Case Studies on Acquisition of Information Technology for Law Enforcement

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Technology Acquisition Project
Case Study

Altamonte Springs, Florida, Police Department

This case study focuses on computer aided dispatch (CAD) and records management system (RMS) technology acquisitions. It is one of 18 case studies prepared for the “Technology Acquisition Project” administered by the Institute for Law and Justice in partnership with Government Technology, Inc., and funded by the National Institute of Justice (NIJ), U. S. Department of Justice. This case study was written by Steve Pendleton, President, Information Analytics, Inc. It has been reviewed by the participating site but should be considered a draft report pending final NIJ review.

Abstract

The Altamonte Springs Police Department (ASPD) is a full-service police department serving Altamonte Springs, Florida, a residential suburb of Orlando. Since 1985, the Department had been using a commercial computer aided dispatch (CAD) application and an internally developed records management system (RMS). As early as 1995, ASPD considered replacing the aging information systems but had not done so by January 1997, when they experienced an outage of the CAD system that lasted for several days. When the failure occurred, the city discovered that the contracted support provider had moved and left no forwarding number. Spurred by these events, the city made an emergency budget allocation to replace the CAD and RMS systems and implement a new mobile data system.

The need to rapidly acquire a replacement system forced the Department to dispense with a formal planning process. Chief William Liquori turned to the Department’s Information Systems Manager to locate and purchase a replacement system. Within a month of beginning the search for a replacement, the IS Manager was dismissed for violating procurement rules on another project. The project responsibility then fell to Lt. William Telkamp, who was considered the manager with the most computer knowledge. From this point on, Lt. Telkamp had sole responsibility for vendor selection, negotiations, and purchasing.

Based primarily on work done by the former IS Manager, Telkamp quickly focused on Vision Software of Castle Hayne, North Carolina. After site visits to a customer site in Alpharetta, Georgia, and the company’s headquarters, Telkamp was convinced that Vision had the right solution for ASPD. Having decided on a vendor, Telkamp and the Chief made an emergency budget request to the City Manager. The budget allocation was approved and ASPD proceeded to procure the Vision system.

Through a state procurement rule known as “piggybacking,” ASPD was able to purchase the Vision products on the strength of a competitive procurement which Vision had recently won in Bradford County, Florida. The ASPD contract with Vision Software was signed in May 1997, and implementation began shortly thereafter.
Although Vision was an established vendor with hundreds of customers at the time ASPD purchased their system, what Telkamp did not know was that Vision was in the process of converting their system from DOS to Windows NT. Although two years have passed since the contract award, the development of the Windows NT version and the ASPD implementation continues. A preliminary version of CAD was deployed for operational use in September 1997. Preliminary versions of the mobile data applications and records management system were deployed in October and December 1997, respectively. Additional modules of the RMS and mobile data system continue to be delivered periodically, and it is hoped that the system will be completed by October 1999.

Despite the lengthy implementation period, Lt. Telkamp believes the Department has benefited from the decision to purchase Vision. After discovering that ASPD was to be more of a beta site for the Vision products than an operational customer, Telkamp was able to negotiate numerous enhancements and additions to the system at no additional cost. Telkamp has also been appointed to the Vision Software Advisory Board and believes he has had a significant influence on the features and functions of the product set. Telkamp also reports that Vision is working closely with ASPD to resolve functional problems with the software in new version releases.

Background on the City and the Police Department

Altamonte Springs, Florida, is a rapidly growing suburban community located in Seminole County north of Orlando, Florida. The city covers 9.2 square miles and has a resident population of approximately 40,000 and an estimated daytime population of 80,000. Primarily a residential community, the city has a mixture of retail establishments, restaurants, hotels, and upscale office and commercial space. It is also the site of a 1.2 million square foot regional shopping mall.

The Altamonte Springs Police Department (ASPD) is a full-service police agency with 99 sworn officers and 48 civilian employees. The Department is divided into four bureaus: Management Support, Operations, Special Operations, and Investigations. Currently the Department handles about 60,000 calls for service and completes about 5,000 police reports annually.

Assessment and Decision Making Phase

Problem Statement

As early as 1995, ASPD had indications that their law enforcement technology systems were antiquated and failing. At that time, the Department was utilizing a CHIEFS CAD system, which they had procured from IBM in 1985. Originally the system ran on an IBM System 36 mini-computer. After the initial purchase, CHIEFS had followed IBM's hardware, migrating first to the System 38 and then to the newer AS/400 platform. Each migration required CHIEFS' users to upgrade their products so that they would work on the new hardware. As is typically the case, CHIEFS also dropped support for the System 36 version of CAD after a time. As CHIEFS migrated from one platform to another, ASPD had failed to upgrade their applications or hardware.
The decision not to upgrade the CHIEFS system resulted in numerous problems by 1997. The antiquated hardware was beginning to have performance problems; and because of its age, service and parts for the system were nearly impossible to obtain. The CHIEFS application was also unable to meet the evolving ASPD needs. Built on a flat-file, text based data structure, it was difficult to query or develop usable reports on the system. Thus, ASPD managers and crime analysts had great difficulty getting usable information out of the system.

As a further complication, CHIEFS was purchased in 1993 by HTE, Inc., of Lake Mary, Florida. The antiquated version of the CHIEFS software and the company's sale to HTE left ASPD with no effective software support and no migration path for the CHIEFS product other than a complete system replacement. Despite these warning signs, ASPD continued to run the original CHIEFS system and failed to plan for a system replacement.

Faced with the replacement of CAD, ASPD also evaluated their records management system (RMS) and mobile technology. The Department's RMS had been developed by the recently departed Information Services Manager on a PC database application known as Paradox. Although the application was custom built for ASPD, Paradox was insufficient to meet the needs of a networked user environment, and users had difficulty retrieving and analyzing data from the system. Further, with the departure of the IS Manager, no one on staff was prepared to support or expand the system. Finally, ASPD wanted to have the system interfaced with whatever CAD they purchased.

To enhance the completion of police reports, ASPD had planned to develop a mobile data system using laptop computers, CDPD modems, and mobile data and field reporting applications written in Paradox. Laptop computers for this project had already been purchased by ASPD, and the IS Manager was set to write the new application. With his departure and the failure of CAD, there was even more reason for ASPD to procure an integrated set of police applications.

By January 1997, the limitations of the police IT systems were well known, but replacement systems had not yet been planned. During this month, however, the CAD computer experienced a catastrophic failure. When the failure occurred, ASPD discovered that the vendor contracted to support the computer had moved and had not left a forwarding number. The CAD failure and the lack of support resulted in the system being unavailable for several days. This frustrating chain of events brought the IT system problems to a head, and a decision was made to replace the systems immediately.

**Systems Planning**

The January failure convinced ASPD to move quickly to replace the CAD system. Given the unstable nature of the CAD, Chief Liquori did not feel that there was time to conduct a formal analysis and planning process. Initially Liquori assigned the Department's IS Manager to find a replacement system. However, within a month of initiating the project, the IS Manager was terminated for violating City procurement rules on another project. Without a computer systems expert, Liquori then turned to Lt. William Telkamp, who was considered the most knowledgeable of all the managers about computers.

When Telkamp inherited the project, he found a file full of vendor literature and airline tickets to Alpharetta, Georgia, and the Vision Software headquarters in Castle Hayne, North
Carolina. From the airline tickets, it was apparent that the former IS Manager had been focusing on Vision Software, but there were no notes to tell Lt. Telkamp what the IS Manager knew about Vision. Despite the lack of information, Telkamp decided to go to Alpharetta and Wilmington to research the Vision products. After returning from the trip and making additional inquiries, Telkamp was also impressed with Vision. He knew that one of the Department’s primary goals was to obtain an integrated CAD/RMS/mobile system built on a stable, modern hardware platform. At that time, Vision was demonstrating an integrated CAD, RMS, mobile data, court, and jail product line. Vision was also developing their products on Windows NT. The integration of the product line and the fact that it used Windows NT made Vision a leading contender for ASPD.

Shortly after his visit to Wilmington, Telkamp asked Vision to supply a quote for ASPD. Convinced that Vision was the right product for ASPD and armed with their quote, Telkamp took his case to the Chief. Based on Vision’s preliminary pricing estimates of $450,000, Lt. Telkamp prepared an emergency funding request for the Chief. This resulted in an out-of-budget allocation by the City Manager for $448,000 in April 1997, but the money also came with the City Manager’s desire for the money to be spent by October 1997. This charge, of course, further increased the urgency of the procurement process.

**Procurement Phase**

Due to the instability of the CHIEFS system, the procurement of the Vision system was necessarily abbreviated. There was no formal requirements document, vendor proposal, or selection process. Lt. Telkamp visited the Vision site in Alpharetta to assess their experience with Vision products and services and the Vision corporate headquarters. Beyond this cursory evaluation, Telkamp relied on the vendor’s assurances in his decision to select the product. While Telkamp knew that Vision was still developing portions of the product, he felt that ASPD could have an advantage by being an early customer.

Once the decision to buy Vision was made and the emergency funding request had been authorized, the procurement was completed within 30 days. This almost miraculous event was facilitated by a state procurement rule that allows governmental entities to bypass the competitive bid requirement by “piggybacking” on other jurisdictions that have completed a competitive bid process. Bradford County, located in northern Florida, had recently chosen Vision Software through a competitive bidding process, and a final contract had been completed. As a result, ASPD was able to take the Bradford County contract and use it to make their purchase of the Vision system.

After the negotiations were completed, the purchase price for the Vision system was $443,000 plus an annual maintenance cost of approximately $40,000. The table below provides a more detailed itemization of the system cost.
<table>
<thead>
<tr>
<th>Component</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAD Hardware</td>
<td>$51,000</td>
</tr>
<tr>
<td>CAD Software and Interfaces</td>
<td>$136,000</td>
</tr>
<tr>
<td>VisionMOBILE Software</td>
<td>$58,000*</td>
</tr>
<tr>
<td>VisionRMS</td>
<td>$115,500</td>
</tr>
<tr>
<td>Training and Services</td>
<td>$46,000</td>
</tr>
</tbody>
</table>

* Includes $17,000 for Sierra CDPD modems.

Technological Solution

The Vision public safety solution is a suite of associated and interfaced applications. Currently Vision offers applications for CAD, law and fire records, mobile data, court administration, and jail management. The software operates on Intel based PC servers using the Microsoft Windows NT operating system. The attached PC workstations run under Microsoft's Windows 95 operating system.

Figure 1 - VisionCAD Dispatcher Screen
Computer Aided Dispatch

The VisionCAD system is a Windows NT application that allows call takers and dispatchers to process 911 and other calls for service. Developed in the Windows environment, the application uses multiple "windows" to display different types of information. A typical dispatcher’s application will have one window for reviewing the active call, one for the status of field units, and one for pending calls. Users can interact with the system either with a mouse or the keyboard. As with most CAD applications, the VisionCAD recommends units for each event and tracks all event activity as it occurs. The application includes interfaces to 911, state and federal law enforcement databases, and the VisionRMS and mobile data applications.

The CAD application is served from a dual processor Pentium Pro 200 server configured with Windows NT 4.0, Octopus data mirroring software, and Microsoft SQL Server. The ASPD server currently supports five CAD workstations configured for both call taking and dispatching functions. As a part of the contract, Vision supplied five CAD workstations (dual-monitor PCs), and two CAD servers.

According to Vision marketing materials, the VisionCAD system provides the following additional features:

- The dispatching screen is designed so that primary CAD functions may be performed without overlapping windows or toggling between windows.
- The system supports dual monitors controlled by one keyboard and mouse.
- Pertinent details about the current call are displayed, including complaint type, ten code, priority, dispatch zone, complaint location, caller name, telephone number, how received, alerts, Emergency Services area Numbers (ESN), and call times.
- Call locations may be entered automatically with E911 or manually by address, location name, or intersection.
- If entered by location name or intersection, the correct address is automatically populated.
- Pull-down selection menus allow fast and consistent data entry.
- The Historical Calls database alerts dispatchers to previous calls at complaint locations.
- VisionCAD alerts users of hazardous conditions that may exist at the call location.
- Scheduled calls can be entered for escorts or other events. The application then activates and displays the call at the set time automatically.
- Complaints can be assigned in order of priority. The calls can then be arranged in the call section of the dispatch screen based on their assigned priority.
- Emergency telephone numbers, business names and information, alarm information, and other entries are available for quick lookup from the dispatch screen.
- CAD includes a wrecker company file that suggests wreckers to be dispatched based on service areas and a rotation schedule. Wrecker dispatches are recorded and stored for later review, reports, and statistics.
- Using the Landmarks database, users can identify landmarks or other location identifiers to assist in determining the exact location of calls.¹

¹ [http://www.vision911.com/](http://www.vision911.com/)
Records Management System

The VisionRMS system is an enterprise-oriented law enforcement records and management computer application. The base application includes incident, arrest, and juvenile custody reports, as well as property and evidence records, case management,

and UCR/NIBRS reporting. Records in the RMS are maintained through four master index files. These include persons, property, vehicles, and addresses. Optional modules are available for reporting and tracking citations, civil summonses, field interviews, pawn tickets, warrants, and bike and gun permit records. The application includes interfaces to CAD and can be accessed by field officers via the MDC.

The RMS system is served by a dual Pentium Pro 200 server configured with Windows NT 4.0 and Microsoft SQL Server. Currently there is no backup for the RMS server; and although ASPD intends to deploy RAID disk drives, they have not yet done so. ASPD has seven RMS clients and is licensed for 20 concurrent users.

According to Vision marketing materials, the VisionRMS system provides the following additional features:
Mobile Data

The mobile data system has two primary components, hardware and software. To equip the field units, ASPD deployed the Panasonic CF-25 laptop computers with Sierra CDPD modems that had been purchased for their mobile data project. These mobile data computers (MDCs) were then loaded with VisionMOBILE client running under Windows 95 on each MDC. MDCs communicate with the Vision applications by sending digital messages through the Sierra modem over the AT&T cellular digital packet data (CDPD) network. To manage the transmission and reception of messages from the mobile network, the mobile data subsystem is equipped with a special purpose message switch supplied by Vision. Running on a single processor Pentium Pro 200 server configured with Windows NT 4.0, the switch is the hardware interface between the mobile network and the ASPD local area network.

Through the mobile data subsystem, field units are connected to both the CAD and RMS application as well as state and federal criminal databases. For example, dispatchers can transmit the details of calls for service directly to the assigned units rather than voicing the run on the radio. Mobile data users can send digital messages similar to email to other MDCs or the dispatcher. MDCs can also communicate directly with the Department’s RMS, or they can send inquiries to the state or federal crime information systems. Another major improvement for ASPD has been the addition of field reporting. Using the MDC, patrol officers and investigators can now complete crime reports from the field and submit them via the mobile network.

