ENHANCED-911

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ENHANCED-911

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INTRODUCTION

In these times of increasing demand for social and health services combined with dwindling resources, it seems imperative that communities do all they can to provide quality emergency service to the greatest number of people. Recent improvements in computer and communication technology offer emergency reporting personnel the opportunity to provide that service.

HISTORY

The concept of a universal emergency reporting number began to develop fifty-three years ago in Great Britain. However, it wasn't until 1968 that American Telephone & Telegraph Co. (AT & T) announced that the digits 9-1-1 were to be made available for nationwide implementation of a universal emergency reporting number. Since that year, the number of 911 system installations has been increasing. When a community is placed under the protection of 911, any man, woman, or child can call for help in any emergency simply by dialing 9-1-1 on the nearest telephone, without the need for any coins when the call is made from a pay phone. The service operates continuously, 24 hours a day, seven days a week, every day of the year.

BASIC-911

Although quick responses by 911 emergency teams have saved lives and property, this basic lifeline is still unavailable in many areas. In these areas the caller must dial a different
seven-digit number for each emergency service. Even where Basic-911 is available, the system can be dangerously unreliable. Consider this:

- Stricken with chest pains, a 35 year-old man in Jackson County, Oregon, called 911 for an ambulance. After gasping the name of his rural road, he collapsed. Repeatedly, the operator asked for a complete address. Her pleas went unanswered. For eight minutes, as the call was traced, she listened to her caller groaning in agony; then, silence. When paramedics arrived 24 minutes after the call was made, the man was dead of a heart attack.²

The Basic-911 systems have been foiled time and again because callers are too ill, too young, too panicked, or too disoriented to inform operators of the nature of the emergency or their exact location.

BASIC-911 LIMITATIONS

Reducing the seven-digit emergency number to three digits was a major advancement, but Basic-911 systems still have five severe limitations. First, the operators must be able to obtain critical information from the caller, who is often times hysterical. "This procedure wastes valuable time, risks omission of vital information, and leaves too much room for error."³ The second limitation also wastes time jeopardizing the delivery of emergency services. If the operator and the caller are disconnected before location information is provided, the operator has no way to reestablish the connection to determine who called without involving the telephone company's tracing procedures. Thirdly, if the operator does not have the number of
the phone where the call was placed, the operator can not call back and verify the need for emergency services. Therefore, emergency personnel must be dispatched. False alarms contribute to the high cost of emergency services and can place the safety of the community at risk. An emergency vehicle traveling at high speeds through busy intersections places other passenger vehicles at risk if the sirens are not heard by the drivers. Also time spent on following up a false alarm could take away from the quality of services that may have been needed in a real emergency. The fourth limitation is based on human error. The operator must repeat the vital information to a dispatcher who in turn repeats it again to the appropriate emergency vehicle operator. If the message is not clear, critical information can be misunderstood or lost. Finally, emergency service can be delayed if the addresses given do not contain street and/or house number identification. This is often experienced in rural areas that have rural route and box numbers.

ENHANCED-911

The inadequacies of the Basic-911 system prompted the development of a new system called Enhanced-911 (E-911). E-911 provides a fail-safe technology that promises to be the breakthrough that will extend 911 services to all residents within reach of a telephone.

Enhanced-911 combines creative and innovative technology with state-of-the-art switching systems to enable a community to
crossover telephone boundaries. In addition to county-wide coverage, E-911 provides the dispatcher receiving the emergency call with visual information provided by way of database utilization. Within two seconds after the call is answered, a computer screen will automatically display the address, name and phone number of the location from which the emergency call was placed, in addition to a listing of the proper responding fire, police and Emergency Medical Service units.4

HOW E-911 WORKS

Many versions of Enhanced-911 exist, but they all operate in the same basic way. There are only four standard capabilities required to provide E-911 service: Automatic Number Identification (ANI), Automatic Location Information (ALI), selective routing, and call transfer. The Enhanced-911 system works this way:

* First of all, the area to be served is divided into sections. Next, these areas are assigned two Public Safety Answering Points (PSAP), which will handle the 911 emergency calls for that particular section.

* The selective routing system located at the central office identifies 911 calls and matches the caller's directory number with its assigned primary and secondary PSAPs. The system then forwards the call to the ANI control system located at the PSAP. If the primary PSAP is unable to answer the call, the call is then sent back to the central office for rerouting to the
designated secondary PSAP.

Some PSAPs may be equipped with Automatic Call Distributors (ACDs) which put calls in queue until an operator answers. After a timeout period, the ACD will divert the call to a recorded announcement or send it back to the central office for rerouting.

