected to cut services and raise taxes to offset close to a $30 billion deficit. As it is unclear specifically when funds from Washington D.C. will be used in each state, it is clear that each state will have some challenges ahead in how to manage these funds when they arrive.

For example, if Governor Gray Davis plans to cut all California state services including emergency services, these new funds might be brought in to simply supplement existing funds already in place. In a case like this, efforts to achieve a true change in bettering our nations emergency services will have very little hope of succeeding. It is also unclear if our government will continue to release additional funds on an ongoing/recurring basis for emergency based services within the United States. If this is a one-time extra shot for each state, what is the best strategy to take with these funds?

For any growth to take place in equipping our emergency services, not only will a significant amount of funds need to be made available, but these funds will actually have to increase the total state budget allocations for emergency services rather than being used to supplement other parts of those budgets. In states facing economic challenges such as California, this may be considered virtually an impossible situation to accommodate.

However, every state can use new government funds to make significant positive advancements, both within wireless and other technology and services by making well thought out decisions. For example, it is clear that each state is going to have similar issues when it comes to how and what technology will be needed to help enhance their services (wireless or otherwise). In the case of technology, states should be working together to leverage as much as they can as an organized front, especially when it comes to purchase commercial software or seeking to development customized software. Here is the challenge, it is likely that one state such as Washington will seek to invest into the software development of some new technology and the state of Missouri, Alabama, Ohio, and Maine are all looking to do virtually the same thing (in some cases with the same vendor). Without any knowledge of each other's pursuit, the cost to the

United States taxpayer virtually becomes four times more expensive. In addition, there is power in numbers of purchasing any type of product. For example, if a vendor is offering their product for $50,000, but has price breaks down to $30,000 based on quantity, states working together can benefit from the economy of this scale.

It is our opinion that it is not in the financial interest in any vendor to mention or suggest this type of cooperation model from state to state. If a vendor receives virtually the same software development request from ten different states, most software vendors will bill the full cost of the development ten fold. If ten states were working together to put a bid into motion, each would benefit from having the cost of this development drop ten fold. However, some centralized government agency would need to create a recommended vendor list, most likely a private website for project suggestions and coordination, and a commitment from every state's purchasing decision makers to use this; for posting new ideas and suggestions, taking ideas and suggestions and participating in organized volume purchasing.

For wireless technology in particular, Westlake offers the following to assist any organization seeking to invest into the improvement of their wireless services: A Roadmap for Wireless Homeland Security Success and Eleven Ways to Ensure Good Wireless Decision Making.

A ROADMAP FOR WIRELESS HOMELAND SECURITY SUCCESS

The issues raised by this survey, simply with regard to the capability of dispatching and acknowledging emergency messages, were many. Many vendors, wireless or otherwise, are lining up to sell countless solutions for every aspect of homeland security ranging from simple economical solutions to extremely expensive and elaborate ones. In 2002, Congresswoman Jane Harmon was the guest speaker in Torrance California for a seminar titled “Technology Against Terrorism.” Many vendors attended, ranging from developers of the latest in scan technology for airports, to those of video surveillance systems, to consulting firms focused on computer security and GPS and location technology. These vendors could be placed into two clear categories: 1) new vendors with no customers pitching a solution or consulting services; 2) established vendors such as Motorola looking to maintain leadership in certain vertical markets such as homeland security. Looking long term at making any type of purchasing decision would be a difficult task for even an expert in any one of these technologies. For deciding on wireless technology, the issues are even broader.

For example, traditional paging networks such as WebLink Wireless typically have broader coverage areas, better in-building penetration and less expensive services than cellular networks. However, cellular providers such as Nextel offer voice services as well as text messaging services similar to those of the paging industry. This is why it is not uncommon to see emergency services personnel carrying a pager (or two), cell phone, and a two-way radio on their belts. No single department or agency has standardized on any single form of wireless technology because no single form of wireless technology offers every capability.

Expanding beyond just deciding on what device to carry and on what network, there are hundreds of choices to be made in applications that use these networks to send and receive data. For example, an agency may purchase phones and services from Nextel and make extensive use of software loaded on these phones to look up license plate numbers, vehicle identification numbers and drivers license numbers.

This “look up” component would typically be provided by a third party vendor, and would involve a monthly service fee over and above the monthly costs for phone usage.