According to Vision marketing materials, the VisionMOBILE system provides the following additional features:

- Notification of positive returns from RMS or external inquiries
- Vision Field Reporting – interface to VisionRMS
- Priority Messaging

2 http://www.vision911.com/
3 ASPD is presently implementing new MDCs with Windows NT for enhanced security and fault protection.
4 The AT&T network provide wireless connectivity to field units by communicating through the digital data portion of the cellular telephone network. **Basic mobile consisted of query functions to FCIC/NCIC and car-to-car messaging. They added CAD and email functions to the laptops in January 1998.
Implementation Phase

Overview
Given his intimate and exclusive knowledge of the project, Lt. Telkamp was assigned as the ASPD project manager. From the vendor side, Scott Nemetz has been the primary contact for the project, but since the product was purchased in an early stage of development, Telkamp has also communicated major product issues directly to Vision’s CEO Richard Holloman.

ASPD went live on the CAD system in September 1997. In December 1997, the RMS was ready to receive new records. These deployments were followed by the implementation of a basic mobile data application in October 1998. Operational testing of the Vision Field Reporting application began in December 1998; however, field reporting has not yet been fully implemented. ASPD is now working with Vision to fine-tune the application prior to general deployment.  

CAD and RMS Implementation
The initial version of CAD was installed in September 1997. According to Telkamp, this implementation went smoothly and there was little resistance from the users. Apparently there were several reasons for this. First, the VisionCAD was the most mature of the Vision applications. Hence, there were less problems with it. Second, the communications personnel were used to computers and had less fear of using computers in their work. Third, since the CHIEFS CAD was not working, any application was an improvement.

In December 1997, Vision delivered the first version of RMS. Immediately ASPD discovered that the design of the RMS conflicted with their procedures and efficient computer use in some places. For example, the RMS required users to enter the same information into different fields in the same report. In addition, it was unable to validate reports according to Florida UCR procedures. Finally, many users were uncomfortable with the way in which the application displayed information. By December 1998, Vision had delivered an upgrade to the RMS. This has corrected the UCR validation problems and partially corrected the duplicate data entry problem. The upgrade also included a new data entry form that lessened complaints about usability.

While Vision is slowly solving the RMS data entry problems, full RMS implementation has yet to be completed. According to Lt. Telkamp, the current date for completion of the

6 The UCR validation problems made the data submitted to the State of Florida prior to December 1998 suspect. After the upgrade, Vision agreed to send personnel on site to work with ASPD to ensure the data is corrected for the State's annual UCR report.
system is October 1999. In order to make this date, Vision will have to deliver case management, field accident reporting, a new property and evidence, and system administration modules prior to that time. But as with many projects, not all of the blame can be laid at the door of the vendor. ASPD and Vision have agreed that more powerful servers will be required to run the system. Deployment of the remaining RMS functionality has been on hold while the city resolved this issue. Recently, new servers were delivered and are now being installed.

VisionMOBILE Implementation

ASPD began using a basic version of the VisionMOBILE product in October 1997. This first version allowed users to submit database inquiries to the state (FCIC) and national (NCIC) criminal information systems and send messages from car to car. The initial version, however, did not include integration with the CAD or RMS or allow messages to be sent to desktop users. In January 1998, a second version allowed dispatchers to transmit call assignments by sending a digital message. This version also improved on the messaging feature by enabling the message switch to store messages for a particular officer or unit if they were not logged on. Subsequent updates have enabled mobile users to direct queries to the VisionRMS application as well as external crime records systems.

While the mobile messaging features have performed well, Vision has had unexpected difficulty with the field reporting application. In December 1998, ASPD began testing mobile field reports on the MDCs. The initial officer response to the field reports was positive. There were some ease-of-use issues with the laptop hardware, but those have decreased with increased familiarization. Although the MDCs are connected to the wireless network, currently report data is transferred to the RMS via a diskette. This more cumbersome process is required because reports that are submitted via the wireless link are recorded directly to the incident database instead of being placed in the report review queue where a supervisor can review them before they are recorded.\(^7\)

Initially, the field reporting application also was unable to collect the necessary data to satisfy the state reporting requirements because of holes in the offense portion of the RMS application design. In order to ensure that a proper solution is delivered, Lt. Telkamp has helped Vision design the updated field reporting interface. Implemented in February 1999, the new interface has resolved the reporting problems and has been well received by other sites. According to Lt. Telkamp, ASPD is now completing 80 to 90 percent of their reports from the field.

At present, the field reporting application requires an unacceptable amount of user interaction during the upload into the RMS database. Until this is resolved, Records personnel will still review the reports prior to submitting them to the state for UCR reporting. While this takes less time than Records personnel entering all reports, it falls short of ASPD’s expectations for the mobile application. ASPD is working with Vision to find a solution to the problem.

Prior to July 1998, ASPD also experienced problems with the Vision message switch. The system required resetting approximately once every 24 hours and often experienced SQL time outs and illegal calls, which temporarily disabled the application. In July 1998, the

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message switch was upgraded. Lt. Telkamp reports that since this upgrade, the message switch has been very stable.

**Training**

As with any major system replacement, the implementation of the new Vision products was a challenge for ASPD for three reasons. First, the Vision applications were new to the ASPD personnel. Second, prior to the implementation of VisionRMS, field officers had hand written their reports while records clerks entered the information into the Paradox RMS. The field officers' lack of computer knowledge was a concern to some. Third, ASPD does not have sufficient staff to train large numbers of its officers during their normal working hours.

To resolve these problems, ASPD and Vision worked together to develop a comprehensive training plan. In order to help novice computer users, the Department provided four hours of training on PCs and the Windows environment prior to the Vision application training. For communications personnel, Vision conducted a 40-hour training course. To minimize the operational impact, the training was conducted in split shifts. To implement the RMS system, records personnel received 24 hours of training. Because they had to interact with fewer modules of the RMS, patrol officers received 8 hours of RMS training and 4 hours of training on the field reporting application. In order to facilitate training and schedules, Chief Liquori established weekly CAD and mobile computer work sessions in September 1998. The sessions were scheduled each Tuesday between 7:00 a.m. and 9:00 a.m. and between 12:00 p.m. and 2:00 p.m. These were scheduled to accommodate all shifts. Off-duty personnel were authorized two hours of overtime to attend. The sessions were informal and training topics were tailored to the attendees' needs.

Because software development was ongoing throughout the implementation phase, training was occasionally hindered. For example, trainers used an early version of the mobile software for training. When the software was implemented, it was different enough that employees had to be retrained.

**Implementation Issues**

While ASPD and Vision had a close working relationship, the accelerated nature of the procurement and the immaturity of the software created implementation issues for both parties.

**ASPD Issues**

From an agency perspective, staffing and staff skills had the greatest impact on the project schedule. When the implementation began, ASPD found that they had underestimated the difficulty of administering the Windows NT and network environment. Because frequent system administration was required and no internal staff members had the requisite skills, the Department decided to hire a consulting firm to fill this role.\(^8\) The lack of technical staff was also an issue in other areas. The original contract called for Vision to convert the data

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\(^8\) Lt. Telkamp reports that ASPD is spending approximately $20,000 per year for a consultant to support their Windows NT and network environments.
from the CHIEFS CAD system and move it to the new system. The conversion was never completed, however, because the Department did not have the staff necessary to provide Vision the data they required for the conversion process. Since the implementation, ASPD has continued to experience some staffing and administration problems. For example, the Department is still trying to resolve which bureau or unit will maintain the CAD geo-file.

In addition to their technical staffing issues, the CAD and RMS supervisors left the Department during the implementation. Since these employees had been trained as system administrators for the CAD and RMS applications, their departures required the training of new administrators. This further delayed the deployment process.

Since end-users were not involved in the selection of the Vision application and were used to the old records system, some of the records staff was unhappy with the RMS application initially. A primary concern was the design of the user interface. Patrol officers were also resistant to the new applications. A primary issue for them was that the Vision field reporting application did not look like the printed forms they were accustomed to, even though both contained the same data fields.

**Vendor Issues**

While ASPD contributed to the delay in deploying the software applications, Vision clearly had more culpability. Sold as an off-the-shelf product, the Vision applications were only partially developed for the Windows NT platform in January 1998. Even today, many modules are still under development and have not been delivered to ASPD. Shortly after the project began, Lt. Telkamp began to realize how much development work remained. Instead of terminating the contract, however, Telkamp turned the development period to his advantage by offering ASPD as a beta site for the emerging Vision applications.

Although being a beta test site has worked out well in some ways for ASPD, it has also caused significant issues during the deployment. For example, when ASPD began entering records into the RMS in December 1997, they planned to have records personnel enter all reports for 60 days in order to test the system. If the tests went well, ASPD planned to have patrol officers take over the report entry via the field reporting module. Unfortunately, this was not the case. At the end of the test period, ASPD discovered that the mobile application was not ready for implementation. As a result, there was a significant data entry back-log as records clerks were forced to continue entering the reports.  

The immaturity of the software also highlighted other problems. For example, ASPD discovered that users had to enter the same data in more than one field on the same report. They also found that the software was unable to fully validate cases for Florida UCR reporting.

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Analysis and Summary

A Retrospective Analysis

Altamonte Springs has had a more difficult time implementing a new police information system than most agencies. While it is easy in retrospect to see how their situation developed, it is also clear that many factors were responsible for the difficulty of the project. By reviewing the sequence of events and the alternatives open to ASPD, it is possible to see how they progressed to this point.

Although ASPD had an IS Manager, he was tied up supporting the RMS and preparing to develop and implement the new field reporting system. At the same time, the CAD seemed to be running well. Unfamiliar with technology and without a qualified IT planner, the Department's leadership did not recognize that its legacy systems were functionally and structurally antiquated. While managers had discussed replacing the legacy system since 1995, they had apparently taken the "if it isn't broken don't fix it" adage too far.

When the CHIEFS CAD system failed unexpectedly in 1997, the Department was in a difficult position. They had no effective vendor support for the hardware or software. As a result, ASPD was forced to conduct an emergency procurement.

Since the Department had not planned to replace the system and the IS Manager was fired shortly after the procurement got under way, ASPD had little knowledge of their IT needs and no time to conduct a comprehensive needs analysis. Aside from Lt. Telkamp, few managers had any knowledge of technology systems or knew what their respective commands needed from a new information system. As a result, responsibility for the system replacement devolved to Lt. Telkamp. While Telkamp was the most knowledgeable about IT systems, it was unrealistic to expect him to know each command's requirements for the new system. Failing to participate in the selection of the new system, few others within the Department developed a sense of ownership and responsibility for the new system. Without this, implementation problems were viewed as problems caused by Telkamp and his system rather than being collective problems.

Having been stung by the failure of the antiquated CHIEFS CAD system, Telkamp wanted an integrated, state-of-the-art replacement system. In January 1997, nothing was more state-of-the-art than Windows NT. At that time, Microsoft was challenging Unix for dominance of high-end desktop and small-scale enterprise systems. With a graphical user interface, Windows promised to provide a high degree of customization, application-to-application integration, and interoperability with other applications. Thus, when Telkamp went looking for a replacement system, Windows NT was at the top of his list.

Although Windows NT was and still is more flexible than most legacy environments, in 1997 Windows NT was in its infancy in the public safety market. Few vendors at that time had developed Windows NT CAD or RMS applications for agencies the size of Altamonte Springs. In choosing the Vision product line, ASPD chose a newly introduced product that was still in the early stages of development. While being an early adopter of the product has allowed ASPD to influence its functional design, the project has been extended significantly as Vision completes the development of the system. Beginning the project on partially developed code has had other consequences as well. In some cases, Vision delivered versions of the applications that were substantially different than those the ASPD
personnel were trained on. This resulted in some retraining. Early copies of the applications have had numerous programming bugs and functions that conflicted with standard law enforcement procedures. ASPD has also experienced some performance issues with the RMS. Many of these are related to the RMS servers and the network design. While Vision did not supply either the servers or the network, if the applications had been tested prior to deployment, Vision could have provided ASPD with better information about server sizing and network design.

In retrospect, however, ASPD's requirements for an integrated, technically advanced system that provided CAD, RMS, and mobile data functionality were reasonable. Unfortunately, finding such a product at that time was difficult. Should that have changed the decision that Telkamp made? In our view, only the agency can decide whether they want to sweat through the deployment of a leading edge system. Even when agencies deploy more mature systems, there is no guarantee that the implementations will be easy.

For his part, Lt. Telkamp is still comfortable with his decision. He believes that with more time, the Department might have found software that was completed, but he believes there is a high probability that ASPD would have had to buy from multiple vendors and might not have met the Windows NT requirement. Lt. Telkamp also thinks that ASPD benefited from working with a single vendor, since they could more easily integrate the CAD, RMS, and mobile applications. Telkamp also says that having a single vendor contact also simplifies the communications and makes it easier to resolve problems.

Reflecting on the project, Lt. Telkamp acknowledges that the Department will not be able to fully realize its true savings in staff time, reporting speed, and accuracy until all the applications have been implemented and are in use.

**Unexpected Lessons**

The deployment of the new systems has not only provided the Department with new capabilities but also new staff responsibilities. Prior to deployment of the new system, little staff time was required to administer the Department's IT applications. Since the new system was deployed, ASPD has found that administering the Windows NT servers and network requires substantially more technical time and skill than they expected. The seven NT servers that host the Vision applications require constant monitoring to ensure acceptable performance levels. Although Lt. Telkamp believes that monitoring will become less time consuming as their knowledge of Windows NT increases, they are discovering that the NT learning curve is substantial.¹⁰

Lt. Telkamp also does not believe ASPD can afford to have a staff person with the breadth of NT knowledge necessary to fully administer the system. Even if they could afford to train in-house personnel, Telkamp is concerned about retaining these personnel. Personnel with advanced NT administration skills are in heavy demand in the public and private sector. One patrol officer who was trained to provide in-house application support has already been hired away by the vendor. For these reasons, Telkamp anticipates continued use of contract support personnel for resolving difficult technical issues.

¹⁰ Ibid., p. 5.
Because of the time that Telkamp has devoted to the design and implementation of the new system and the anticipated demand for technology services in the future, ASPD has promoted him to the recently created position of Information and Technology Manager. In this position Telkamp will be responsible for continuing to guide the technology projects and will directly supervise a computer support specialist, a crime analyst, and a network manager. The CAD and RMS supervisors will continue to act as system administrators for their respective applications.

In his Computer System Report to the Chief dated January 6, 1999, Lt. Telkamp offers a view of the ASPD system's future impact:

Eventually, reports will be written by all personnel directly on a computer. Officers will be able to email the completed report to their Watch Commander for approval. Once approved, the report will be uploaded into RMS and will be UCR compliant. As soon as the report is uploaded into RMS, Investigations can immediately review and assign the case to a detective. The data will simultaneously be available for crime analysis or to be printed for a victim. Supplemental forms will flow to Records and be digitized (scanned in as a picture) and electronically attached to the original case.

The Investigations Watch Commander will assign the reports electronically and detectives will be notified via email of new cases. Supplemental reports and investigative notes will be completed in the computer system and cleared cases will flow electronically back to the Watch Commander for approval. The Watch Commander will be able to see the status of all cases electronically at any time.

In 1999, we will probably grow to around 100 computers in our system. All of our employees will be using a computer for some aspect of their work, so supporting over 100 machines and 145+ users will keep Terry (the network manager) and the technician very busy. This will leave little or no time for Terry to ensure the complete system is being used to its maximum benefit for the Department. Individual managers and supervisors most likely won’t be able to focus on the “big picture” of the interaction of all the systems.