* Once the call has been received by the ANI control system it then requests the ANI for decoding. The calling number goes to the ANI display at the PSAP attendant station. (See Exhibit I)

* At the same time that the calling number goes to the ANI display, ANI information is forwarded to the ALI system, where it is cross-referenced with the Automatic Location Identification (ALI) data base containing detailed location and identification information. This data base includes a file for each directory number. Each file contains such standard information as street address, the type of phone (business, residential, or public), occupant name(s), and the nearest facility for police, fire medical service and poison control. The information is then displayed on the 5 x 7 screen of the ALI terminal. (See Exhibit II)

Expanded screen formats are available that allow the input of even more detailed information. For example, the screen could display unique attributes of commercial and residential structures, hazardous conditions (explosives, chemicals and radioactive materials), and specific information about the occupants (disabled person, children and elderly). (See Exhibit III) This information is provided verbally by the telephone
customer and is updated daily. The use of the expanded screen places a high level of liability on the telephone company if the information is incorrect.

* The ALI system is located at the PSAP. In addition to interfacing with the ANI control system and matching ANI information with the appropriate data base file on the caller, the ALI system automatically forwards location and identification information to the proper agency's attendant terminal using the feature entitled single button transfer. The call transfer feature eliminates the need for the attendant to rekey information. These terminals may be located at the police or fire station, or at a centralized emergency center. Not only does this feature save time, but it also virtually eliminates the possibility of a call being lost in the transfer process.

* The Enhanced-911 feature called call detail recording records what time the call came in, when it was answered and when it was cleared. After compiling the data, monthly and quarterly usage reports are generated. This information can be invaluable in assessing performance of dispatchers and in providing an overall evaluation of response time in general. The information can also be used to identify telephones used to turn in false alarms.

The efficiency of the Enhanced-911 system relies on the selective routing feature. Three routing techniques exist to provide quality service. First, alternate routing can be employed. As mentioned earlier, the system can reroute calls
when lines are busy or the primary PSAP is out of service to ensure that no emergency call will go unanswered. Default routing simply means if the telephone cabling is damaged by a natural disaster or by human means then the call, as with alternate routing, would be rerouted to another PSAP in that community. The final routing technique is force disconnect. This technique allows a 911 operator to clear his/her line at anytime. In other words, if someone intentionally blocks all lines into a PSAP such as someone preparing to commit a major crime and wishing to slow police reaction time, the operators at the 911 switchboard can immediately disconnect and re-open these lines for in-coming calls.

E-911 ADVANTAGES

The advantages of the Enhanced-911 service are obvious. Emergency service can still be provided in a timely way even if the caller can not identify or incorrectly identifies his/her exact location. The frequency of false alarms and crank calls will decrease since agencies will be able to locate exactly from where the calls are being made and be able to pinpoint those units which are being misused frequently. This information could lead to the arrest of those individuals who are misusing the system. Also the reports generated will assist emergency team supervisors in allocating resources where they can be most effective. Since the 911 operators are not verbally transferring information to dispatchers, human error is decreased, thus
improving the quality of service.

E-911 INADEQUACIES

However, Enhanced-911 also has its inadequacies. The increasing popularity of cellular phones has required 911 personnel to search for ways to provide these telephone users with the same quality service. Presently, the system cannot identify where the caller is or who it is. So, if the connection is broken, it is impossible to reestablish contact and provide timely emergency service. When the call is answered, the only information that displays on the ALI monitor is the phone number, which is classified as a business phone. The problem lies in trying to locate the vehicle. Telephone companies are trying to convince cellular phone companies to release information such as the license number and the mobile number. In addition, a satellite mapping system is being developed that can pinpoint a vehicle's location within 50 feet.

Another limitation of E-911 is that not all of the human element is eliminated. The operators must rely on procedure, experience, and intuition to prioritize the emergency calls. The operator's judgement can mean the difference between life and death.

Another challenge that E-911 faces is building and maintaining an accurate database of addresses and phone numbers. If an accurate address and phone number do not appear on the screen when a caller dials 911, the whole purpose of E-911 -to save precious time in an emergency- is lost. The database must
be updated daily, and the jurisdictions must provide the updated information as the result of annexations or street name changes.