We have identified five different directions emergency service organizations will take when moving forward in managing this technology. First, they can do nothing. These organizations are either satisfied with their existing technology, do no have a budget to acquire new technology, or do not believe any new technology will significantly enhance the way in which they communicate today. Second, they can invest into newer technology than what they have today but not take advantage of the very latest and most expensive systems. These organizations either are being cautious about adopting new technology too early, have new budgets that only warrant moderate improvement, or make a split investment with their field force (some officers or departments receiving better technology than others). Third, they can invest into the very latest technology. These organizations are typically very well funded and can afford such an investment. In these cases, there are still potential consequences from dealing with vendors who are incompetent or too poorly established to survive or from implementing immature technology that may not work adequately, conceivably causing even more communication problems than existed previously. There is also a danger that if the total fees for the solution are high, and cutbacks happen, the original upfront investment (devices, software, activation fees, etc.) could be lost. Fourth, they can cut back existing services. For example, we saw a few emergency services stop carrying pagers and activate the paging functions available through their cell phone and cellular provider. Although coverage issues were less effective at times (some times drastically less effective) and messaging was even further challenged with poor in-building penetration, the overall cost per month was decreased by a few dollars per field force worker. Fifth, they can laterally switch technologies. Emergency services that use pagers have found it difficult to find a stable paging carrier. PageNet, Arch, WebLink Wireless, Metrocall, SkyTel (Worldcom), etc. have all been in and out of bankruptcy in the last several years. This has caused serious fluctuations in customer service reliability as well as network reliability at times (with a few exceptions). However, most of

these organizations have reorganized under Chapter 11 and appear to be emerging with significantly more stable and stronger financial and business models, new devices with more capabilities, leaner and more educated sales teams, etc.

In any case with any provider, the local wireless representative will typically provide the same information about their company in a bid. Most customers are typically left with coverage maps and pricing for different device models and airtime. These bids and proposals often do not come with information pertaining to additional technology such as software for pagers and phones to enhance the way in which customer operations could run, any internal needs assessment of an underlying need to communicate within a department or across departments, and no real benchmarks to clearly differentiate themselves from their competition other than price and the personality of the wireless representative.

It is the responsibility of each organization to make the best purchasing decision they can when spending taxpayer dollars. Further, it is impossible for any person with purchasing power to become an expert in all technologies when making these decisions. This is expected to be even more challenging with new government money and new homeland security personnel. The same person or group of people state-by-state who will ultimately be responsible for wireless decisions will also be responsible for having expertise ranging from gas masks and electronic surveillance equipment to purchasing cars, trucks, and specialized vehicles.

Over the last ten years, Westlake and its management have witnessed significant mistakes made in wireless purchasing decisions by local and government agencies. In these cases, there was already little margin for error due to lack of additional funds. For any emergency service looking to expand its communication and wireless capabilities, we offer the following ten guidelines to help in making the best decision possible. You will find that portions of these guidelines can be used for any purchasing decision you may have, wireless or otherwise.

ELEVEN WAYS TO ENSURE GOOD WIRELESS DECISION MAKING

First, before any meeting is set up on site, make sure the carrier provides the proper coverage for your needs. Most service providers offer coverage maps on their websites. However, if you see areas in which you need coverage that are not on these maps, it is worth making a call to see if the maps in these area are out of date or if there are any immediate plans for expansion to accommodate your additional needs. Bottom line: if the coverage is not a good fit, there is no purpose for an on-site meeting. If you are seeking cellular services, ask for a map that will show local dead spots as well. As good as all the cellular providers have become over the last several years, there are known dead spots around every major city. Make sure these dead spots do not interfere with critical operations. In addition, have everyone who is required to carry a cell phone take a demo home to ensure they have the best possible coverage at their house or apartment. You may find your purchasing decision split between multiple carriers because of this test. Make sure you test their coverage prior to making your decision.