By the time we finish all aspects of a fully integrated system, probably a year or so away, we will have more than $750,000 in a computer system that is two years old. We are implementing a very modest computer replacement program in next year’s budget. We will have to double or triple this amount to keep our hardware adequate, as most computers start becoming substandard in three years, and inadequate for the task in five. Our software maintenance fees should keep our CAD, RMS, and Mobile software adequate for the next 5-7 years without further investment.

With the substantial investment we have made to become fully automated and the necessity for the systems (people and computers) to all work together for maximum return on this investment, further oversight may be
necessary that can be provided by the level of Information Systems personnel currently assigned to the task.\textsuperscript{11}

\textbf{New Capabilities Enabled by the System Replacement}

The implementation of the Vision applications has significantly enhanced the Department's IT capabilities. Indirectly, the implementation of the Vision products has also encouraged the Department to modernize its office automation and other IT systems. Together these systems have increased the Department's ability to process information and develop timely reports.

Of the applications supplied by Vision, the mobile data system has clearly had the most profound impact. Thanks to the MDCs, officers are now completing reports in the field instead of returning to headquarters. According to ASPD's estimate, this has resulted in the addition of more than five full-time police officers to the ASPD patrol force. Because the officers are now completing the reports directly, transcription errors have been reduced. Since officers are able to access the local, state, and federal criminal information systems directly from their vehicles, they have access to more data than ever before. This access is improving their ability to investigate crimes and make arrests.

Interfacing the mobile data system to the CAD has resulted in other benefits. With the advent of digital dispatch, ASPD no longer voices calls for service over the radio. While this improves security, since criminals cannot monitor field activity, it has also improved the communication between headquarters and the field units. Instead of trying to remember call details as they drive, officers now receive a complete copy of the call record on their MDC. The mobile data application alerts the officers to hazards at the event address, previous calls, and other important information.

The new VisionCAD also includes the Department's first interface to the 911 system. With this feature, the caller's name, address, and phone number are transferred directly from the telephone system to the CAD event record. This interface both reduces the time required to process many calls and improves the accuracy of the event record. CAD also has an interface to the RMS, which was not present in the previous system. Through this interface, dispatchers are able to automatically access information about callers and suspects without having to submit a separate inquiry to the RMS application.

As a part of their office automation upgrade, ASPD has now deployed Microsoft Exchange. This powerful application provides the Department with email and many other collaboration and coordination capabilities for the first time.

\textbf{Recommendations from the Project Director}

Lt. Telkamp offers the following “do’s and don’ts” for agencies that are considering technology acquisitions:

1. Create a good RFP with input from all levels of the organization.

\textsuperscript{11} Ibid., p. 7.
2. Create a team approach to the purchase and the implementation.
3. Ensure that department staff understands how the system works.
4. Involve the end users in the selection process.
5. Be flexible enough to change internal procedures to use the technology instead of trying to make the technology fit the organization exactly.
6. Insure that the contract includes technical specifications and functional paragraphs describing what each module is expected to do. Use clear language for these paragraphs.
7. Keep detailed project notes, i.e., the reasons for delays no matter who is at fault.
8. Drive the implementation process; don’t sit back and enjoy the ride.
9. Don’t have a single person hold all knowledge about the project.
10. Don’t avoid oversight of the project team or project manager.

Conclusion

Altamonte Springs has made good from a bad situation. They have replaced their failing CAD system, implemented a better RMS system, and added a new mobile data system. Most of their employees are comfortable with the new systems and are using them to their benefit. After several years of breaking in Vision products, ASPD is nearing the end of the implementation period. Their systems are now relatively stable and the benefits of automation are beginning to be realized. Clearly the degree of effort expended on this project, the unplanned outages, and the time required to restore the systems to full production could have been avoided.

ASPD’s failure to upgrade their CHIEFS CAD system or plan for a replacement left them vulnerable to failure. When the CAD did fail, ASPD had no contingency plan. This forced the agency into an emergency procurement, which in turn forced the agency to by-pass a formal needs analysis process. A further result was that one person was responsible for the entire project.

Since ASPD did not have a needs analysis and Vision had only partially developed the software, neither knew exactly what the applications were supposed to do. Without a shared understanding of system functionality, expressed in writing, both parties were left to imagine how the system should operate. In some instances, their interpretations were different and they had to negotiate solutions. While Lt. Telkamp says Vision often acceded to his interpretation, such missteps caused further delays. The lack of a needs analysis and having Telkamp as a one-man project team also prevented the police department from developing shared ownership in the new system. When problems occurred, it was Telkamp’s system, not the Department’s. As we examine the process, we also question the wisdom of placing all the institutional knowledge in one person. Telkamp could easily have been hired away by Vision or another firm. If not disabled, the project would have been seriously impeded at that juncture.

ASPD’s lack of technical sophistication and haste to procure a new system also led them to purchase a system that was incomplete. To what degree they knew the system was incomplete when they bought it is unclear, but it is clear that they agreed to be a beta site
for Vision. On the negative side, this resulted in a longer than normal implementation, some retraining, and many more programming bugs than most sites will experience. On the positive side, ASPD received more functionality in the long run and had a significant influence on the development of the software. According to Lt. Telkamp, the advantages to the beta relationship outweighed the disadvantages: “From our point of view, ASPD was lucky. It could easily have worked out differently.”
References

Altamonte Springs Web Site at http://www.ci.altamonte-springs.fl.us/


Memorandum from Deputy Chief James Perry to all patrol personnel, “Mobile Computer Terminal Use,” July 14, 1999.


Contact Information
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Technical Acquisition Project
Case Study

Baltimore County, Maryland, Police Department

This case study focuses on crime analysis and mapping technology acquisitions. It is one of 14 case studies prepared for the “Technology Acquisition Project” administered by the Institute for Law and Justice in partnership with Government Technology, Inc., and funded by the National Institute of Justice (NIJ), U. S. Department of Justice. The author of this case study is Julie Wartell, Senior Research and Technology Associate, Institute for Law and Justice. The report has been reviewed by the participating site but should be considered a draft pending final NIJ review.

Background on the Project

This case study looked at the acquisition and implementation of crime analysis and crime mapping technology within the Baltimore County Police Department (BCPD). The BCPD is considered one of the leading agencies for crime analysis and crime mapping in the country. They began crime analysis over 15 years ago and were one of the first agencies to implement computerized crime mapping. The technology they use—acquired both through purchases and in-house development over the last decade—includes Geographic Information Systems (GIS), a number of different databases and spreadsheets, and statistical programs. The key people involved in crime analysis and mapping are Phil Canter, Chief Statistician, Analysis Unit; and the analysts and volunteers within the Analysis Unit.

Baltimore County and the Police Department

Baltimore County’s population is about 720,000 and the county includes 610 square miles of mixed urban, suburban, and rural areas situated in a horseshoe shape around the city of Baltimore. There are 1,700 sworn and 290 civilian BCPD employees. In 1997, the Department went through a re-organization and now has an Operations Bureau and Services Bureau (headed by colonels); the Administrative Division (headed by a major), where the Analysis Section resides, was moved within the Office of the Chief. Patrol is broken down into two divisions, and investigations is centralized and has separate units for specific crime types. Crime analysis is a centralized function, and its two teams (scanning and forecasting, and crime analysis) serve eight patrol area precincts, the centralized investigative units, and the Chief’s office. The analysts do a combination of tactical, strategic, and administrative analysis for patrol officers, detectives, supervisors, and command staff.

Importance of Crime Analysis and IT

The 1997 Annual Report has two significant references to crime analysis and related technology. In the Chief’s message, he states that “... with timely and sophisticated crime analysis, we can identify crime trends and deploy officers to respond to those crimes and prevent additional ones.” The Workload and Crime section notes that “the reduction in
crime and the increase in arrests can be attributed to many factors... and include the management and analysis of crime information by the Crime Analysis Team.” In BCPD, information technology growth and commitment is not limited to Crime Analysis. The Records and Technology Division oversees all information technology procurement and application development for the department. In addition, they prepared a Technology Improvement Plan in January 1999. This document discusses the Information Systems Plan that was created over five years ago and the commitment of the County Office of Information Technology to constructing a communications network to allow all County agencies connection to each other as well as Internet access. In addition, the current Plan lays out a background for automating police reports and booking systems, video teleconferencing, networking, a new records management system, Y2K conversion, crime analysis, data warehousing, and digital imaging.

**Report Organization**

After summarizing the crime mapping technology solution in the BCPD, the rest of this report is broken down into two sections: (1) general crime analysis/mapping technology and (2) crime analysis/mapping technology for officers and investigators. Each section discusses technology acquisition in terms of a four-phase model: (1) assessment and decision making, (2) procurement, (3) implementation, and (4) impact.

**Summary of the Technology Solution**

BCPD has worked with existing technology, purchased new technology, and developed customized applications in order to do effective, progressive crime analysis. This “solution” began over a decade ago and continues to be updated and enhanced as technology changes and different possible strategies arise. BCPD has not found one, simple technological solution for crime analysis and mapping. Instead, they experiment, test, and shift as the environment changes. They have used MapInfo for mapping for ten years and are now trying ArcView. They are comfortable and satisfied with dBase and FoxPro but are looking to convert their databases and associated reports to Microsoft Access. They have been using STAC for spatial analysis and use several other statistical programs depending on their needs. They were a pioneer of the Regional Crime Analysis System (based on their own in-house developed Baltimore County Crime Analysis Program) and are the lead beta site for the Regional Crime Analysis GIS, a new application being developed by the Department of Justice Criminal Division.

BCPD has been considered a progressive policing department since the early 1980’s when Chief Behan began the Community Oriented Police Enforcement (COPE) project. As with any department truly involved with community policing, crime data and information is vital. Many agencies created a crime analysis unit or position back then in order track the Uniform Crime Reports. Crime analysis’ primary function in many departments today is still for administrative reporting. BCPD recognized the importance of and need for tactical crime analysis early on. With limited technology and resources, BCPD was able to provide some assistance to the officers and investigators.

The technological growth and advancement of crime analysis and mapping was not a simple, straightforward “project” for BCPD. Crime analysis and mapping technology has developed and evolved for over ten years. There have been multiple decision making, procurement, implementation, and impact phases for a variety of technological
acquisitions. Presently, BCPD is still behind technologically in many ways but attempts to overcome these challenges on a regular basis. BCPD did not have a modern LAN or WAN, so the Analysis Unit led the effort in developing a telephone dial-up LAN between their computers and with computers at the precincts. The Analysis Unit still does not have Internet access and continues to enter data into their tactical database. As far as they have come already, the next few years should see even more advancement in regard to connectivity and efficiency for analysis throughout the department.

General Crime Analysis/Mapping Technology

Assessment and Decision Making Phase

BCPD has used a “project management” approach for many years. People from throughout the organization who are affected by a new project come together to brainstorm options and solutions, a technical group and operating group provide different specifications and ideas, and then user feedback is considered. This approach does not eliminate infighting and jealousy, but they are tempered by the fact that money allocation decisions are made by the group. The Records and Technology Division has tried to convince decision-makers not to do piecemeal things but instead to look at the big picture for a desirable future environment. The Analysis Section has made one of the strongest arguments; therefore, many of their technology projects have taken priority. Some of the technology started out as a collaborative experiment or research; the chief encourages partnerships and relationships with outside law enforcement and research organizations.

IT procurement is approved by the Records and Technology Division, but decisions are also reviewed by County IT (except in-house development). This includes products ranging from off-the-shelf software to major projects requiring an RFP. The county has a set of standards for software. Individual departments are not required to adhere, but if they do not, they receive no support. The police do not mind this extra layer of review because many applications need to interact with the county backbone, and they realize that they do not have all the answers. Although there have been issues in the past, the county finally realizes that the Police Department can be a good partner.

Need for Decentralized Capabilities

The decision to use technology in crime analysis dates back to the early 1980s at BCPD. At that time, technology consisted of a calculator and an IBM System 3 with punch cards to capture Uniform Crime Report (UCR) data. Analysts and management saw an additional need for a way to do tactical crime analysis. In 1988, there was a great deal of information being processed in the Crime Analysis Unit, but the knowledge was centralized. There was very little access for people throughout the department. They received whatever reports the Analysis Unit chose to share. In order to be an effective Analysis Unit, a variety of programs were needed, including spreadsheets, databases, and statistical and graphical programs. Decisions to acquire the various programs were made based on special needs, available funding, and research partnerships.

Need for Accurate Geofiles

At the same time that crime analysis technology was being purchased and developed, several people saw a need for graphical support and its value in visually displaying information. The decision to move to computer mapping was timed well in regard to
Certain circumstances. During the mid-1980s, the Police Department became concerned about the accuracy of the CAD/911 geofile (street map). After the county was sued because of a dispatch to a wrong location, the BCPD finally contacted the Baltimore Metropolitan Council (BMC), the local council of governments, for assistance. They found the geofile to be very inaccurate. In addition, the police needed to fund a new communications/800 mhz system. The county passed a referendum, and the Police Department was able to use part of that money to contract (with BMC) for a new and improved CAD geofile. Now that an accurate street map existed, the Analysis Unit had more incentive to begin computerized crime mapping.

By 1992, a new county administration was looking to cut costs and wanted to disband BMC (including eliminating the GIS function) because they were considered too big and bureaucratic. Users got together, met with county executives, and told them of the terrible impact this would have on each agency. Although BMC ended up keeping GIS, this started a genuine concern for what would happen to GIS in the County if BMC folded. Many people said there was a need for a county GIS Unit. In 1996, a capital improvement referendum passed, and the county hired a GIS Administrator who wanted all county agencies on one platform. The county decided to go with Environmental Systems Research, Inc. (ESRI) and to no longer support MapInfo.

**Procurement Phase**

*BCCAP, RCAP, and RCAS*

By the mid-1980s, Crime Analysis received its first microcomputer. By the late 1980s, the first version of the Baltimore County Crime Analysis Program (BCCAP) was created by a computer-smart officer. BCCAP was in DOS and dBase3. In the early 1990s, BCCAP was re-written for Windows, and in 1994-95 it was re-written for the LAN. The “LAN” connection is between Analysis Unit computers and precinct computers using a phone/dial-up modem system. BCCAP was used as a basis for the Regional Crime Analysis Program (RCAP) as part of the Regional Crime Analysis System (RCAS). BCPD began to see a strong need for regional crime analysis in 1994 and led the effort to establish a regional system and consortium (more information about RCAS can be obtained from the participating agencies). RCAS includes thirteen neighboring jurisdictions, all using RCAP, with the data and transfers occurring on a server housed at the Baltimore-Washington High Intensity Drug Trafficking Area (HIDTA) office. RCAP data is downloaded to BCPD precinct computers daily (with PC Anywhere software). Presently, the BCPD is establishing a true WAN with network and application servers, routers, etc., and is planning to have 500 nodes by the end of 1999. In addition, RCAP is getting some “bells and whistles” to provide more functionality and ease of use.