Another area of concern is education. Today 911 is being taught to kindergarten and grade school children as the number to call if you have an emergency. However, this is still not enough if the county where the call is being placed has not implemented a 911 system. As of 1984 only 45% of U.S. citizens in cities across the country were served by more than 1,100 911 systems.\textsuperscript{5} Although this number has increased since 1984, no exact number has been recorded since that time. Of the 45% covered by 911 systems, only 25% of the population is covered by Enhanced-911.\textsuperscript{6} So, the time spent on educating children about 911 is only valuable if that area is covered. That is why it is imperative that the Enhanced-911 system become a standard part of all community emergency reporting systems. Once the community has the new system and educates its people about its use, then the quality of service will be dramatically improved, and the number of false alarms or crank calls will drop as well.

**PROCURING E-911**

Exhibit IV. summarizes the steps and groups involved in purchasing an E-911 system.

**ISSUES**

Many issues must be addressed by community officials when installing Enhanced-911 systems. Some issues are "funding,
choice of equipment, access to and accuracy of address and phone records, good training of workers receiving the emergency calls, insuring privacy for those who have unlisted phone numbers and addresses, overcoming turf problems among jurisdictions and between police and fire departments, and compatibility of electronic and cellular telephones with E-911 systems."

Before any action takes place the community must examine state legislation about emergency reporting systems, if any exist. As of 1987 twenty-five states had passed legislation addressing 911. A mandate for statewide implementation of 911 system(s) was included in some of them, along with the technical and operational standards that must be followed.

PHASES

The remainder of choosing and installing an E-911 system can be divided into four phases: Definition phase, Development phase, Implementation phase, and Post-implementation.

PHASE I: DEFINITION

The first step of the definition phase is to form committees to define system requirements. The members of the committees should consist of civic leaders, telephone company personnel, police, fire and personnel from various municipal agencies. If the system is going to span a wide area, then the committees may require participation of more than one central office, a number of emergency service organizations, and several municipalities.
The committees analyze the jurisdictional, public safety and telephone exchange boundaries. In the area that is to be covered by E-911 it is likely that there are several police, fire and emergency medical facilities. Each agency should prepare maps and definitions of the area they serve. These maps, along with telephone company maps, are overlaid to form the master E-911 planning map. The master map will clearly delineate where exchanges overlap into bordering non-E-911 areas, which can be remedied by providing a recorded announcement that directs the caller to use the seven-digit emergency number for their area.

Next, the Master Street Address Guide (MSAG) needs to be developed. The master map and other sources such as election guides, tax records, and census files are used to build the MSAG. Street and address data from all sources must be compared, and the differences must be investigated and resolved. Rural and/or unincorporated areas may need to be given street names or be renamed and assigned house numbers. The MSAG is then used to define the Emergency Service Zones (ESZ), which are areas having a unique set of service agencies and a primary PSAP. Each ESZ is assigned a unique Emergency Service Number (ESN).

The committees should then determine what type of calls will be handled by the emergency system. Those that will not be handled by the system must be assigned a seven-digit number. The type of calls that are handled by a 911 system varies from area to area.
PHASE II: DEVELOPMENT

Several ways of implementing an E-911 system exist, and the differences in cost and service provided can vary greatly from one system to another. In addition to the ANI, ALI, selective routing, and call transfer features, other features and requirements need to be identified. Telephone Engineer & Management magazine lists a series of questions that need to be asked:

1) Does the system employ redundant copies of critical hardware for back-up in the event of trouble in the primary circuits? Redundancy ensures that calls will not be lost due to system outage.

2) What type of diagnostics are built into the system? Is it capable of automatically reconfiguring? A fault-tolerant design is highly desirable.

3) Is the system compatible with existing equipment and systems with which it must interface? This is extremely important where existing equipment is involved.

4) Does the system provide call transfer and conferencing capability? In a good system, ANI and ALI information accompany the call whenever it is transferred to another center or area.

5) Does the system provide Call Detail Recording? If so, a statistical summary of call data can aid in managing the efficiency of the system and its operators. In addition, a library of recorded conversations can be maintained.

Another area that should be addressed in the development
phase is the reliability of vendors. It is suggested that the installed 911 system be able to interface with a broad range of central office and customer premise equipment. Should the manufacturer of proprietary equipment or integrated systems go out of business or withdraw from this increasingly competitive market, PSAPs could be stranded without maintenance service, spare parts, or the means to upgrade or expand 911 service.

PHASE III: IMPLEMENTATION

Implementing a 911 system is a complex task because it requires the coordinated effort on the part of many individuals with a variety of expertise. The implementation team may be composed of "marketing specialists, systems analysts, data systems specialists, and specialists from regulatory agencies, central office engineering, circuit provisioning, business services, directory, independent company relations and equipment vendor personnel."9

The use of PERT charts has proven to be an effective management tool for coordinating and tracking the various activities. Meeting on a regular basis helps to keep the team aware of project status and problems.

