

Pierce County, Washington

Pierce County Responder System (2000—Enterprise System)

System Summary

The Pierce Responder System qualifies as an exemplary enterprise system because it is used by law enforcement, fire, medical, and emergency-management personnel when responding to an act of school violence, which is the nation's number one issue in public schools.

The escalation of school violence has created the need for expanded school emergency preparedness and a better coordinated emergency response. As school administrators take steps to prevent violence, several questions still need to be addressed:

- How do schools inform responders of their emergency procedures and evacuation plans?
- Where do responders obtain accurate information on school contacts, utilities, shutoffs, and floor plans to act safely and efficiently?
- How can multiple responding agencies coordinate and expedite staff, resources, and actions in the most organized manner?
- How can all school personnel and responders remain informed of the incident and plans?
- How can casualties and property destruction be limited and school safety be improved for 75 junior/senior high schools and 122 elementary schools in Pierce County?

The Pierce Responder System answers these questions and increases student safety by:

1. Displaying the key information needed for emergency management including school emergency plans, school contacts, utility shutoff, building characteristics, area maps, floor plans, and digital images of interior and exterior spaces.
2. Providing interactive tools to develop Incident Action Plans, Situation Reports, Organization Charts, and Communications Reports. These allow responders to view

the most current information status on the incident from on-site, en route, or office locations.

The accomplishments of this exemplary government system are related to ease of use and the actual utilization of the Pierce Responder System for school emergencies. More than 60 organizations and agencies use the system in Pierce County and many jurisdictions in the Puget Sound area are planning on future implementation.

Pierce Responder's ease of use starts with the Web-based application, which uses a central database to store information. When designing the system, the project team interviewed emergency response and school officials to ensure the correct data was captured and that the user interface was carefully planned for casual users. Even though many of the personnel were not experienced information system users, the emergency-management staff taught fire, law enforcement, and school personnel the database loading and operation of the full system in two hours! Many officers commented that the intuitive interface was simple to learn and use, and that is critical during an emergency requiring assistance from neighboring jurisdictions.

The Pierce Responder System was tested during a simulated school emergency and was recently used for a school violence incident. A student brought a live hand grenade to Mount Tahoma High School. Officials evacuated the school and police and fire responders used the system to view floor plans as well as to access information before sending bomb technicians into the school.

The benefits of the Pierce Responder System are immeasurable when lives are at risk. The costs to implement the system are low. Pierce County nominated this system for the URISA ESIG award because this model can benefit any jurisdictions across the country and dramatically improve safety in our communities.

Motivation for System Development

According to national polls, the number one issue in public schools is student safety. Many schools are taking preventive measures against violence by establishing policies, increasing student awareness, and hiring School Resource Officers. These measures identify and prevent actions but many parents still worry, "Will my children be safe if something does occur? Will they know where to go and how will they be protected?"

Even before the Columbine tragedy, Pierce County's Department of Emergency Management was building the foundation for a new approach to school safety. In reviewing incidents that have occurred in other parts of the country (Arkansas and Ohio) as well as locally (Moses Lake, Washington, and Springfield, Oregon), it became clear that the emergency response was severely impacted by issues of organization, coordination, and communication.

The reoccurring theme in talking to the public safety community was one of "ifs"—if we only had better information about the school, if only we had used a common "incident command system," if only we had communicated before the event in a joint planning mode. To overcome these issues, Pierce County's school violence Preparedness Program addresses the key information needs of law enforcement, fire, emergency, medical, and school personnel with:

1. The Pierce Responder System, an interactive, online Web-based school information system.
2. Community partnership building between response agencies and schools.

The motivation for developing the Pierce Responder System was to enable responders (from any responding agency or jurisdiction) to see critical school information, coordinate tactical actions between agencies, and communicate status during a school emergency. In July of 1999, with the system prototype completed, Pierce County's Department of Emergency Management sponsored a trip to Littleton, Colorado, where they met with the local officials who responded to the tragic shooting at Columbine High School. This visit provided information to fine-tune the Pierce Responder System and verified the critical and strategic importance of the system. Since the visit, Littleton Fire Department has implemented a system similar to the Pierce Responder System for its schools.

System Benefits Achieved

The Pierce Responder System has achieved the primary benefit of improving student safety. Many other benefits are listed in this document. In addition to the expected, several significant unexpected benefits have occurred.