Second, (when possible) avoid focusing on price. The concept here is that if price is not the dominant driving factor in the sales process (even if it really is internally), you will place more pressure on the wireless service provider or third party vendor to communicate the benefits of their services and the reasons why they should be considered as a vendor for your business. However, be aware of the new fees on fees model the industry is headed in. Activation, Insurance, cell time, direct connect time, GPS fees, third party fees for mapping, software and associated maintenance, etc. One could quickly spend over $100.00/month in recurring fees in some cases. However, do the math, if a solution is capable of saving more lives, enabling you to respond faster, track assets, be more productive, cut down on staff or overtime, etc., it may pay for itself ten fold. If the carrier representative is untrained in how to calculate this value for you (most are not), find a “return on investment” calculator on the Internet and do the math yourself.

Third, everyone offers the “best customer service” in town. This is easily tested prior to making a purchasing decision. Create a comparison table listing the name of the carrier, the day and time of the

week, and record hold times when making phone calls for assistance. You may have found that the wireless service provider who offers the best price may also have the longest hold times with the least qualified customer service representatives. In addition, you may also want to know the internal policies in the customer service department (supervisor ratio to general staff, depth and accuracy of problem solving trees, etc.) This is a critical aspect of what you are paying for. If the support is poor, do not expect it to get any better especially in an emergency service situation.

Fourth, look for the carrier that appears to be more focused on problem solving in their communication approach, rather than focusing on their standard sales pitch. For example, if you see a wireless representative actively wanting to talk to at least one person in the field at each level that would use their services, looking to assess existing challenges you have described and ones they might have uncovered with their own research, you are headed down the right path with the right provider regardless of price. This carrier and its representative are looking for ways to ensure you get the most out of their service receiving the maximum possible return on your investment.

Fifth, challenge each carrier and their representatives to solve communication problems rather than simply trying to sell you devices and airtime. Do this even if you may already know your communication problems and have the answers to these problems. This places the responsibility on the wireless representative to take an active role in ensuring their technology is the best fit for your organization.

Sixth, take special focus on resellers and third party vendors. In the best case scenario, you can find a third party vendor that can offer you software, devices and airtime as a complete package, and do so better than the carrier can directly. However, you will also find newly formed venture capital based companies having massive expenses that are not keeping up with their costs with little to no relationships with carriers the sell solutions for. Ask for a financial statement. The technology they offer may work perfectly and do exactly what you are looking for but they may be out of business six months down the road. You should also ask a reseller what their technology relationship is with the wireless providers they

resell. For example, if the network is having a problem, what access do they have to the proper engineers and what priority are their requests given? Just because a third party company has a reseller arrangement for devices and airtime does not mean they are set up well to handle problems when they arise. Some third party companies have you deal directly with the wireless provider so these issues stay separate. And with these types of organizations, calling into their customer service departments to evaluate hold times and response times to problems before you make a purchasing decision is critical. We were told some stories as hold times exceeding well beyond an hour for services that cost over $60.00/month per device. This should be considered unacceptable.

Seventh, ask for references from three customers that are having a good experience with the company and ask for three references of customers that left the services of the company. The latter is often not asked for but could potentially provide you will significantly more detail into what you might expect immediately after the sales closes. We have found that case studies and success stories on websites can be misleading at times. Get the references and make the calls.

Eighth, network reliability is key. As we all know, technology is problematic from time to time. A history of down time over the last year with the network in your area would be valuable data. Ask about their back up and data recovery plans, redundancy systems, and their internal procedures for when the network goes down. Expect your wireless communications to be only as good as the engineering and engineers behind the network. Most are quite good; downtime is a reality. However, for emergency service organizations this is an additional critical layer that should be investigated.

Ninth, if your services are going to include text messaging, customized software for pagers or phones (Flex OS, Palm, Pocket PCS, J2ME, WAP, etc.), get references from other people who have used similar software on the same devices from the same software development firm. Also, make sure that you ask the software development firm if you will have the same developer(s) of their demonstrated examples

working on your solution. This may not be that important of a question, but it should make a difference in pricing if you are expected (unknowingly) to pay for a new developer's learning curve.

Tenth, negotiate additional terms for your agreement; just because a potential vendor states their pricing does not mean you can not negotiate a better deal by asking for it. And create some urgency in dealing with your account. These would include customer service, the replacement of lost and stolen devices, a process in which you can make it easy to add or remove services, price protections as service plans continue to drop and modifications to cancellation policies to protect you from long term costs associated with canceling services early. For example, you can pay a little more a month with Sprint PCS but there is no contract to sign. Get price breaks in writing up front for the addition of devices or services as more and more workers come on line. (100 pagers, 500 pagers, 2500 pagers, etc.).