**Procurement of Mapping Technology**

Procuring mapping technology began a few years after the initial crime analysis technology. In 1988, the BCPD applied for but did not get a National Institute of Justice (NIJ) mapping grant, so they submitted their proposal to the Governor’s Office of Crime Control and Prevention for another grant (entitled Substance Abuse Tracking System) and received about $100,000. This covered a GIS analyst, hardware, software, peripheral equipment, and supplies. They now needed to decide what software to buy. They looked at several different packages, leaning toward ESRI’s ArcInfo, but after talking to users, decided it was too complicated. They chose MapInfo because it was one of the few PC
versions of software for mapping, which made it more practical for officers and civilian analysts. In addition, BMC was a MapInfo retailer. In the early 1990s, they upgraded to MapInfo for Windows. BMC maintains many MapInfo coverages and continues to do quarterly updates of geo and digital map files.

In early 1998, BCPD purchased ESRI’s ArcView, but its use is still limited; they are primarily using MapInfo. The latest version of ArcView as well as the ArcView extensions Spatial Analyst, Network Analyst, 3-D Analyst, and ArcPress, were purchased in early 1999. These were funded by a state grant (Auto Theft Reduction through Analysis Program, or ATRAP) that had one analyst in the budget. Because the county funded the analyst position, BCPD was able to use the money for software and hardware. County GIS has spent millions to develop data, including 200 scale planometrics/building footprints, digital aerials, centerline files (bought attributes from BMC), and zoning information. BCPD will have access to more layers with ArcView than they did with MapInfo.

Besides the continuously upgraded database application, BCPD acquired and tested a number of other crime analysis-related applications. They procured several different statistical programs, including SPSS, SYSSTAT, Forecast Pro, Spatial Analyst, and CStat (still under review), for forecasting, spatial and non-spatial analysis, and graphical presentation. In the last year, the Analysis Unit has procured a whole new set of technology. The Department (upon recommendation from the county) purchased Microsoft Office products. All equipment and computers in crime analysis and precincts and the WAN were purchased through grants. Phil Canter, the lead on procuring crime analysis technology, noted that “if it weren’t for grants, we wouldn’t have what we have … they are a headache, but well worth it.”

Crime analysis hardware and software (purchased between 1988-1999) include the items listed in the following chart.

<table>
<thead>
<tr>
<th>Technology/Equipment</th>
<th>Total Cost</th>
<th>Year Purchased</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Desktop (486, 25)</td>
<td>$7,500</td>
<td>1989</td>
<td>SATS grant</td>
</tr>
<tr>
<td>6-pen Plotter</td>
<td>$9,000</td>
<td>1989</td>
<td>SATS grant</td>
</tr>
<tr>
<td>Laser Jet Printer</td>
<td>$1,300</td>
<td>1990</td>
<td>SATS grant</td>
</tr>
<tr>
<td>10 Desktops</td>
<td>$14,000</td>
<td>1995</td>
<td>SATS grant</td>
</tr>
<tr>
<td>HP 650 C Plotter</td>
<td>$7,500</td>
<td>1995</td>
<td>ATRAP grant</td>
</tr>
<tr>
<td>9 Desktops</td>
<td>$12,600</td>
<td>1996</td>
<td>Replaced 1995 desktops</td>
</tr>
<tr>
<td>2 Laser Jet Printers</td>
<td>$2,600</td>
<td>1996</td>
<td>SATS grant</td>
</tr>
<tr>
<td>HP 1200 color printer</td>
<td>$800</td>
<td>1996</td>
<td>SLAP grant</td>
</tr>
<tr>
<td>Proxima Projector</td>
<td>$9,000</td>
<td>1996</td>
<td>ATRAP grant</td>
</tr>
<tr>
<td>1 Laptop</td>
<td>$4,500</td>
<td>1996</td>
<td>ATRAP grant</td>
</tr>
<tr>
<td>Bubble Scanner/Program</td>
<td>$7,500</td>
<td>1996</td>
<td>ATRAP grant</td>
</tr>
<tr>
<td>Network Server</td>
<td>$6,000</td>
<td>1996</td>
<td></td>
</tr>
<tr>
<td>Novell Network System</td>
<td>$6,500</td>
<td>1996</td>
<td></td>
</tr>
<tr>
<td>Autodialing System</td>
<td>$7,500</td>
<td>1997</td>
<td>ATRAP grant</td>
</tr>
<tr>
<td>10 Modems</td>
<td>$1,000</td>
<td>1997</td>
<td>SLAP grant</td>
</tr>
<tr>
<td>Laser Jet Printer</td>
<td>$1,300</td>
<td>1997</td>
<td>SLAP grant</td>
</tr>
<tr>
<td>11 Desktops</td>
<td>$26,560</td>
<td>1998</td>
<td>SLAP grant, for Precincts</td>
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</table>
**High Resolution Scanner** $500 1998 ATRAP grant
**Autodialer Upgrade** $4,500 1998 ATRAP grant
**HP Server** $5,000 1998 CrimeStat grant

<table>
<thead>
<tr>
<th>Software</th>
<th>Cost</th>
<th>Year</th>
<th>Grant</th>
</tr>
</thead>
<tbody>
<tr>
<td>dBase III</td>
<td>$800</td>
<td>1988</td>
<td></td>
</tr>
<tr>
<td>2 MapInfo for DOS</td>
<td>$2,400</td>
<td>1989</td>
<td></td>
</tr>
<tr>
<td>3 MapInfo for Windows</td>
<td>$2,100</td>
<td>1993</td>
<td></td>
</tr>
<tr>
<td>3 FoxPro for Windows</td>
<td>$2,400</td>
<td>1993</td>
<td></td>
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<tr>
<td>3 Lotus 123</td>
<td>$2,400</td>
<td>1993</td>
<td></td>
</tr>
<tr>
<td>3 Systat for Windows</td>
<td>$3,300</td>
<td>1994</td>
<td></td>
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<tr>
<td>IDRISI for DOS</td>
<td>$600</td>
<td>1994</td>
<td></td>
</tr>
<tr>
<td>10 MapInfo Windows/Upgrade</td>
<td>$3,000</td>
<td>1996</td>
<td></td>
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<tr>
<td>10 PCAnywhere</td>
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<td></td>
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<tr>
<td>Stanford Graphics</td>
<td>$500</td>
<td>1997</td>
<td></td>
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<tr>
<td>SLAP Mapping Program</td>
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<td>1997</td>
<td></td>
</tr>
<tr>
<td>10 ArcView GIS</td>
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<td></td>
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<tr>
<td>10 Spatial Analyst</td>
<td>$13,000</td>
<td>1997</td>
<td></td>
</tr>
<tr>
<td>SpaceStat for DOS</td>
<td>$1,100</td>
<td>1997</td>
<td></td>
</tr>
<tr>
<td>10 MS Office 97</td>
<td>$7,000</td>
<td>1998</td>
<td>County Budget*</td>
</tr>
<tr>
<td>4 Systat for Windows/Upgrade</td>
<td>$1,400</td>
<td>1998</td>
<td>County Budget*</td>
</tr>
<tr>
<td>3D &amp; Network Analyst</td>
<td>$4,000</td>
<td>1999</td>
<td></td>
</tr>
<tr>
<td>5 ArcView upgrades</td>
<td>$7,375</td>
<td>1999</td>
<td></td>
</tr>
<tr>
<td>ArcPress</td>
<td>$300</td>
<td>1999</td>
<td></td>
</tr>
</tbody>
</table>

* All other purchases in this list were funded by grants. The Auto Theft Reduction through Analysis Program (ATRAP) funded $86,000 in hardware and $43,000 in software between 1995-1999. The Byrne Memorial grant, Street Level Access Program (SLAP), funded $18,300 in hardware and $8,500 in software between 1996-1997. The Byrne Memorial grant, Substance Abuse Tracking System (SATS), funded $17,800 in hardware and $14,000 in software between 1988-1994. NIJ grants funded $6,600 in hardware in 1998. Other crime analysis start-up technology was funded by the County budget and Police Foundation grants in 1985-1987.

**Implementation Phase**

The first use of micro-computing for crime analysis was to create a tactical crime database in dBase2 and generate statistics for burglaries and robberies with COBOL programs. In general, these reports took overnight to process. With the creation of BCCAP, the tactical crime database was expanded to include auto thefts, and the queries and reports were easier and quicker. Since that time, narcotics complaints were also added into RCAP. The tactical database is used for identifying trends and patterns and filling requests for reports and maps. As an extension of the tactical database, the Analysis Unit developed a “known offender database” containing information about Baltimore County arrestees. They use this database to match crime information to possible suspects. In addition, pin maps are still used to provide a small-scale, countywide perspective on crime. The analysts receive copies of the four tactical crime reports at the same time that Records gets them, as well as a Crime Analysis Worksheet, a bubble scan filled in by officers (see Exhibit 1). The worksheets are scanned every morning into RCAP, and when analysts
receive the actual reports (which are picked up in the mailroom every day), they read them and add more data.

EXHIBIT 1

Analysts use PRISM, the mainframe records management system, for UCR statistics and data queries on all UCR crimes, arrests, and calls for service. Crime cases are entered into PRISM within 6-9 weeks depending on the backlog and type of crime; they are then available on-line for analysts and other department personnel. The UCR summary statistical sheets are imported into Lotus (spreadsheet software) for inclusion into the Department’s Quarterly Crime Reports. Part of the reason for creating the tactical crime database was this time delay and the unfriendliness of queries, reports, and links to mapping in PRISM. CAD/911 data is used extensively for resource allocation studies.
precinct and post redistricting, response time studies, false alarm reports, maintenance of order reports, and public safety indicator maps. Monthly extractions (on the 6th of the following month) are imported into FoxPro for ease of use (this will eventually be into Access instead).

The BCPD was the first department in the county to use GIS. Other agencies followed, also choosing MapInfo. Planning and Zoning eventually took the lead on the county GIS user group and now maintains many of the files and site licenses. The data that was created and maintained by BMC includes street centerline, census, police reporting areas (1,407 in Baltimore County), regional planning districts, and transportation zones. BCPD maintains post car areas (an aggregate of reporting areas) and special police areas (i.e., for business initiative and strategic planning). BMC gave some formal MapInfo training to the analysts several years ago, but most training has been “on the job” and “learn as you go.” Phil Canter (the Chief Analyst) has been trained in MapInfo and ArcView, and he trains analysts for one hour every 2-6 weeks in GIS, statistical analysis, and spatial analysis.

Besides using GIS for tactical analysis, BCPD uses GIS for strategic analysis. Three examples are (1) use of public safety indicator maps to identify “communities in need,” (2) analyzing response times by reporting area and post car area twice per year, and (3) mapping for re-districting posts and reporting areas. BCPD has also been using STAC (Spatial and Temporal Analysis of Crime, free from the Illinois Criminal Justice Information Authority) for about ten years as the primary application for hot spot analysis, but they also use various other statistical programs based on the project (see chart on page 5).

The analysts are in the process of shifting their workload to Microsoft Office products. In particular, they will be making extensive use of word processing, spreadsheets, and databases. They hope that these products will be “better, smarter, and more efficient.” The analysts (and other employees who were interested) received training as part of a collaborative effort by the police academy and the community college.

All application servers are in the public safety building, centrally administered by Technology Services and behind a firewall. Analysts do some self-maintenance on their own LAN (such as load software, etc.), but network issues are handled by Technology Services.

Impact Phase

In regard to the impact that the crime analysis and mapping technology has had on the Analysis Unit, they feel that they could be nowhere near where they are today if not for technology. BCPD has been a test-bed for crime analysis-related applications; this has not only benefited them but the entire crime analysis field. BCPD’s success with mapping and STAC; the ideas, time, and effort put into the regional crime analysis and mapping applications; and the partnership in various technology-related grants and research projects has put the Analysis Unit years ahead of most law enforcement agencies.

Benefits for Users

After speaking with a number of users from patrol, investigations, administration, media, and strategic planning, the resounding sentiment was that crime analysis technology, information, and people were extremely effective. Some of the crime analysis “products”
that users noted were crime bulletins, post car alerts, and weekly trend worksheets. Media Relations (a unique, frequent, and proactive crime analysis user) noted the usefulness of Business Beat and seasonal trend media releases. Strategic Planning felt that the department-wide effort could not have been successful had crime analysis not been able to provide the statistics and maps necessary to create “strategic objective areas” and evaluate public safety indicators. The Operations Bureau had many excellent examples of the application of crime analysis data and technology, ranging from “almost real time” knowledge of problems for the precinct commanders, to better communication across the department, to using the trend information to help prioritize lab requests.

Finally, one precinct lieutenant stated that he uses crime analysis information every day. He became convinced of its value soon after the Analysis Unit had implemented MapInfo. He recalled that a group of shotgun bandits had been robbing multiple locations in the city and the county. The lieutenant came to crime analysis with a stack of reports (there had been between 50-80 related incidents) and asked what they could do. They printed out maps and immediately saw clusters of patterns. Instead of doing County-wide surveillance (which had been the previous, unsuccessful strategy), they were able to concentrate their efforts in specific areas. Although the suspect was eventually arrested in Delaware, the lieutenant became a crime analysis devotee.

**Challenges**

No one within the BCPD (or any other law enforcement agency, for that matter) would disagree about the importance of the timeliness of entering information into crime analysis systems and distributing it to users in an understandable fashion. Although BCPD has greatly improved upon this process over the last decade, some feel there is still some distance to go. Certain departmental technology projects in the near future will affect crime analysis. The new RMS is due to be implemented in December 1999, and the second release in mid-2000 will have crime analysis enhancements and mapping. CAD will also feed into the new RMS; and automated field reporting, anticipated for late 2000, will reduce redundant and late data entry. The Department hopes to be able to eliminate the use of SLAP and possibly the tactical crime database with these improvements.

The Records and Technology Division Major feels that there have been baby steps in technology advancement due to (1) lack of funding and (2) the learning curve involved in using technology. For example, the Department talked about networking in 1988 but did not get a network until the early 1990s. Some challenges and lessons have been revealed with BCPD’s technology acquisitions. In general, management of IT projects is often difficult for police agencies because of a lack of expertise within the ranks and a hesitancy to provide adequate training. His recommendation is to use a consultant when expertise is lacking. BCPD has turned to Mitretek over the years. They helped BCPD with “where to start,” providing a focus and direction. In 1996 they created a fundamental plan for networking and an integrated criminal justice system big picture. In addition, using contract employees to help with development and implementation is not conducive to the local government employment/personnel process because it is often difficult to retain them due to the bureaucracy and red tape. Concerning GIS, current issues include: (1) What should BCPD do with 10 years of MapInfo geocoded data (they cannot use x,y coordinates from a different scale)? and (2) How steep will the learning curve be for analysts?
Crime Analysis/Mapping Technology for Officers and Investigators

Assessment and Decision-Making Phase

By 1994, access to meaningful crime analysis information was still limited for most end users. During the following year, the Analysis Unit felt they could better manage this issue by giving officers the ability to query the tactical crime database for field use and problem solving. The average user was not going to use sophisticated programs, so they needed to create a customized, user-friendly application.

Recognizing a need to provide line officers and patrol commanders with unlimited access to tactical crime data, BCPD submitted a grant application to fund development and implementation of a communications network connecting precinct microcomputers to the Analysis Unit’s LAN server. In 1996, a Byrne grant was awarded by the Governor’s Office on Crime Control and Prevention to develop application programs for use by line officers in a microcomputer environment. This system, called Street Level Access Program (SLAP), was developed with the express purpose of providing officers with access to the department’s tactical crime databases. In turn, this information would assist officers in identifying criminally active areas for directed patrol, problem solving, case enhancement, and community outreach.