The first unexpected benefit occurred early in planning for the system. Building a common database takes cooperation from all agencies and jurisdictions and, sometimes, politics and "old history" keep groups from working effectively together. Implementing the Pierce Responder System inspired agencies to collaborate as everyone worked together to build the school

database as quickly as possible. The system's practicality and ease of use created an urgency to gather the information and make it available.

The second unexpected benefit came in November of 1999 as Y2K planning was reaching a high point. The county's major concern was not about computers but about social reactions. At this time, an Algerian citizen was caught smuggling explosives at a border crossing less than 100 miles away. Immediately, law enforcement was concerned about attacks on government buildings and banks in the county. The Pierce Responder System was quickly modified to allow the entry and display of information for nonschool buildings.

The third unexpected benefit has been the tremendous interest in the system expressed by other counties and jurisdictions. Pierce Responder solves many student safety issues faced by all emergency-response agencies. Because the system can easily be implemented (Web-based, wireless, and database-driven), it is a cost-effective solution.

A fourth unexpected use and benefit of the Pierce Responder System was evident during a planning incident response for a large protest demonstration. A local high school was selected as an operations base for law enforcement personnel from Pierce County and surrounding jurisdictions. The system was used to view floor plans, area maps, and building information to plan staging, sleeping, and command areas. This information can be shared with the responding agencies via wireless network in their patrol vehicles to improve communication and coordination for the responders.

The most significant and unexpected benefit occurred in the first year of deployment. A student brought a live hand grenade to Mount Tahoma High School. The 11 PM news reported the incident, stating that the school and emergency personnel had been working together to prepare for such an unexpected event. Bomb technicians used the Pierce Responder System to review the floor plans, maps, and utilities before responders entered the school.

System Design Issues Encountered and Overcome

The Pierce Responder System design requirements presented several unique challenges. The system architecture had to support a large number of users both in the office (networked) and in the field (remote). The school database development (75 senior/junior high schools with 3 to 15 buildings per school) was a large effort that required precise and accurate information.

Access to a Current Database by All Users

Initially, the project team considered storing and retrieving the school data on CDs. After reviewing the data volume for each school and outlining the maintenance and logistical problems of supplying CDs to 30 fire stations across the county, this approach was abandoned.

The Pierce County Geographic Information Systems (GIS)

department built Web-based applications including a system to view crime data and maps across wireless modems. The decision was made to use Web technology for Pierce Responder that would enable rapid deployment to a large number of users, access to a single, secure database source, and low cost implementation.

The Internet Web solution did have one drawback: security. Extra programming was performed to develop ways to secure the database and application from any unauthorized personnel.

Building the Large School Database Quickly, Efficiently, and Accurately

The largest design and implementation concern was how to input all the needed school information (for each school building) into a database in the shortest time possible. The county did not have resources to hire additional staff but relied on the fire, school facilities staff, and school resource officers to enter the data, thus allowing the task to be distributed to a large number of knowledgeable people.

The Pierce Responder System was expanded to include a Web-based, secured, and authorized data-entry system that was simple to use.

Each user of the system is assigned a log-in and password with specific privileges such as editing data. When a user makes an edit to a database record, the changes are stored in the “list of changes” page. The changes are added to the system only after the administrator views and accepts the information. Once accepted, the change is available to all users on the system. The administrator also has the option to revert to original values or accept changes that were originally rejected.

The ability of the administrator to control entries into the database is not only a security feature but also helps standardize the database information. With many staff members entering data at the same time, this feature makes it impossible for two people to update the same field unknowingly. The administrator’s validation step ensures that each database record is checked before being accepted into the database. Because the process is automated in Pierce Responder, this administration task is not time-consuming and solved the database construction problem by enabling a large number of staff to work in a Web environment to enter data.

Access to School Data and Incident Plans from Anywhere

The Columbine incident clearly showed that large numbers of personnel (fire, law enforcement, medical, emergency-management, federal) from multiple jurisdictions can be called on to assist in an emergency. Providing information to all these agencies across many types of networks would be impossible or cost-prohibitive and would not address the needs of responders at the incident. Because Pierce Responder is Web-based, the latest wireless data modems can be used. This allows any responder with a laptop and wireless access to the system (for situation reports, action plans, floor plans, maps, and images). This approach also saves time and confusion as responders can view Situation Reports from

their cars or offices and arrive on the scene prepared. During the Columbine incident, 100 officers “self-dispatched” and clogged the surrounding streets, making it difficult to get medical teams to the site. The Pierce Responder System was developed for, and fully tested in, the wireless (19.2 bps) environment.