The hardware implementation involves installing the terminal equipment at the PSAP locations and tying them into the ANI control system at the PSAP.

The software implementation involves loading the ALI and switching system data bases. Great care should be exercised when
entering data to ensure that the degree of accuracy established in the development phase remains the same.

After the system has been installed, the system must undergo extensive Call Through Testing. Because each system is unique, test criteria will also vary from area to area. The test criteria should include the number of test calls to be made, who will make the calls, and how much time to allot for testing purposes.

Once the equipment is in place and is functioning properly, it is still only as good as the operator, who must be well-trained to use it properly. The method of training varies from area to area depending upon budget and other constraints. Some areas provide on-the-job training, while others enlist the services of professional emergency communications instructors or training consultants. Even some community colleges provide two-year certificate programs.¹⁰

The final step in the Implementation phase is to publicize the new E-911 system. Generally, all groups involved in designing and implementing the E-911 system are active in public relations to some degree. In some areas the telephone companies have played a leading role in education by providing informative booklets, seminars, news kits, slide shows, bill inserts and other creative programs. Regardless of which organization is responsible, a successful education program must be comprehensive and designed to reach everyone - the old and young, the blind, the hearing and speech impaired, the retarded, and many different
nationalities. The biggest challenge that E-911 educators face is getting across to the general public just what an emergency situation is, what it is not, and placing the right emphasis on the use of E-911 for emergency purposes only.

PHASE IV: POST-IMPLEMENTATION

The post-implementation activities' purpose is to maintain and enhance system integration. By monitoring employee job performance, structuring an ongoing public relations program, updating software, and establishing a comprehensive equipment testing program, system designers can ensure the reliability of the system. If this phase is overlooked, the full potential of the E-911 system can not be realized.

COSTS & FUNDING

Obviously installing and maintaining an E-911 system is a costly venture. System costs range from $100,000 to over $1 million. At the present time there appear to be at least three options for funding E-911 services: increased taxes to pay for the service; increased phone rates; or by charging a user's fee for ambulance services and using the savings to pay for E-911.

The most direct approach would be to have the county councils include the annual cost into the operating budget. This could be a drastic increase to the budget and may require an increase in taxes. If taxes need to be increased, a referendum would be called for to approve the upgrade to E-911.
Some state legislatures have established laws that enable counties to provide "enhanced emergency telephone system" service and impose a county-wide fee sufficient to pay the cost of installation and operation of the system for all participating agencies. What this does in effect is evenly spread the cost of E-911 to every phone in the county.

Finally, an alternative approach would be to provide the E-911 county wide and apply the ambulance users fees collected to pay for the increase in expense of E-911. In this case, there would be no increase in actual expense but a shifting of funds from one expense to another, yet still improving the emergency phone service.

Each option is a costly undertaking. The ultimate question is, however, what cost do people attach to human life.

CASE STUDY: MARION COUNTY E-911 SYSTEM

The Indiana Legislature enacted HB1062 in June 1988. This law enables counties in Indiana to provide E-911 service by imposing a county-wide fee. Further, HB1062 allows the supplier of said service to collect from each service user and to pay the county quarterly those monies collected. The supplier is allowed to charge not more than 3% of the monies collected as its fee for collection and will supply to the county the names of all those who have not paid or defaulted for appropriate collection action. (See Exhibit V)

Indiana Bell serves Marion County and charges a surcharge
on the customer's monthly telephone bill. The amount charged varies according to the number of subscribers. Marion county has approximately 104,000 subscribers. If the monthly bill for service was $15,600, then the surcharge would be $0.15.

The Indiana law places a limit on the amount of the surcharge. The supplier is not allowed to charge more than 3% of the average telephone line charge that the customer may have per month. Indiana Bell charges $10-12 for residential lines and $30-35 for basic business lines. The 3% is figured from the total access line charge. (The total line charge/ total # of lines = total access line charge). So, for a resident with one line, the maximum surcharge that can be charged is $0.36.

Indiana Bell's central base covers all of Indiana. The central base also provides service to Madison and Milwaukee, Wisconsin as well as cities in Illinois. Due to the high speed data link and fiber optic lines, the distance does not matter. Currently, the number of subscribers is over 3 million. However, Indiana Bell only can surcharge Indiana businesses and residents. A group fee is paid to Indiana Bell for the use of the central base by the communities in Wisconsin and Illinois.