Eleventh, if you need help, get professional advice. As you do move forward with new and emerging technologies, consider retaining an independent consultant who is truly working in your organization's best interests. The consultant's contribution may be as little as helping to identify communication challenges, or may encompass the entire process of helping assess and select a wireless vendor.

- End -

Wireless Business Solutions

Westlake Software, Inc. is a wireless software development and consulting firm that specializes in assisting emergency service and distributed field force organizations in selecting the best wireless technology to fit their needs. Organizations such as the United States Secret Service, VA Hospital, Providence Health Systems, HealthNet, City of Carlsbad, Dayton City Police and others actively retain Westlake and its staff on an ongoing basis to maintain and consult on their wireless technology/needs. If it is not Westlake, we do encourage you to find some outside resource to help ensure you make the best decision possible for your wireless needs.

With over ten years of experience and thousands of customers served, Westlake Software, Inc. leads the way in ensuring that its customers receive the best value and technology for their wireless needs. Services include assessment, consulting, development and integration and training services for all wireless devices, wireless networks, and wireless platforms. Contact us today for a free consultation on your wireless needs.

Assessment	Consulting	Development & Integration	Training
Wireless Services and Software Needs	Wireless Services Selection	WAP, J2ME, Pocket PC, Reflex OS, Palm	Hand Held Devices
Technology	Solution Architecture	Java, Windows, C, C++, HTML, WML, etc.	Software and Computer
Enterprise Integration	Software Selection	Windows (NT, 2000, XP), Unix, etc.	Customized Software
Existing Systems and Services	Return on Investment Modeling	Telemetry and Remote Asset Monitoring	Wireless Provider ROI & Solution Selling Programs

WESTLAKE SOFTWARE, INC – PO Box 9075, Calabasas, CA 91302
Phone: (818) 932 9120 • Fax (702) 995 3494
www.westlakesoftware.com • sales@westlakesoftware.com

APPENDIX A – INITIAL SURVEY

CONTACT INFORMATION
Domain: Westlake Software
Form Name: Wireless Homeland Security Project
First Name:
Last Name:
Company Name:
Title:
Email:
Address:
Phone:
GENERAL ENTRY SURVEY
Does your organization have a system to effectively communicate emergency messages to agencies outside your organization?:
Does your organization have multiple departments that need to be notified in the event of an emergency?:
Do you have an effective way to guarantee wireless devices received messages today?:
Do you have an effective way to guarantee a person received a message via a wireless device today?:
MISCELLANEOUS INFORMATION
How do you dispatch emergency messages to mobile members today?
How did you hear about this project?
Please send me the full research project document for review.

APPENDIX B – EXIT SURVEY

CONTACT INFORMATION
Domain:
Form Name:
First Name:
Last Name:
Company Name:
Title:
Email:
Phone:
Fax:
EXIT SURVEY QUESTIONS
Prior fastest time:
Prior slowest time:
Project fastest time:
Project slowest time:
Experimented with SMTP/WCTP:
Carrier Used:
Other carriers used:
Received proper service:
Service improvements:
Additional functions/services:
Prevent from being viable option:
Enhanced communication within department:
Enhanced communication between departments:
Would pursue with government funds:
Interested in cost information:
Need more time:
Websites used:
Print publications read:
Any other information:
Consent to publish name and organization:
Consent to take calls:

APPENDIX C

Mutual Non-Disclosure Agreement

This Non-disclosure Agreement ("Agreement") is made and entered into as of this_____day of_____, 200__, by and between Westlake Software, Inc., a California S-Corporate, PO Box 9075, Calabasas, CA 91302 and _____located at _____.

WHEREAS, each party (the "Disclosing Party") may disclose to the other party (the "Receiving Party evaluating a possible business relationship between the parties ("the "Transaction").