What Differentiates This System from Other Similar Systems

Currently, no comparable systems to Pierce Responder for school violence preparedness exist. Some fire departments keep floor plans on CDs, law enforcement agencies have static Web pages, and schools keep their emergency plans in binders in their offices. Nowhere has an interactive database and Web-based application been developed that incorporates:

- Detailed descriptive information about the school building, contacts, and utilities
- Floor plans of each building
- Maps and images of the school and surrounding area
- Pictures and videos of entrances and hallways
- Incident Action Plans, Situation Reports, and Communications Plans to manage an incident
- Individual school emergency plans to communicate school actions to responders
- Simple user interface so responders can easily enter school and incident data
- Enhancement to allow other public buildings to be added to the database

Historically, no close working relationships between schools and public safety agencies have existed. Building partnerships between responding agencies and schools required holding meetings at the schools to walk through the facilities and identify hazards, observation sites, and evacuation routes. In many instances, team members didn’t know one another prior to being brought together for the Pierce Responder planning effort.

The universal acceptance of the Pierce Responder System differentiates it from others. There has been support from all emergency-response agencies and organizations in Pierce County that includes:

- Pierce County Sheriff and Emergency Management
- Twenty-one (21) city police agencies
- Law Enforcement Support Agency for Tacoma-Pierce County
- Ten (10) fire dispatch agencies
- Twenty-six (26) fire districts
- Washington State Patrol
- Fifteen (15) school districts

This opportunity to plan and prepare for disasters greatly enhances the effectiveness of emergency operations. By building interpersonal relationships between responding agencies and schools and providing emergency response persons with critical information needed to protect the students and themselves, the

Pierce Responder System is crucial for making strategic decisions and preventing further casualties and destruction.

System Hardware, Software, and Data

Hardware:

Fortunately for users of the Pierce Responder System, the hardware components are very simple. Users need only a browser on their PC to view the system (assuming responders using the system have a Pentium-based PC). The following chart summarizes the hardware components. Costs are for estimating purposes only and jurisdictions may have existing hardware that can be used or may be able to purchase hardware at a discounted rate. The hardware listed in the table is what Pierce County has in operation for the Pierce Responder System. Note: This is for one server. Systems operation personnel recommend having an additional redundant server for critical mission applications.

Hardware Item Number	Description	Cost
SKU 429891	Compaq Proliant 1600R P3/600 512K 128MB IBO/107658 32XCD 10x100 Part # 1523551-001	3,422.00
SKU 297325	Compaq Smart Array 3200 IBO/897290 Part # 295643-B21	2,062.00
SKU 440567	Compaq 18.2GB pluggable Ultra2 SCSI 10x100 Hard Drive 1 in Part # 128418-B22	1,213.00
SKU 427084	Compaq Integrated Management Display IBO/127409-B21 Part # 127409-B21	177.00
SKU 208979	Compaq Hot Plug redundant power supply IBO/771411 Part # 283697-001	636.00
SKU 193246	Compaq 35/70GB Internal DLT wide SCSI IBO/724652 Part # 242520-B21	4,949.00
SKU 292377	Kingston 256MB SDRAM module F/CPQ Proliant 1600R Part # KTC3614/256	538.00
SKU 193249	Compaq DLT 35/70 Tape cartridge 7-pack IBO/742656 Alt SKU 193248X7 Part # 295192-B21	621.00
Estimated Hardware Cost		\$23,759.11 including Tax

Software:

The Pierce Responder System can be implemented at relatively low cost. The work of deciding what information to display about schools is completed and the database is built. As a result, agencies need only to complete and enter data into the forms for each school. The floor plans and digital pictures are easily entered into the system. The following chart lists the core software needed on the central server to support Pierce Responder.

Core Software Item	Quantity	Cost
Windows NT server operating system IIS	1	400
Cold Fusion Server Professional	1	1,300
IIS monitoring software	1	500
ArcserveIT v 6.6 Workgroup Ed for NT	1	366
Estimated Software Cost		\$2,566

The Pierce Responder System can easily be implemented with technical staff who are familiar with relational databases and

NT servers. The system is built with the previously mentioned commercial software and is delivered with a database ready for data entry.

Data:

The Pierce Responder System uses relational database technology via an SQL Server database. Cold Fusion software connects the database with the application. Any relational database can be used with only minor changes to the software system.