Procurement Phase

The Street Level Access Program (SLAP) was created in-house in 1996. It uses RCAP data, which is downloaded to the computers at the precincts daily (with PC Anywhere software). BCPD then contracted with the Baltimore Metropolitan Council to create Street Level Access Mapping (SLAM). Much like SLAP, code has been written in conjunction with MapInfo to create a limited set of canned queries and maps.

Implementation Phase

SLAP went on-line in 1997. It is now installed locally on each of the eight precinct computers that are connected to the dial-up LAN. It has canned queries and reports with menu choices that include property breakdown, statistical breakdown, target vehicle, data and time cross tab, and location (see Exhibit 2).
There are two main types of searches. One search is quick and easy, but the user does not get back much detail (generally used by most patrol officers); the other provides a great deal of detail but takes longer, and the user needs to know more about how the system works. An example of a search result can be seen in Exhibit 3.
Managers were given the first training, an overview of the system. The centralized and precinct detectives were next; and finally in 1998, training was expanded to any interested individual. Training consists of a four-hour class at the Academy taught by analysts. Many considered it not basic enough and too fast for non-computer users. One corporal noted that they “lost people right away;” and one sergeant said “it was too quick and too much,” so he does not use the application now. He and one of the lieutenants said they rely on the roll call incident list and the paper reports sent from crime analysis. During training, the analysts used printouts, but a user’s manual now exists.

**Impact Phase**

Although it was somewhat difficult to find and speak with a SLAP/SLAM user, one corporal did find SLAP very useful. He uses SLAP about once per week and SLAM about once every couple of months. His use of SLAM was limited because the maps are very general; they are broken down by crime type only (i.e., all robberies but not by time of day or day of week). In order to get complete information, the user needs to go to SLAP and run a separate query. Regarding SLAP searches, he noted that if you do not use the detailed search in SLAP regularly, it is not easy. He uses SLAP because he does not have to wait for the information.

The corporal related one of his success stories. He said he saw a suspicious subject report in roll call; it was a cross-dressing white male who was robbing females. He used SLAP and found two other robberies in the prior year with similar suspect and m.o.
descriptions. He found a parolee that fit the description and did a search warrant where he found photos and evidence. The suspect ended up pleading guilty to both robberies.

A common reason given for people not using SLAP more often is that many of the officers are not frequent computer users and the training is too advanced. Others feel that SLAP does not fulfill specific needs and the analysts do such a great job of answering specific requests. In 1998, the Analysis Unit mailed a survey to over 100 officers who had attended SLAP/SLAM training and asked questions about what would help them, data types, and functionality. With a 76 percent response rate, they learned that over 78 percent of the officers thought the training was very good or outstanding; and about 81 percent thought SLAP had very good or outstanding potential for providing officers with information. The Precinct Activity Report was the most commonly used SLAP module.

There are no plans for SLAP to move to the new WAN initially, because it would need a re-write. SLAP and SLAM are due to be replaced with Regional Crime Analysis GIS (RCAGIS), which is currently being developed by the U. S. Department of Justice Criminal Division. The application is supposed to be ready in December 1999. Development was delayed pending the release of the latest version of MapObjects (programming software) by ESRI.
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Technology Acquisition Project
Case Study

California Department of Justice CAL/GANG® System

This case study focuses on intranet technology acquisitions. It is one of 18 case studies prepared for the “Technology Acquisition Project” administered by the Institute for Law and Justice in partnership with Government Technology, Inc., and funded by the National Institute of Justice (NIJ), U. S. Department of Justice. The authors of this case study are Raymond Dussault, Research Director, Government Technology, Inc., and Julie Wartell, Senior Research and Technology Associate, Institute for Law and Justice. The report has been reviewed by the participating site but should be considered a draft pending final NIJ review.

Background on the Study Site and the Problem

The state of California has the seventh largest economy in the world and the population to back it up. With those statistics comes a corresponding level of crime and especially gang-related crime. Combating that crime are hundreds of diverse agencies, from monolithic police and sheriff’s departments like those in Los Angeles, to smaller departments throughout the state, like the El Cajon and Redlands Police Departments.

Over time, a grass roots-developed gang information database—the GREAT system—had developed in California. It was in regular use by the early 1990s and had enjoyed moderate success. By 1995, though, it became obvious to the California Department of Justice (Cal DOJ) and numerous local agencies that new technologies could provide a more robust and user-friendly system. This awareness led to the development of CAL/GANG®. The new system has resulted in some unprecedented successes and has been embraced by most of the state’s law enforcement personnel who have been exposed to it. However, in addition to technological challenges, the CAL/GANG® system has faced significant hurdles in overcoming entrenched jurisdictional and political objections and suspicions regarding the new system.

With the establishment of the GREAT system in the 1980s, California was the first state to have an investigations tool and database that was focused entirely on combating the proliferation and growth of violent street gangs. While GREAT began as a grass roots effort out of the Los Angeles Sheriff’s Department, it quickly dominated the state’s efforts to attempt to capture the vast amounts of gang data being gathered through the literally hundreds of different law enforcement agencies in California.

Although the gang problem first showed itself as a problem in urban areas like Los Angeles and San Diego, the gangs’ influence had quickly spread throughout the state. In the last seven to ten years, gangs have gained prominence in less dense urban areas like Sacramento, as well as in predominantly agricultural regions whose largest cities include Stockton and Fresno. As the street gangs grew, prospered, and spread, the difficult-to-use, DOS-based GREAT system strained to keep up. The system was faced with political, architectural, ease of use, and capacity problems.
Assessment and Decision Making Phase

In 1993, the strains on and limitations of the GREAT system led Cal DOJ to investigate what options might be available using new technologies that had been developed since implementation of GREAT. CAL/GANG® was designed as the modern replacement for the outdated GREAT system. It is an extremely powerful and sophisticated relational database and link analysis tool developed by Orion Scientific Systems, Inc., based in Irvine, California. It resides on an intranet backbone accessible through any user-friendly web browser, including Netscape and Internet Explorer.

Since Cal DOJ viewed GREAT’s difficult interface and cumbersome language as its biggest drawbacks, they were very excited about finding a way to apply the developing Internet technologies to their gang information challenge.

Officers at various departments, while having some complaints about the CAL/GANG® system (mainly about the political issues surrounding its administration), are unanimous in one regard: the GREAT system had to go. They all point out how entering even small blocks of information required several intricate key commands that officers had to remember. As one sergeant said, “You had to re-learn the system and the commands every day.” In addition, if investigators in San Diego, for example, wanted to search the entire state for a gang-related suspect, they would have to dial up each node separately. This effort ate up a lot of staff hours.

Finally, one of GREAT’s biggest drawbacks was its extremely high cost. According to Don Mace, Special Agent in Charge at Cal JOJ, the GREAT system was lucrative for the vendor because the vendor retained the source code, and every change or additional node had to be paid for separately.

Procurement Phase

Cal DOJ first began looking into replacing or upgrading GREAT in late 1993. To accomplish the task, they were using a $300,000 grant from the Office of Criminal Justice Planning (OCJP) that was designed to expand the existing system. To make the changes, they turned to a computer consultant who, in the end, seemed more focused on his own enrichment than on increasing effective access to gang data. From 1993 to 1995, this consultant worked on the system; but the process, as described by several people, was like pulling teeth. After paying several invoices without seeing much in the way of results, Cal DOJ asked for a demo of the system under development before they would pay out any more funds. That demo left a lot to be desired, according to one source, and the potential did not seem to be much of an improvement over the existing system.

After spending $100,000, Cal DOJ faced a difficult decision, although they felt the answer was obvious. Rather than continue to spend money on a system that promised little improvement over what they were replacing, Cal DOJ cut ties to the consultant and went back to the drawing boards in late 1995.
Working Relationship with the Vendor

Through chance, Mace came across Orion giving a demonstration of their investigative software about the same time that Cal DOJ was ending its relationship with the consultant. Orion is a software developer that specializes in high-tech work for federal agencies like the CIA and NSA, and has in the last several years expanded its reach into state and local law enforcement. The user-friendly approach of the software intrigued Cal DOJ, and a series of meetings was quickly arranged.

At the first meeting, the Cal DOJ team presented their problems with GREAT and asked Orion to make a proposal. At the second meeting, in November 1995, Cal DOJ realized they had not been clear in their desires when Orion proposed a way to create links between GREAT and the state backbone. “We stopped them immediately and said, ‘We don’t want a link; we want a replacement,’” explained Cuong Nguyen, bureau chief for Cal DOJ. In December 1995, Cal DOJ and Orion had a third meeting at which the vendor sketched out the first outline of what would later become CAL/GANG®.

Cal DOJ went to OCJP with a feasibility study report and request for funds. At the same time, Orion was lined up with the San Diego Police Department, the California Gang Node Advisory Committee (CGNAC)¹ and Cal DOJ to create a working prototype.

The first CGNAC meeting was held in December 1995. Work on the prototype began and was completed in January 1996. The prototype was presented to the CGNAC board and Cal DOJ that same month, and the San Diego node was on-line in August of 1997. The system was declared officially complete in April 1998.

Throughout this process, Don Mace was the key individual at Cal DOJ, lobbying for funds and coordinating the development process. Nguyen was his direct Cal DOJ supervisor at the time.

“What we laid out as our requirements was that we wanted Web technology—we had already had our fill of a closed proprietary system—and it had to be a system that anyone could step into and learn how it works quickly and easily,” said Mace.

In addition to containing text-based data, as GREAT did, CAL/GANG® catalogues just about every piece of information imaginable, including tattoos, mug shots, vehicle types and photographs, nicknames, and known associates. It was designed based on the idea that gangs of every type survive and prosper by creating internal links and tiers of power. Through an easy graphical user interface (the web browser), CAL/GANG® allows officers to use collected gang data and images to track, retrieve, and analyze gang-related information.

It is important to note that CAL/GANG® is more than just a database of information, it is an investigative tool that allows investigators to quickly create and illustrate links between disparate information. In addition, the data and the link and image tools can all be accessed through laptops in the field. This aspect of the system is not in extensive use yet, but it is possible.

¹ CGNAC is an advisory board created to guide decisions affecting the original GREAT system. Since GREAT was a grass roots-developed system, some CGNAC members needed extensive lobbying to agree to abandon the archaic system and follow an untested vendor. CGNAC has since been rolled over to an expanded advisory role for the CAL/GANG® system. CGNAC meets quarterly.
Surprisingly, despite CAL/GANG® being a complex and broad system developed from scratch, the system was brought on-line extremely quickly. Cal DOJ first started working with Orion in November 1995 and by January of 1996 they had a working prototype established between San Diego Police Department and Cal DOJ. Project approval and budgeting negotiations at the state level postponed formal launch of the project until May of 1997, at which time the project goal was to launch a usable system within 18 months. Seven months later, CAL/GANG® was fully on-line with seven nodes in operation throughout the state.

“Why did this happen?” project director Mace asked rhetorically. “It happened because the vendor felt like it was a matter of principle to bring the project in on time and [on] budget. They were responsive throughout development and have continued to be.”

System Funding and Ownership

Funding the CAL/GANG® system was unique and was drawn through a politicized process. In addition, there developed a partnership between Orion and Cal DOJ that resulted in the vendor being able to create and prove a system that they could sell elsewhere, while DOJ was able to purchase the system for the funds they could find.

From their initial OCJP grant to expand and link the GREAT system, Cal DOJ had $100,000 left in their coffers. Obviously, a new system was not going to be built for $100,000, so Mace went back to OCJP with Orion and the San Diego-developed prototype/demo. Orion was asking for $750,000 to purchase the system. (Orion said that this initial bid included not just CAL/GANG® but several of their other investigative software tools as well.)

By this point, Mace was doing demos of the software for local law enforcement agencies in California. Very quickly, the concept gained enthusiastic support, and Mace encouraged local law enforcement leaders and CGNAC members to lobby OCJP and the Governor’s office. The biggest break came in May 1997, when then Governor Pete Wilson announced at a press conference that he would commit over $800,000 to get CAL/GANG® up and running. In the end, the money did come, but in chunks as opposed to all at once.

First, OCJP provided $120,000 in Byrne and other federal funding plus $300,000 in gang suppression funds. Coupled with the $100,000 left from the earlier grant, Mace had $520,000. The limit to avoid having to put the project out on an RFP was $500,000, so he countered Orion’s offer at that number. Orion came back asking for the full $520,000, and Mace applied for and received an exemption on the RFP limits.

In the following year, OCJP awarded the program another $386,000 in gang and violence suppression funds. These funds have been used to finance expansions in hardware and assist local nodes in coming on-line as CAL/GANG® has grown.

The problem for Orion was that at the time when they agreed to accept $520,000, they had already spent close to $1 million on research and development. In addition, Cal DOJ wanted to “own” CAL/GANG® without having to pay for owning it. The vendor and user developed a unique agreement that has proven to benefit both.
If Cal DOJ did “purchase” the system and became the owner, state law would not allow it to be sold by Orion to anyone else. That arrangement would be unworkable. Instead, Cal DOJ and Orion agreed to a 99-year lease, which granted specific rights to each party. Cal DOJ would receive the source code and contract for maintenance from Orion. Over the 99-year term, Cal DOJ could give the software to any California justice agency. Orion for its part could recoup its investment by retaining the right to sell the system anywhere in the world, though inside California the Cal DOJ could bring on new sites without additional software licensing costs.

The system has enjoyed a huge success both in and out of California, resulting in a win-win for the parties involved. “I got a free proof of concept and they got a cutting edge system they could sell,” said Mace. He also pointed out that through the whole process, Orion never missed a single delivery date.

The development of the software drove the hardware needs. Ultimately, the beauty of CAL/GANG® is that all an officer needs to access the system is a computer with a browser and a password. Behind that interface, CAL/GANG® resides on the statewide CLETS Intranet backbone. Each node requires either having a server in the user’s offices to keep their data, or utilizing a server that resides at Cal DOJ. Initially, the first seven nodes (there are currently 11 nodes, including Cal DOJ) all purchased on-site servers. More recent nodes have chosen to allow Cal DOJ to maintain their nodes, as this reduces costs in training, maintenance, and hardware.

Servers are Compaq Proline 5000, single 200 processors with a minimum of 256 MB of RAM and 2.1 GB hard drive. Larger users like Los Angeles and Orange County have had to add memory and processor resources. Those two sites currently have 512 MB of RAM backed up by 36 GB hard drives.

**Implementation Phase**

Obstacles to implementing CAL/GANG®, once designed and built as a prototype with the San Diego Police Department (as described above), were largely political.

First, as noted before, despite GREAT’s extreme limitations—to the point of being nearly useless—members of CGNAC had to be heavily pitched to move away from GREAT. It was largely a question of changing from a grass roots-developed system with which they were comfortable. More of a challenge, though, were the power, or perception of power, issues.