Indiana Bell's database is stored on two stacked computers. One is on-line, and the other provides backup. The other phone companies update their subscribers and notify Indiana Bell once a week of any address or street name changes.

Marion County has five master PSAPs located in Speedway, Lawrence, Greenwood, Indianapolis, and Carmel. Marion County
also has five secondary PSAPs. All ambulance service is provided by Wishard Hospital. Wayne and Perry Township fire departments handle the majority of the fires. All information can be directly transferred to the dispatchers of these agencies.

Before an E-911 service was installed, Indiana Bell sent thousands of letters to Marion County telephone customers asking if they would be willing to pay a surcharge for the E-911 service. An overwhelming 79% said yes, while only 8% declined. The remainder did not declare a preference. Those residents in retirement communities highly recommended the systems installation.

Marion County began by publicizing the system to elementary school children. Indiana State Police officers lectured to the students about the proper emergency procedures, as well as passed out coloring books and buttons. The adults received pamphlets and flyers on exactly what E-911 was and the descriptions of the equipment to be purchased. (See Exhibit VI) News stations and radio stations also became involved in educating Marion County.

Since its installation in January 1990, Marion County has experienced positive results. After the public became aware of the tracing capabilities of the equipment, there was a dramatic decrease in the number of false alarms. The number of calls that were unable to be completed is also decreasing since emergency personnel can be dispatched even if the caller cannot identify his/her location.

Other counties in Indiana are installing similar systems.
Hamilton County's system began service on April 2, 1990. Delaware County is expected to switch in July 1990. Finally in October, Vanderburg County's system should be operational.

**Future of E-911**

Additional features that are likely to enhance the service of this quality system will occur at the dispatch level. The changes police departments will make include software programs for helping dispatchers insure that patrol cars are available to respond to life-threatening calls. A sophisticated mathematical model, known as cutoff priority queue, will provide a basis on which the dispatcher can decide to delay police response to low-priority calls.\(^{12}\)

Also, with the use of satellite transmitters dispatchers will be able to pinpoint a emergency vehicle's location to within 50 feet.\(^{13}\) The automatic vehicle location (AVL) systems will help dispatchers determine which patrol cars are in the vicinity, thus providing faster service.

Another future application that will improve the E-911 service is Network 911. If an individual would dial 0, instead of 911, the operator answering the call would be able to send the information directly to the requested police, fire, or rescue agency. Currently, the operator must patch the call to the 911 system.
SUMMARY

The future looks very bright for the Enhanced-911 system. Its ability to improve emergency service and hence save more lives is critically needed. As more states pass legislation advocating its usage, E-911 will soon be in even the smallest of communities. For a minimal cost to each resident, the very finest technology in emergency assistance will be at people's fingertips. All they will have to do is call 911.
EXHIBITS
ANI DISPLAY TERMINAL
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<td>14:03</td>
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</tr>
</tbody>
</table>
ALI Display Screen
Expanded

SEPTEMBER 15, 1987  9-1-1 EMERGENCY SERVICE  14:44:50

ADDRESS:
1234 SOUTH MAIN ST.

WARNING MESSAGES:
ELDERLY COUPLE WITH A HEARING PROBLEM
FASTEST ACCESS THROUGH BACK DOOR

CITY: WEST ALLIS  TELEPHONE NUMBER: 475-9347
TYPE OF SERVICE: RESIDENT  EFFECTIVE DATE: 9-1-87

MESSAGES: 9-1-1 RESPONSE CODES - ENTER ONE OF THE RESPONSE
CODES BELOW

1 - METROPOLIS POLICE DEPARTMENT
2 - METROPOLIS FIRE DEPT. DISPATCHED
3 - METROPOLIS AMBULANCE DISPATCHED
4 - METROPOLIS HUMANE SOCIETY
5 - SUBURBAN POLICE DISPATCHED
6 - SUBURBAN FIRE DEPT. DISPATCHED
7 - SUBURBAN AMBULANCE DISPATCHED
8 - NUISANCE/PRANK CALL
9 - NON-EMERGENCY/REFERRAL/INFO
10 - NO ACTION/DUPLICATE CALL
E911 PURCHASING FLOWCHART

Feedback Loop

State/Local Government Objectives

Needs of the Community

Potential Vendors Identified

Rural Requirements
1. Reliability
2. Configuration Flexibility
3. Upgradability
4. Compatibility
5. Expandability
6. Maintainability
7. Affordability