Where Are We Now?/Future Directions

When Pierce County won the 2000 Enterprise System ESIG award, the use of technology for emergency responders was just beginning. The Pierce Responder System showcased the concepts and benefits of Web-based applications, wireless communications, and GIS for emergency response. Driven by rising incidents of shootings at schools, the Pierce Responder System was designed to allow easy access to details about school facilities, scanned floor plan images, and maps. Through a creative business plan, the system is now being deployed throughout the State of Washington and around the United States. One of the largest changes in the past five short years is the change in focus from schools to terrorism. Pierce County has adapted the Responder System for terrorism preparedness. The state-of-the-art concepts, ideas, and designs developed for school safety in the Pierce Responder System are now being repeated in information systems designed homeland security initiatives. URISA initiatives have helped educate and communicate these important information system concepts throughout local government through the ESIG program.

Usage

In the past five years, the Pierce Responder school safety system has been used in several emergencies. In 2000, when it was unknown to what extent the date change from 1999 to 2000 would affect computer systems, Pierce County used the Responder System to help plan for any needed emergency or law enforcement response. Floor plans in the system were used to plan staging areas at downtown schools for personnel, equipment, and communications.

As expected, the Responder system was used when sheriff deputies responded to a grenade brought to school and during a chemical release in a science lab. Whether for a large or minor emergency, the Responder system has provided needed contact information, details about the buildings, floor plans, and maps to emergency personnel. The local newspaper has praised the county for creating and maintaining this important information system that hopefully never is used, but when needed, provides vital information used to protect students.

System Expansion

After the World Trade Center terrorism event, the federal government asked jurisdictions to develop a list of potential terrorism targets. Pierce County's list includes a large port with chemical

storage, two strategic military bases, several important commercial businesses (State Farm headquarters), and an interstate corridor that, if affected, could cripple the region's economy. When managers discussed what would be needed for preparedness, there were clear similarities between the information and functionality of the Pierce Responder System and the information that is needed for terrorism preparedness.

Within three weeks of 9/11, Pierce Responder was "cloned" and ready for adding information into the new Terrorism Response System (TRS). Very quickly, information for major targets was created and loaded into the database. Emergency responders from the county, cities, the port, utility companies and commercial business formed a Terrorism Early Warning (TEW) group for sharing terrorism information and developing plans and training for terrorism preparedness. The TEW group added information to TRS and requested additional functionality be added to manage folders for incident response procedures (bombs or chemical releases). Responders have used the system during emergency training simulations and are prepared with reliable and useful information if a terrorism event occurs in the county.

For five years, responders have designed enhancements to the Pierce Responder and Threat Response systems. New enhancements have included:

- Adding all elementary and junior high schools to the Responder database of high schools.
- An interactive GIS map showing aerial photography, contours, schools, targets, and resources.
- Expanding the searching methods from a drop-down list to search for schools/targets based on keyword, proximity from an address, or within a sheriff precinct.
- Linking photos of the building to a location on a map or a floor plan image.
- Adding "target" folders to the TRS system that include guidelines and procedures for various incident types.
- An interactive GIS map with a symbol editor that allows commanders in the field to quickly map locations of the command, resources, and staging areas and immediately share this information with responders in the field via the system.
- An information portal for emergency management that displays the various emergency management systems and provides secure access to the applications.

The system is now used by more than 1,700 responders and school officials in the county and contains detailed and specific information on 283 schools (high, junior high, and elementary) and 176 terrorism targets for responders.

The Business of School Safety

After Pierce County won the URISA ESIG award, many jurisdictions across the United States contacted the county about how they could use the Pierce Responder System. County attorneys

reviewed several methods of sharing the county technology or transferring ownership to other jurisdictions. To protect the county from third-party tort claims, other agencies would need to indemnify Pierce County, which was unworkable. To make the system available to other counties, Pierce County transferred ownership of the software to a commercial software provider. The county receives royalties when the product is sold to another jurisdiction and these revenues enable the county to maintain the database. The company, Prepared Response, now sells the product as well as implementation services to jurisdictions nationwide.

In 2000, the Pierce Responder System was one of the first systems in the country to address the needs of emergency responders during a school violence incident. The justifications and benefits of the Responder System have surpassed schools and now includes the homeland security needs of the county. Steven Bailey, Director of Emergency Management in Pierce County, commented, "Our Web-based technology, GIS, and wireless communications have proven over and over again that reliable data and communication are essential to successful emergency response and personal safety."

Examples of System Images and Screen Shots