**Hosting and Maintaining the Data**

Based on the technical aspects, it made more sense for Cal DOJ to host and maintain the data, with the nodes accessing the data from their PCs. At that proposal, CGNAC and local law enforcement balked immediately. They already felt like they had seen the state jam several other programs down their throats (like CLETS) and believed that DOJ already had plenty of power just by controlling the purse strings through OCJP.

Ultimately, Cal DOJ bent on this issue, agreeing to allow the nodes to keep their local regional databases and maintain their own data, which is replicated at DOJ. “Politically, we had to do it,” said Mace. “Technically, it has been a constant headache.”
Cal DOJ continues to allow this choice; however, the funding is set up so that an agency that chooses to place its data with DOJ can save thousands of dollars. Most new nodes are opting for the latter approach. That trend is irritating to some older nodes, especially San Diego, which views it as a push by Cal DOJ to eventually centralize the entire system.

**Training and Ease of Use**

Training, on the other hand, has been a piece of cake. From the beginning, Cal DOJ insisted on ending up with a user-friendly piece of software and CAL/GANG® is as easy to use as the Internet. There have not been any “ease of use” issues raised at all. “Speed and ease of use were our main goals in development of CAL/GANG®,” explained Tom Gates, a former FBI agent who now works for Orion. “We have a lot of former law enforcement people and we went to law enforcement professionals outside of our company for input. The system was essentially developed by police officers for police officers. It is probably the most user-friendly system ever made for law enforcement—it is like having a dog that walks itself.”

All costs involved in the system have been exactly as expected, according to both the local and regional nodes and Cal DOJ. For formalized training, Orion trained trainers for each node. There is also a formalized, POST-approved (three-day, 24-hour) course. Detectives at most nodes are not allowed on the system until they have completed the training. San Diego detectives said the system was so simple to use that, if it wasn’t necessary to bring detectives up to speed on basic computer use, the CAL/GANG® class could be taught in a single six-hour session.

**Impact Phase**

CAL/GANG® has had a profound effect on gang-related crime investigations since its inception. While there continue to be some challenges—most dealing with traditional law enforcement reticence to embrace new technologies and data-sharing—probably no system in recent memory can boast so many specific examples of a product’s impact. “The biggest problem we have had is in underestimating how well it would work, how much it would help, and how quickly local law enforcement would embrace the system. We went from 366 end-users on the first day to over 3,600 now, and growing every day,” said Mace. “It helps solve cases—what more can you ask?”

**Success Stories**

Perhaps the most visible of the CAL/GANG® success stories was the gang rape in May 1998 of three juvenile girls by 14 male gang members. The crime happened in a Fresno hotel, where the girls were lured into a room by a couple of under-aged suspects and were then attacked by the others—all members of the Mongolian Boys Society, one of the many Asian gangs that have sprung up throughout California. In this case, it is possible the criminals would not have faced justice without CAL/GANG®; certainly the process would have been more arduous and time-consuming without the system.

“We had one word to go on—Bolo. It was a name one of the [victims] remembered being used in the room,” said Jim Kerns, deputy sheriff in charge of the CAL/GANG® node in
Fresno. "We didn't know whether it was a first name, a last name, or a moniker. Maybe it had no meaning at all. Turns out that Bolo was one of the gang member's street names. That information turned up in CAL/GANG® and gave us his real name. From there we went to work, and now every one of those guys has pled and will be going to prison for 22 to 24 years."

South of Fresno, in Kern County, the system provided the information necessary to conclusively refute a murder suspect's alibi. "Members of our gang suppression unit were able to refute an alibi of a homicide suspect simply by retrieving a three-year-old field interview card from CAL/GANG®," said Carl Sparks, Sheriff of Kern County, in a letter thanking Governor Pete Wilson for funding the system. "The application is extremely vital in our day-to-day work and instrumental in our effort to suppress street-gang criminal activity."

In the San Diego area, the El Cajon Police Department called up the San Diego Police Department with a possible gang member I.D. request: the name “Maria” tattooed across the suspect’s chest. The man was from east San Diego County; he was Hispanic; and the incident in question occurred on Sunshine Street. The CAL/GANG® system turned up 13 possible matches. One of those possibilities had an address on Sunshine Street, and an arrest was made. "Ten years ago we couldn’t have found this just relying on card files; five years ago the process with GREAT would have been difficult, uncertain, and lengthy," said Dave Rohowitz, Sergeant, San Diego Street Gang Investigations Unit. "Today, with CAL/GANG®, we made the match in less than five minutes."

**Drawbacks**

While these successes continue to build and are being repeated in other states as well, some drawbacks continue to exist. These are primarily political in nature or related to police officers’ natural resistance to accepting change.

One example is that, while the system possesses excellent and easy-to-use photo capabilities, most officers still won’t take the time to photograph distinctive tattoos on known gang members. Also, quite a few officers are still reluctant to release the old-fashioned field interview (FI) cards. Instead, they keep their extensive but cumbersome paper files, refuse to enter gang data in the computer, and the police department is relegated to asking volunteers to re-enter this data in the system on a regular basis.

The final issue that has created friction, though it has not affected the efficacy of CAL/GANG®, has been the addition of new nodes. Some agencies have been resistant to the addition of new nodes, especially those outside of traditional law enforcement agency definitions, like the state parole board, which was recently added. Parole was finally added only because state administrators pushed it through. Other questions have been raised when smaller departments, which may not be as security-conscious as they should be, have been added to the system.

In the belief that sharing information is the key to success in law enforcement, Cal DOJ continues to push for expansion of CAL/GANG® not only in their own state but possibly as a nationwide gang information network, all working off the same system.
References
Magazine articles providing further background on the CAL/GANG® system can be found on the Internet at


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Background on the Project
This case study looked at the acquisition and implementation of crime analysis and crime mapping technology within the Charlotte-Mecklenburg Police Department (CMPD). When Chief Nowicki arrived in 1994, he quickly made technology—and in particular, crime analysis and computerized mapping—a priority. In the last five years, a variety of crime analysis-related software has been purchased or developed. This includes Geographic Information Systems (GIS), Access databases, and statistical programs. The key people involved in crime analysis and mapping are Richard Lumb, Director, Bureau of Research, Planning and Analysis; and Analysts Monica Nguyen, Carl Walter, John Couchell, Steve Eudy, and Veronica Sorban. In addition, two other individuals who have played a role in the crime mapping technology acquisition are Elizabeth Groff, former GIS Coordinator; and Tobin Bradley, County GIS programmer.

Background on the CMPD
The CMPD was formed in 1994 when the city of Charlotte and Mecklenburg County police departments merged. Besides Charlotte, there are six other cities in the county; five have their own police departments and one contracts with CMPD. The Mecklenburg Sheriff’s Department covers the local correctional facilities and functions.

CMPD serves a population of 609,000 and covers 550 square miles. There are 1,300 sworn and 350 civilian personnel. Crime analysis is a centralized function and serves 12 patrol area districts as well as centralized investigative units. The analysts do a combination of tactical, strategic, and administrative analysis for patrol officers, detectives, supervisors, and command staff.

CMPD Technology Plans and Responsible Units
“Technology Goals,” one of the CMPD Strategic Plan’s five sets of goals, emphasizes CMPD’s commitment to making information one of the most important problem solving tools. These
goals include references to automated systems, electronic communication, information access capability, and CAD for community policing. In addition, the CMPD has a Master Information System Plan that relates the findings of an in-depth analysis of the CMPD information systems infrastructure (UNCC, 1996). This Plan includes information about strategic planning, organizational information resource requirements, resource allocation, and expected outcomes. It has served as a guide in CMPD’s information technology acquisition process. The two primary units responsible for information technology are the Computer Technology Services Unit (CTS) in the Administration and Support Division, and the Crime Analysis Unit in the Bureau of Research, Planning and Analysis.

Summary of the Technology Solution

CMPD enhanced the crime analysis functionality of the agency by purchasing new technology, augmenting existing technology, and changing the focus and priorities of the analysts. Although some information technology was being used in 1995 when the enhancement process began, it was not fulfilling the department’s needs or the desires of the new Chief. The major advancement was the acquisition of ArcView GIS and STAC (Spatial and Temporal Analysis of Crime). ArcView is sold by Environmental Systems Research Inc. (ESRI) and presently costs approximately $1,200 per license. STAC is software used to analyze incident clusters and is available free from the Illinois Criminal Justice Information Authority. At the time, CMPD was able to work out a deal with ESRI to exchange the MapInfo GIS software they had recently purchased. In addition, CMPD started using Microsoft Excel and Access (off-the-shelf spreadsheet and database software costing approximately $700 for the entire Office package). Over the last few years, the analysts have also acquired SPSS (off-the-shelf statistical software) and three extensions to ArcView–Spatial Analyst ($2,500 per copy), Network Analyst ($1,500 per copy) and 3-D Analyst ($2,500 per copy). Finally, CMPD contracted with the County GIS Team to create an Intranet mapping application (approximately $10,000).

Need for Improved Crime Analysis Capabilities

CMPD hired a new Chief in 1994. The Chief had come from an agency that was technologically advanced in crime analysis and GIS. One of his top priorities was to not only bring CMPD up to speed but to push this department ahead in its use of information technology. CMPD did two major things to further this effort. They partnered with the University of North Carolina–Charlotte to do an extensive technology needs analysis, and they hired a new Planning Director and GIS Coordinator.

The results of the needs analysis were written into the Master Information System Plan, and this is continuously followed in furthering all aspects of information technology within CMPD. One of the highest recommendations was for improved information systems, which included a need for a new CAD, RMS, and crime analysis tools. According to the writer of the Master Information System Plan, the overall goal for CMPD was to put an architecture up first, then get critical databases going, and then turn to serious GIS. The department has concentrated their efforts on a wireless network and a new CAD and RMS, all of which will be going on-line in the near future. But because the Chief felt that GIS was important, it was taken on as a concurrent effort and made a priority.

At the time, crime analysis was functioning with basic systems, limited network capabilities, and paper maps. In addition, analysts were spending a great deal of time doing data entry (basic information was entered by Records into the mainframe, and analysts had to enter
supplemental information, such as suspect and M.O. data, into a dBase file). Crime analysis information was not readily available or easily accessible to the entire department. Crime analysis, and GIS in particular, had not been a priority; therefore, resources had not been provided for progressive information technology needs.

Assessment and Decision Making Phase

Prior to 1995, several things occurred in regard to GIS in Charlotte-Mecklenburg that relate to the present position of the Police Department. In the late 1980s, CMPD began to research mapping software, and based on a visit to another North Carolina police department, they decided to purchase LandStat. This acquisition fell through because the street file was terrible, and they could not get the mainframe data to integrate. In 1989, when the city of Charlotte was mandated to do storm water control, it found a need for GIS. The City and County Information Technology Departments began a joint effort to create base maps, maintain a joint GIS, and form users’ and management GIS groups. CMPD chose not to be involved.

When the Chief arrived in 1994, he was not made aware of the ongoing city and county GIS efforts, but he knew he wanted GIS within his department. Crime analysis began to research mapping software at other agencies and decided to purchase MapInfo. Several analysts went to training, but the software was never implemented. In 1995, the Chief hired a new Planning Director and gave him a mandate to implement GIS. To accomplish this, a GIS Coordinator position was created and filled with a person who had a background in geography and research. She was hired into the Planning Unit (which soon merged with the Crime Analysis Unit) and quickly began to assess the department’s GIS needs. The GIS Coordinator identified the necessary hardware, software, and training, and the Chief said he would find the money. After doing the necessary research, she concluded that CMPD should choose ArcView GIS and related ESRI products (other Charlotte and Mecklenburg agencies were using ESRI).

Analysts also felt there was a need for other software that would assist them in their crime analysis functions. The decision was made to purchase the Microsoft Office Suite, which includes Excel spreadsheet and Access database programs. With this software, analysts could import and export data easily between software packages, as well as maintain other databases for investigations and problem solving. They could be used for stand-alone crime analysis purposes or as add-ons for GIS data collection and analysis. SAS (Statistical Analysis Software) is still used to complete basic listings and cross tabulations.

Once GIS had been established in Research, Planning and Analysis, the Chief wanted to turn his focus to community problem-oriented policing. The GIS team also felt there was a need for a distributed GIS solution so all police personnel would have access to mapping for problem solving. In the summer of 1996, development of an Intranet mapping application began and ESRI released MapObjects (programming software for creating customized GIS applications). This would free up analysts to do higher level spatial analysis as well as allow officers to fulfill their own basic analytical mapping requests, especially since the network to the satellite police facilities was still not in place.

Procurement Phase

The procurement of GIS and crime analysis systems has continued on a regular basis. The Chief sees GIS as a priority and is willing to support new technology as it becomes available. He used a combination of grant and department budget funds to support the technology
acquisitions. Some crime analysis software and hardware purchases go through the CTS Unit for approval, while others are selected and purchased directly by Research, Planning and Analysis. The Chief has given approval and funding for all requested crime analysis software and hardware during this time of growth and enhancement. Besides the GIS technology, all purchases were off-the-shelf products. The analysts began to use Microsoft Access and Excel in 1995 and have recently acquired SPSS (statistical software). The Intelligence Unit crime analyst uses Analyst’s Notebook (link analysis software) and the department has used PCAM (IACP formula) for staffing and resource allocation. The IACP allocation formula has recently been automated within GIS.

**Mapping Software Purchases**

In regard to the mapping software, after discussions with ESRI, CMPD was able to swap each copy of MapInfo they had purchased with a current version of ESRI’s ArcView. A licensed copy of ArcView was installed on each of the analyst’s machines. The police department upgraded from PC ArcInfo (licensed by County Data Processing) to full ArcInfo in 1997, at a cost of about $6,500. A second ArcInfo license was purchased from a grant for about $9,000. In addition, the GIS Team obtained STAC (free from the Illinois Criminal Justice Information Authority) and began using it to analyze crime clusters. The first basic GIS database was created on a stand alone box and replicated on the Crime Analysis Unit network (Planning and Analysis were not in the same offices at that point, and Crime Analysis was not connected to other police or government buildings). In 1998, CMPD acquired copies of ArcView extensions—Spatial Analyst, Network Analyst, and 3-D Analyst—for each of the analysts’ desktop and laptop computers.

**Purchase of Intranet Mapping Application**

The procurement for the Intranet mapping application was occurring simultaneously. During the fall of 1996, the GIS Coordinator met with ESRI about developing a prototype application for CMPD. They received the first cut in February 1997 and were quoted a price of $20,000. That spring was spent selling the idea and prototype application to CTS, the Chief, the command staff, and the officers. A series of focus groups were held involving personnel from all levels; and software requirements were written based on the results, with patrol requests receiving the highest priority.