NOW, THEREFORE, the parties agree as follows:

1) "Confidential information" as used in this Agreement means information in any form disclosed or made available by the Disclosing Party to the Receiving Party that the Receiving Party knows or has reason to know (either because such information is marked or otherwise identified by the Disclosing Party orally or in writing as confidential or proprietary, has commercial value, or because it is not generally known in the relevant trade or industry) is confidential information of the other party and shall include, without limitation, (a) the current, future and proposed products or services of the Disclosing Party, its subsidiaries or affiliates, as well as financial, technical, research, operational, sales and marketing information related thereto; (b) ideas, inventions, and works of authorship; (c) business plans, business forecasts, budgets, prices and costs, financial statements, research, sales and distribution arrangements, and the identity of partners, suppliers and customers; (d) the existence of any business discussions, negotiations or agreements between the parties; and (e) any information regarding the skills and compensation of employees, contractors or other agents of the Disclosing Party or its subsidiaries or affiliates.

2) The Receiving Party will not copy, make use of, disseminate, or in any way disclose any confidential information of the Disclosing Party to any person or entity, except to employees and authorized representatives of the Receiving party bound by a duty of confidentiality no less protective of the Disclosing Party's confidential information than this Agreement and only as necessary to evaluate, discuss and/or negotiate the Transaction.

3) The Receiving Party shall treat confidential information of the Disclosing Party with the same degree of care as it accords to its own confidential information, but no less than a reasonable degree of care under the circumstances.

4) Each party's confidential information shall not include information that: (a) was in the public domain at the time it was disclosed or made available to the Receiving Party by the Disclosing Party; (b) entered the public domain subsequent to such time through no fault of the Receiving Party; (c) was in the Receiving Party's possession free of any obligation of confidence at the time it as communicated to the Receiving Party by the Disclosing Party; (d) was rightfully communicated to the Receiving Party free of any obligations of confidence subsequent to the time it was communicated to the Receiving Party by the Disclosing Party; or (e) was developed by employees or agents of the Receiving Party without use or reference to confidential information of the Disclosing Party. In addition, the Receiving Party may disclose the Disclosing Party's confidential information in response to a valid order by a court or other governmental body, as otherwise required by law, or as necessary to establish the rights of either party under this Agreement, provided that the Receiving Party shall immediately notify the Disclosing Party of receipt of any such order and provide the Disclosing Party a reasonable period of time in which to oppose such order before responding.

5) All confidential information and materials furnished to one party by the other shall remain the property of such party and shall be returned to it promptly or destroyed (if so requested), together with any copies thereof. All confidential information and materials furnished to the Receiving Party by the Disclosing Party hereunder are provided on an "as is" basis, and Disclosing Party shall have no liability for the use thereof.

    a. Neither party will communicate any information to the other in violation of the proprietary rights of any third party.

    b. The Receiving Party acknowledges that the Disclosing Party (or any third party entrusting its own confidential information to the Disclosing party) claims ownership of the confidential information disclosed and all patent, copyright, trademark, trade secret and other intellectual property rights in, or arising from, such confidential information. No option, license, or conveyance of such rights to the Receiving Party is granted or implied under this Agreement. If any such rights are to be granted to the Receiving Party, such grant shall be expressly set forth in a separate written instrument.

    c. Neither party will assign or transfer any rights or obligations under this Agreement without the prior written consent of the other party.

    d. The non-disclosure obligations imposed by this Agreement shall terminate two (2) years from the delivery of the particular confidential Information in question.

e. Each party shall comply with the applicable export laws and regulations of the United States with respect to any information received under this Agreement.

f. This Agreement shall be governed in all respects by the laws of the State of California, without giving effect to principles of conflict of laws and venue shall be in Los Angeles County.

g. The parties agree that confidential information is valuable information, the unauthorized disclosure of which would cause irreparable injury for which there would be no adequate remedy at law.

h. The parties agree that the Disclosing Party shall be entitled, without waiving any additional rights or remedies otherwise available at law or at equity or by statute, to seek injunctive and other equitable relief in the event of a breach or intended breach of this Agreement.

i This agreement represents the entire understanding of the parties with respect to its subject matter, and supersedes any other prior or contemporaneous agreements or understandings, whether written or oral concerning confidential information. This Agreement may only be changed by mutual agreement of authorized representatives of the parties in writing.

j. All notices or reports permitted or required under this Agreement shall be in writing and shall be sent to the person indicated below.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed by their duly authorized representatives as of the date first written above.

Westlake Software, Inc.

By: _____

Name: Alan Gould

Title: President

Date: _____

Organization: _____

By: _____

Print: _____

Title: _____

Date: _____