Selected Vendor

Implementation Plan

Outcomes
1. Vendor Service
2. Network Performance
3. Community Satisfaction

Resources
1. Budget
2. Manpower
3. Expertise

Feedback Loop

Telephone Company's Objectives

Emergency Service Providers' Objectives

E911 Service
1. Priorities
2. Expectations
3. Demand

Contingency Plan

Feedback Loop
SAMPLE ORDINANCE

Be it ordained by the Common Council of the [city/county] that in accordance with I.C. 36-8-16 that an emergency telephone system fee may be established to provide the funding for an "Enhanced Emergency Telephone System" which utilizes the three digit number 911 to send automatic number and location identification for reporting police, fire, medical or other emergency situations.

SECTION 1: A monthly fee per telephone access line will be collected by the service supplier to pay for the lease, purchase or maintenance of enhanced emergency telephone equipment, including necessary computer hardware, software and data base provisioning; and the rates associated with the service suppliers' enhanced emergency telephone system network services. The fee will be determined by dividing the total monthly system cost by the total number of telephone subscribers in the service area to be covered.

SECTION 2: Each service supplier that collects the enhanced emergency telephone system fee on behalf of the city/county is entitled to a three percent (3%) administrative fee as compensation for collecting the fees. The remaining amount of the fee collected during the calendar quarter shall be remitted to the fiscal officer of the city/county within ten (10) days after the last day of the quarter. At the same time the collected fees are remitted, the service supplier shall provide a fee collection report to the fiscal officer of the city/county on a form provided by the fiscal officer.

SECTION 3: The city/county fiscal officer shall deposit the remitted fees in a separate fund known as the "Emergency Telephone System Fund". The city/county fiscal officer may invest money in the fund in the same manner that other monies are invested with the interest earned from such investment to be deposited in that fund.

SECTION 4: During January of each year, each service supplier that is required to collect the fee for the city/county shall provide a delinquent fee report to the city/county fiscal officer. The report shall list the name, address, and amount due for each service user who is two (2) or more months delinquent in paying the fee.

SECTION 5: Be it further ordained that this ordinance shall be in full force and effect on the first day of the second month after its passage by the Common Council of the city/county and approval by the Mayor.
To respond to all calls for help faster...

to reduce confusion, delays and false alarms...

to save more lives and more property-

give everyone in your community a
direct line to all emergency services...
...with ENHANCED

9-1-1 SERVICE from your
local Ameritech Company
What is Enhanced 9-1-1

It’s an improved version of the 9-1-1 emergency telephone service that has been providing a life-saving link between people and emergency services in communities across the United States for years—to help protect lives, homes and businesses.

By providing everyone in a community with one simple easy-to-remember number to use for all emergencies, Enhanced 9-1-1 Service shortens overall response time between when an emergency situation is first detected and emergency help arrives at the scene. Because with Enhanced 9-1-1 Service there is no need to fumble with telephone directories looking up fire, police and other emergency telephone numbers—and no need to dial seven or more digits—the response time can be cut by critical seconds—even minutes—to speed the emergency teams to where they’re needed as quickly as possible.

Enhanced 9-1-1 automatically routes calls to the proper community and number.

Versions of this new system are planned or have been installed in Chicago, Illinois; Kalamazoo, Michigan; Sheboygan, Wisconsin; Columbus, Ohio; Indianapolis, Indiana and many other communities throughout the Ameritech region.

Your local Ameritech Company is ready to help the officials of your community plan, design and implement the new Enhanced 9-1-1 emergency system—or improve an existing 9-1-1 system—to provide the kind of emergency services communications network your community can use to respond to all calls for help faster—to help save more lives and more property than ever before possible.


4Mr. Jerry Larrison, representative of Indiana Bell. Personal Interview.

5Moslow, 34.

6Michelmore, 168.


8Leora H. Bell, "A Primer for E911 Planners; Planning and Implementing a Cost-effective Emergency 911 System," Telephone Engineer & Management, 15 December 1987, 60.

9Bell, 62.

10Woodhouse, 4.

11Bell, 62.


13Larson, 30.

EXHIBITS

14Ameritech - Indiana Bell, "What is Enhanced-911."

15Jerry Larrison, representative of Indiana Bell. Personal Interview.


18 Jerry Larrison, representative of Indiana Bell. Personal Interview.

19 Ameritech - Indiana Bell, "What is Enhanced-911."

Ameritech - Indiana Bell. "What is Enhanced-911".


Larrison, Jerry, representative of Indiana Bell. Personal interview.