Contract negotiations began with ESRI in June 1997, but there were many hurdles to overcome. These included mistakes in the contract, attorney arguments over language and intellectual property rights, identifying a funding source, and the city of Charlotte hiring a technology attorney in the middle of the process who changed the rules of the game. When the GIS Coordinator left in February 1998, contract negotiations were still underway, but the contract was in final form and ready to be sent to ESRI attorneys. At that point, one of the analysts took the same specifications to the county GIS team, who responded that they could create the application for half the price. They began work in September 1998.
Crime Analysis Hardware Purchases

Crime analysis hardware, purchased between 1995 and 1998, includes the following:

- 6 desktops – Pentium 200 mhz, 64 meg RAM, 2 gig hard drive, 17” monitor
- 5 laptops – Pentium 166 mhz, 80 meg RAM, 2 gig hard drive
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- 5 – 1 gig Jaz drives
- HP Design Jet 2500 CP (e-size plotter)
- D-size plotter
- HP 1200 (color laser)
- HP 5 SI (black and white laser)
- HP color scanner
- Sony digital camera
- CD writer (not hooked up yet)
- 7 LCD projectors (all available to the analysts but 3 assigned to the analysts)

Hardware and Software Costs

CMPD Research and Planning was unable to specify all of the individual costs for hardware and software but estimated that the total since 1995 was approximately $180,000. Of this, about 25 percent came from the Department’s budget and the remaining were grant funds.

Implementation Phase

One of the most important aspects of any information technology is the data—what it is, how it is collected and maintained, and its proclivity for analysis. CMPD has a variety of data sources that they have created in-house, obtained from other agencies, or purchased.

In the fall of 1995, after Planning and Analysis joined together and moved into the government building, the analysts now had network access to the city/county GIS server. At that point, the GIS Team began to expand the number and types of GIS data by going to outside databases and agencies and getting access to or copies of these databases. This increased the sophistication of products that were given to patrol (the primary customer) and began CMPD’s foray into using GIS for research. They contracted with Appalachian State University for creation of the initial police boundaries (done in ArcInfo), but an effort is currently underway to create neighborhood boundaries in house (also in ArcInfo). A programmer/analyst in the CTS Unit (he is soon to move to the Research, Planning and Analysis Bureau) uses ArcInfo to maintain the GIS layers for the police department.

Crime analysts use different data depending on the system and type of analysis or report. Although CAD and Records (incident and arrest) data are on the city’s mainframe, analysts are presently able to receive daily downloads of the Records data (this will change when the new CAD and RMS are implemented). They also use parcel data from the Tax Assessor, traffic accidents from the city’s Department of Transportation, probation and parolee information from
Community Corrections, and investigative report data (i.e., sex crimes and robbery) that a data entry clerk maintains in MS Access. Maintenance of the crime analysis data and server is performed primarily by analysts and interns. If they are unable to solve the problem or it is a network issue, CTS may be able to troubleshoot. If not, the city Information Technology Department handles it.

Typical reports may include a combination of raw data, analysis, charts, and/or maps. Some reports are very basic and give an overview of the information, and some are more statistical and complex, showing change over time or a combination of related data types. Two examples follow.

<table>
<thead>
<tr>
<th>Study Area:</th>
<th>4800 S Tryon St</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Frame:</td>
<td>January 1, 1999 to YTD</td>
</tr>
<tr>
<td>Subject of Analysis:</td>
<td>Arrests</td>
</tr>
</tbody>
</table>

(General) Place Type of Offense Location:
- Vehicle Storage 13
- Commercial Place 12
- Outside Location 6

(Detailed) Place Type of Offense Location:
- Other Parking Lot 11
- Hotel/Motel 8
- Other Outside Location 4
- Other Commercial Parking Structure 2
- Street, Highway, or Alley 2
- Bar/Tavern/Nightclub 1
- Factory/Plant 1
- Other Business Location 1
- Restaurant/Diner/Coffee Shop 1

Property Stolen Included:
- Other miscellaneous 8
- Automotive items 7
- TV/radio/stereo 6
- Track/bus 4
- Cash 4
- Sports equipment 2
- Clothing/furs 2
- Auto parts 2
- Non-negotiable check 1
- Business/personal records 1
- Building interior 1
- Building exterior 1
- Bicycles 1
ArcView training for the analysts was informal and on-the-job. The GIS Coordinator performed much of the in-house training and provided technical assistance. Several analysts have also taken GIS classes at the University of North Carolina to expand their knowledge. Spatial Analyst training will be done on site by certified ESRI instructors. Other department personnel receive some training at the Academy and much more informally through one-on-one with the analysts. Analysts spend one hour of the Community Policing and Problem Solving class at the Academy talking about crime analysis and technology, and they do their own “marketing” of their products and functions on a day-to-day basis.

As CMPD got involved with GIS, they also became more involved with the city/county efforts. The GIS Coordinator (and later other GIS staff) started attending the City/County Users Group monthly meetings and pushed for police representation and involvement. Presently, there is a countywide effort to create a five-year GIS strategic plan, and police department analysts have been asked for input.

Many maps are produced by the analysts — some on a recurring basis and some as a result of requests from officers, investigators, or management. Using the data and software available, analysts may create a map based on their own analytical assumptions or with input from the requestor. The GIS products range from very simple and quick to more complex and time consuming. The latter are often difficult to explain to the intended audience.

Two examples of GIS products follow.
At the time of the case study, the Intranet mapping application had not yet been implemented. It was scheduled to be ready for testing in February. The county GIS team had started with the original specifications that were given to ESRI and then continued to meet with the analysts during the development. During creation, it was being run off of a server at the county, but that will be moved to the police department upon installation. According to the county GIS programmer, there were no plans for a manual or training at this time. The plan was to use the remaining money (from the original $20,000 allocation) to make coding changes to integrate into the CMPD’s planned RMS Oracle database and modify the application appropriately to be run on the Internet for the public.

Impact Phase

In the five years since Chief Nowicki arrived at CMPD and was appalled that analysts were still using pin maps, the department has moved to the forefront of crime and GIS analysis in the country. It is true that mapping and analysis technology has come a long way, but this success is also due to the Chief’s vision and ability to provide resources, and to several persevering individuals. The Chief feels that there is still ground to cover and that the department has yet to capture the full power of a GIS’s ability for data integration and analysis. He feels that the quality of the data will improve with the use of automated field reporting and the officers’
growing understanding of how important GIS is. He also believes the demand from the officers and the community will be taken care of through the planned Intranet and Internet applications.

Benefits to Users

When the various users of crime analysis were interviewed, the majority felt that the change was like night and day between the products and service prior to 1994 and the present. They felt that the old systems (and in turn, people) were not as timely and responsive. The analysts were often limited by the available technology and were not provided organizational support or opportunities for creativity. Others mentioned that five years ago, Crime Analysis produced reams of paper that meant nothing and did very little analysis, and some noted that crime analysis was wholly reactive before and much more proactive now. While some say that the information now is extremely timely, other users would like to see more timely information than monthly reports. Investigators agree that the present systems offer them analysis and reporting capabilities that were unheard of five to ten years ago when they were tracking cases by memory.

Although no one would attribute CMPD’s problem solving success and crime rate reduction to crime analysis technology, everyone who has used it realizes how important it has been and its contribution to making officers’, investigators’, and administrators’ jobs easier. The analysts produce a variety of reports and hot spot maps on a monthly basis as well as fulfill ad hoc requests for unique analysis and maps. GIS is regularly used to assess problem-solving efforts, inform the community, and build partnerships with other outside agencies. While there were many “success stories” from GIS users, these stood out:

1. By drawing a 500-foot radius around every liquor license establishment, CMPD learned that 50 to 60 percent of all aggravated assaults happened within this area. This helped sell the argument that stores were not being monitored. As a result, officers were trained and qualified to be ABC agents to do inspections.

2. The Robbery Unit used maps of multiple robbery series, broken down by suspect description and method of operation, to convince “higher ups” and the community that there was a need for a task force and more investigators to target robbery series.

Challenges and Lessons Learned

One challenge some users believe still needs to be overcome is that crime analysis is not more widely used due to a lack of marketing or an attitude of disbelief that crime analysis has new, effective technology.

Maintaining a GIS is a time and resource intensive effort. Mecklenburg County Engineering leads the base map effort. They contract with ADC for fly-overs, James Sewall for conversion, and take care of all addressing concerns. A complete county base map is updated every three years. Charlotte City Engineering maintains planometrics as supplemental data, and the County Tax Office just completed a $5 to $7 million project to derive edge of pavement and centerlines for parcels. The new street centerline file should be done by the fall of 1999.

CMPD has learned several lessons regarding information technology acquisition (not specifically crime analysis/mapping technology). One is the importance of negotiating good
contracts and the willingness to stand up to the vendor or walk away. Many vendors say “trust me and sign here,” and many agencies do. Related to that is the need for a well-written contract and the ability to stay flexible. Another lesson is that good project management is the key to successful information technology acquisition. Finally, an agency must be willing to spend money to get the optimal product.
References


Bureau of Research, Planning & Analysis, Organizational Chart, 1999.

Charlotte-Mecklenburg Police Department, Strategic Plan, 1998.

Time Warner Communications, various hardware and network structure diagrams for CMPD, 1998.

Contact Information

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Technology Acquisition Project
Case Study

Charlotte-Mecklenburg, North Carolina
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- 7 LCD projectors (all available to the analysts but 3 assigned to the analysts)

Hardware and Software Costs

CMPD Research and Planning was unable to specify all of the individual costs for hardware and software but estimated that the total since 1995 was approximately $180,000. Of this, about 25 percent came from the Department’s budget and the remaining were grant funds.

Implementation Phase

One of the most important aspects of any information technology is the data—what it is, how it is collected and maintained, and its proclivity for analysis. CMPD has a variety of data sources that they have created in-house, obtained from other agencies, or purchased.

In the fall of 1995, after Planning and Analysis joined together and moved into the government building, the analysts now had network access to the city/county GIS server. At that point, the GIS Team began to expand the number and types of GIS data by going to outside databases and agencies and getting access to or copies of these databases. This increased the sophistication of products that were given to patrol (the primary customer) and began CMPD’s foray into using GIS for research. They contracted with Appalachian State University for creation of the initial police boundaries (done in ArcInfo), but an effort is currently underway to create neighborhood boundaries in house (also in ArcInfo). A programmer/analyst in the CTS Unit (he is soon to move to the Research, Planning and Analysis Bureau) uses ArcInfo to maintain the GIS layers for the police department.

Crime analysts use different data depending on the system and type of analysis or report. Although CAD and Records (incident and arrest) data are on the city’s mainframe, analysts are presently able to receive daily downloads of the Records data (this will change when the new CAD and RMS are implemented). They also use parcel data from the Tax Assessor, traffic accidents from the city’s Department of Transportation, probation and parolee information from
Community Corrections, and investigative report data (i.e., sex crimes and robbery) that a data entry clerk maintains in MS Access. Maintenance of the crime analysis data and server is performed primarily by analysts and interns. If they are unable to solve the problem or it is a network issue, CTS may be able to troubleshoot. If not, the city Information Technology Department handles it.

Typical reports may include a combination of raw data, analysis, charts, and/or maps. Some reports are very basic and give an overview of the information, and some are more statistical and complex, showing change over time or a combination of related data types. Two examples follow.

<table>
<thead>
<tr>
<th>Study Area:</th>
<th>4800 S Tryon St</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Frame:</td>
<td>January 1, 1999 to YTD</td>
</tr>
<tr>
<td>Subject of Analysis:</td>
<td>Arrests</td>
</tr>
</tbody>
</table>

**(General) Place Type of Offense Location:**
- Vehicle Storage 13
- Commercial Place 12
- Outside Location 6

**(Detailed) Place Type of Offense Location:**
- Other Parking Lot 11
- Hotel/Motel 8
- Other Outside Location 4
- Other Commercial Parking Structure 2
- Street, Highway, or Alley 2
- Bar/Tavern/Nightclub 1
- Factory/Plant 1
- Other Business Location 1
- Restaurant/Diner/Coffee Shop 1

**Property Stolen Included:**
- Other miscellaneous 8
- Automotive items 7
- TV/radio/stereo 6
- Track/bus 4
- Cash 4
- Sports equipment 2
- Clothing/furs 2
- Auto parts 2
- Non-negotiable check 1
- Business/personal records 1
- Building interior 1
- Building exterior 1
- Bicycles 1
ArcView training for the analysts was informal and on-the-job. The GIS Coordinator performed much of the in-house training and provided technical assistance. Several analysts have also taken GIS classes at the University of North Carolina to expand their knowledge. Spatial Analyst training will be done on site by certified ESRI instructors. Other department personnel receive some training at the Academy and much more informally through one-on-one with the analysts. Analysts spend one hour of the Community Policing and Problem Solving class at the Academy talking about crime analysis and technology, and they do their own “marketing” of their products and functions on a day-to-day basis.

As CMPD got involved with GIS, they also became more involved with the city/county efforts. The GIS Coordinator (and later other GIS staff) started attending the City/County Users Group monthly meetings and pushed for police representation and involvement. Presently, there is a countywide effort to create a five-year GIS strategic plan, and police department analysts have been asked for input.

Many maps are produced by the analysts — some on a recurring basis and some as a result of requests from officers, investigators, or management. Using the data and software available, analysts may create a map based on their own analytical assumptions or with input from the requestor. The GIS products range from very simple and quick to more complex and time consuming. The latter are often difficult to explain to the intended audience.

Two examples of GIS products follow.
At the time of the case study, the Intranet mapping application had not yet been implemented. It was scheduled to be ready for testing in February. The county GIS team had started with the original specifications that were given to ESRI and then continued to meet with the analysts during the development. During creation, it was being run off of a server at the county, but that will be moved to the police department upon installation. According to the county GIS programmer, there were no plans for a manual or training at this time. The plan was to use the remaining money (from the original $20,000 allocation) to make coding changes to integrate into the CMPD’s planned RMS Oracle database and modify the application appropriately to be run on the Internet for the public.

**Impact Phase**

In the five years since Chief Nowicki arrived at CMPD and was appalled that analysts were still using pin maps, the department has moved to the forefront of crime and GIS analysis in the country. It is true that mapping and analysis technology has come a long way, but this success is also due to the Chief’s vision and ability to provide resources, and to several persevering individuals. The Chief feels that there is still ground to cover and that the department has yet to capture the full power of a GIS’s ability for data integration and analysis. He feels that the quality of the data will improve with the use of automated field reporting and the officers’
growing understanding of how important GIS is. He also believes the demand from the officers and the community will be taken care of through the planned Intranet and Internet applications.

**Benefits to Users**

When the various users of crime analysis were interviewed, the majority felt that the change was like night and day between the products and service prior to 1994 and the present. They felt that the old systems (and in turn, people) were not as timely and responsive. The analysts were often limited by the available technology and were not provided organizational support or opportunities for creativity. Others mentioned that five years ago, Crime Analysis produced reams of paper that meant nothing and did very little analysis, and some noted that crime analysis was wholly reactive before and much more proactive now. While some say that the information now is extremely timely, other users would like to see more timely information than monthly reports. Investigators agree that the present systems offer them analysis and reporting capabilities that were unheard of five to ten years ago when they were tracking cases by memory.

Although no one would attribute CMPD’s problem solving success and crime rate reduction to crime analysis technology, everyone who has used it realizes how important it has been and its contribution to making officers’, investigators’, and administrators’ jobs easier. The analysts produce a variety of reports and hot spot maps on a monthly basis as well as fulfill ad hoc requests for unique analysis and maps. GIS is regularly used to assess problem-solving efforts, inform the community, and build partnerships with other outside agencies. While there were many “success stories” from GIS users, these stood out:

1. By drawing a 500-foot radius around every liquor license establishment, CMPD learned that 50 to 60 percent of all aggravated assaults happened within this area. This helped sell the argument that stores were not being monitored. As a result, officers were trained and qualified to be ABC agents to do inspections.

2. The Robbery Unit used maps of multiple robbery series, broken down by suspect description and method of operation, to convince “higher ups” and the community that there was a need for a task force and more investigators to target robbery series.

**Challenges and Lessons Learned**

One challenge some users believe still needs to be overcome is that crime analysis is not more widely used due to a lack of marketing or an attitude of disbelief that crime analysis has new, effective technology.

Maintaining a GIS is a time and resource intensive effort. Mecklenburg County Engineering leads the base map effort. They contract with ADC for fly-overs, James Sewall for conversion, and take care of all addressing concerns. A complete county base map is updated every three years. Charlotte City Engineering maintains planometrics as supplemental data, and the County Tax Office just completed a $5 to $7 million project to derive edge of pavement and centerlines for parcels. The new street centerline file should be done by the fall of 1999.

CMPD has learned several lessons regarding information technology acquisition (not specifically crime analysis/mapping technology). One is the importance of negotiating good
contracts and the willingness to stand up to the vendor or walk away. Many vendors say “trust me and sign here,” and many agencies do. Related to that is the need for a well-written contract and the ability to stay flexible. Another lesson is that good project management is the key to successful information technology acquisition. Finally, an agency must be willing to spend money to get the optimal product.
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Technology Acquisition Project
Case Study

El Dorado County, California
Sheriff’s Department

This case study focuses on RMS and laptop technology acquisitions. It is one of 18 case studies prepared for the “Technology Acquisition Project” administered by the Institute for Law and Justice in partnership with Government Technology, Inc., and funded by the National Institute of Justice (NIJ), U. S. Department of Justice. The author of this case study is Raymond Dussault, Research Director, Government Technology, Inc. The report has been reviewed by the participating site but should be considered a draft pending final NIJ review.

Background on the Project

In El Dorado County, California, the Sheriff’s Department faced unique geographic challenges in implementing a useful Records Management System (RMS), whereby vital information was to be made accessible to field officers via laptop computers.

Realizing that accomplishing this task could help them use their officers more efficiently, enable officers to use their time on the street more effectively, and enhance their ability to quickly solve crimes, they set out to find the needed funding and a vendor with whom they could design a solution. To fund the solution, the El Dorado County Sheriff’s Department applied for and was awarded a competitive COPS MORE grant designed to help agencies increase their level of community policing through automation. Moreover, El Dorado and the Placerville Police Department, which also received a COPS MORE grant, worked together to develop a unique regional data sharing agreement.

Summary of the Technology Solution

The El Dorado County Sheriff's Department needed to replace a paper-based RMS and report writing process and give their field deputies remote reporting and query capabilities. The technological solution was TRACNET's For The Office RMS software and On The Road field laptop reporting and query software. The software runs on the existing IBM AS 400, integrated PC server on a Novell network. The Department uses TCP/IP over ethernet connections, with Windows 95 and 98 user interfaces. A local area network (LAN) operates in the jail, the Lake Tahoe Substation, the District Attorney’s Office and main administration. The entire system is tied together by a wide area network (WAN) that bridges the Sierra Nevadas and links all the remote stations. Officers in the field are assigned their own ruggedized ACER laptops.
Data Sharing Partnership

In addition to finding a solution that overcame their own geographic and financial challenges, the Sheriff's Department decided to reach out to other local law enforcement agencies, helping the smaller Placerville Police Department to finance and implement the same state-of-the-art RMS and supply its officers with laptop computer technology. At the Sheriff's Department's urging, Chief Steve Brown of the Placerville Police Department also applied for and was awarded a COPS MORE grant. Together they have created a unique partnership that includes a fully operational regional data-sharing agreement.

“Our philosophy is that the information starts in the street with the officer, and we wanted that street-level information available to each officer in as timely a manner . . . as possible,” said Deputy Bob Moccio, the county's current project leader. “The second priority was to share information [and] broaden the base of knowledge that the patrol deputy has available. To that end, we worked with the Placerville Police Department to acquire the same system we were working on, and now we regionally share our data.”

Since the El Dorado County Sheriff's Department is larger than the Placerville Police Department (approximately 100 sworn officers versus 18 sworn officers), automation and the advent of remote laptop computing for field officers will show its greatest effect at the county level. Due to this fact, the case study focuses primarily on the implementation process in the Sheriff's Department and secondarily on the smaller police department. This should in no way reflect on the important advantages of automation to a law enforcement agency of any size.

El Dorado County: An Elevated Challenge

El Dorado County spans hundreds of miles of varied terrain, stretching from an eastern border with Sacramento County to a western border that splits the high mountain lake—Lake Tahoe—in half. In between, the Sheriff's Department is responsible for one of the most rugged and densely forested areas of the nation. The county’s range in elevation is drastic—from 200 feet at the edge of the Sacramento Valley to nearly 11,000 feet in the Sierra Nevada peaks. The county's boundaries encompass a large chunk of the Sierra Nevada mountain range and include the El Dorado National Forest and the Desolation Wilderness, a nationally designated wilderness area.

The county's two ends are connected by State Highway 50, which is only two lanes wide during much of the climb through the Sierra Nevadas. A drive from one end of the county to the other can easily require two hours and gets worse on days when the traffic is not flowing smoothly.

The county seat is located in the west end of the jurisdiction in the city of Placerville, a rapidly growing historic town that is home to many long-time residents, with an influx of new arrivals fleeing the crime and crowding in nearby Sacramento. Not surprisingly, this growth is bringing with it much of the same crime and high traffic problems that the new arrivals had hoped to leave behind.

At the western end of the county, the Sheriff's Department maintains a full-service substation. The substation is located in the largely tourist area of South Lake Tahoe, a California city that borders the state of Nevada and several large casino hotels.
Completely separated from the main Sheriff’s station by the Sierra Nevada’s, the Lake Tahoe substation must be able to subsist entirely on its own. Often, during the winter season, the substation is cut off completely from the main facility due to heavy snow, avalanches, flooding, and mudslides. Individual officers face similar challenges in administering their own patrol areas.

Politically, many key decisions, especially funding decisions, must be ultimately approved by an elected body, the El Dorado County Board of Supervisors.

Assessment and Decision Making Phase

The Problem

Until this project went online in 1998, El Dorado County operated on an entirely paper-based system. Field officers—especially those in remote areas of the county, where they are allowed to deploy directly from their homes—faced a difficult choice each day: physically visit the station to file reports and obtain any current data, or go straight into the field without that exchange of information. In addition, the actual act of writing and filing reports was cumbersome and time-consuming.

“It took a lot of manpower to take care of that whole process. We used to dispatch the officer, [who then] . . . went to the call, then wrote the paper report, and then would put it in the sergeant's basket,” explained Moccio. “The sergeant would look at it, approve that case, then make and disseminate copies to the right departments. The detectives would come in, figure out if the copies were being disseminated to the DA’s office, and so on and so forth. Then a clerk would come in and make copies . . . and re-disseminate that paper, send it to records.”

“Records would take that small amount of information that we had a database for,” Moccio continued, “and enter it into our ancient DOS-based mainframe. If, at a later date, we needed to get any information on a specific report, we had to go back through records . . . to pull that report. If someone else needed the information, like the DA, we would actually make another copy of it and either snail-mail or fax it. If you faxed it, someone on the other end probably ended up making more copies. So you can kind of see that it was a very meticulous paper process.”

Just as difficult a challenge as the mounds of paperwork were the piles of granite that make up the county’s terrain. In addition to the expense, a wireless system—where a deputy punches in a query on a laptop and the query goes to the server and then back—wouldn’t work in an area where canyon walls and mountain peaks determine when your transmissions will connect. Instead, the Department needed to streamline their records data, so that what officers needed in the field could be downloaded to their laptops on a daily basis. To do that meant coming up with more money than the county had available.

Genesis of the Project: COPS MORE Grant Helps Make the Connection

While the county felt something more needed to be done, it was the discovery of the federal COPS MORE program that really got Deputy Moccio and the rest of his team excited about possibilities.
"We had, I think, been a little more aggressive than other departments about keeping track of finance opportunities," said Nancy Egbert, manager of administration and finance at the Department. "So when we started looking at the needs we had, we also knew there was money out there to help us fill the need. And the grant money was geared to help departments do more community policing, which comes down to time in the field, not in the station house. It was a perfect fit for us."

After evaluating their basic paper process, they saw the potential to effectively create 25 new positions from within the department, just by automating record keeping and report writing. This meant more deputies on the street and more opportunities to advance community policing programs while staying within the existing personnel budget.

In addition to eliminating the double and triple workload of a paper-based system, they saw that putting laptops in all their cars meant more time in the field for deputies. In a jurisdiction where a round-trip from distant patrol areas to the Sheriff's station could take up to a couple of hours, making it possible for a deputy in the field to write and file reports, as well as access important information, promised incalculable savings in time and money.

The team at El Dorado—which initially included Moccio, Egbert, and Deputy Theis (now an investigator in the DA's office)—put together their grant application and were pleasantly surprised with the response. Their grant approval was based on a sharing of federal and local dollars, with the U. S. Department of Justice (DOJ) providing 75 percent of $493,000. The team began to look around at their alternatives, bypassing the traditional RFI and RFP processes.

The Placerville Police Department subsequently applied for and was awarded a grant under the same program. Theirs also was a 75 percent grant from DOJ, with the combined (DOJ and city) total of $181,000.

**Procurement Phase**

The Sheriff's Department chose to sole source the project after exhaustive research narrowed the field of qualified RMS vendors to what they viewed as a single choice. That choice was a relatively small firm, TRACNET Corp., based out of Santa Cruz, California. TRACNET's software resides on the department's existing IBM AS 400 server.

"Everybody that receives a COPS MORE grant basically gets pummeled by product literature, so that was one source of vendor leads," explained Moccio. "But we gathered information from everywhere. We went to the conferences, other agencies doing similar projects, and the big name vendors in the field. What really made the difference was that we knew what we wanted."

Moccio's team did two things before they even began talking to vendors. First, they wrote a strategic plan for purchasing and implementing the new system. Second, they set down four specific criteria for what they wanted:

(1) It had to be running successfully in another jurisdiction.
(2) It had to be Windows-based.
(3) It had to support their jail management system.

(4) It had to run on their existing IBM AS 400 server.

Essentially, they created a plan, reviewed the plan, and stuck to the plan.

"The only company that fit that criteria was the company we went with, so it made the final decision to purchase a 'no brainer,'" said Egbert. "An RFI might have been a way of gathering information, but we were afraid that because of our small size we wouldn't get a lot of responses, and to go through a time-consuming, staff-intensive RFP process would have been a waste of money."

For the laptop portion of the project, the Department also sole-sourced the purchase and selected ruggedized Acer laptops.

They are utilizing a combination of extended warranty packages and a three-year-cycle leasing program to ensure they can stay current on technology and quickly replace laptops that are damaged in the field.

To assure that officers remain current on technology, the El Dorado team informed the Board of Supervisors from the beginning that laptops would have to be replaced periodically and that each new hire would have to be issued a laptop. In the Sheriff's Department, $3,000 has been allotted by the county to supply each new hire with the necessary technology.

The results on the RMS side of the project were excellent, with TRACNET turning out to be a strong partner for both El Dorado County and the City of Placerville. As a relatively small and narrowly-focused software developer, TRACNET was willing to give both communities plenty of personal attention, regularly tweaking their software package to meet specific criteria. Comments like this one from Chief Brown are typical in El Dorado: "They [TRACNET] are super, super people," he said. "In my mind, they are golden, absolutely solid gold."

Implementation Phase

Installation Process

The installation process in both agencies went smoothly. The only significant challenge has been in locating a laptop mount. The deputies typically complain that all the mounts end up in the way during the course of the day, and Deputy Moccio has run into a different problem altogether.

According to Moccio, each time they replace a laptop with a new version, the location of electronic ports and CD ROM drives seems to change. This means that the intricate series of cabling in patrol cars must be re-routed to accommodate the new computer, and the mount must be re-adjusted to fit the computer without blocking the necessary ports.

There is a definite need for a standardized configuration of ports on the laptops designed for use in law enforcement.
Post-Installation Process: Implementation from the Bottom Up

The greatest challenge for El Dorado lurked just around the corner, after implementation and during the training process. Because two deputies spearheaded a project that brought on a great deal of change to the department, some veterans were immediately resistant, going as far as refusing to complete their reports electronically. Lacking rank, Moccio and Theis had to rely on the Sheriff to ensure that all the mid- and upper-level personnel were behind the project, a strategy that was nearly derailed when elections mid-way through the implementation and training brought on a new Sheriff.

"If everybody wasn't willing to use the system, essentially eliminating our old paper-based record keeping system—and there were several veterans that were intimidated by change and technology—then automation would not work," said Dennis Theis. "The key was getting the new Sheriff behind the system. We needed him to say, 'If this guy doesn't want to use this system, he needs to find another job.' It sounds harsh, but if an agency is not willing to take that stand on new technology, then they shouldn't start the process."

The new Sheriff, initially ambivalent, did step in and take a supportive stand after steady lobbying from the project team. The project is now fully implemented and in regular use by the department. As an added bonus, the City of Placerville, which started the project a year later, is also on-line with a new IBM AS 400 server and TRACNET's RMS and report-writing software.

Training

Training was another issue that El Dorado addressed in a proactive manner. They had a wide range of knowledge levels in the Department, from those who could not find the computers' "on-off" switch to a handful who were regular users outside the department's offices. The Moccio team took a two-pronged approach. First, they set up basic computer and RMS training classes designed to catch the middle of their knowledge band. They realized that this meant more sophisticated users would feel the pace was slow and the least knowledgeable would feel lost, but they did not have the funding to set up individually-paced courses. Second, they captured the two ends of the spectrum with a special program. Sophisticated and motivated users were identified on each shift and were labeled the Department's "power users." These individuals became on-shift mentors to anyone struggling with the automation process.

Implementation in Placerville

In the city of Placerville, they have seen a smoother transition from the past paper-based system to the automated RMS and laptop computer system. This smooth transition was attributed to three important factors:

1) Chief Brown led the process for the city, lending it instant cache;
2) It is a smaller department; and
3) It has a younger group of officers, who are already adept at using technology.

While the regional sharing of data between the two agencies is now a reality, the process of hammering out the agreement was not without its challenges. When the city of
Placerville first applied for grant funding, they did not think it was likely they would get it; so in the early stages of the grant writing process, they agreed to house their data on the Sheriff's Department server. The two agencies also agreed to earmark a portion of any money received to upgrade the Sheriff's Department server.

When they were awarded the grant, however, the Placerville Police Department immediately had second thoughts about this plan. The issue was primarily territorial, with the Police Department wanting a greater sense of control over their own records. The issue was resolved by the Police Department purchasing its own, though smaller, IBM AS 400 server.

**Impact Phase**

Probably the most difficult part of this project is just now beginning. Anecdotally, El Dorado County is convinced of the technology's benefits for the department, but they are having trouble quantifying the payoff. Initially, they feel, there may have even been an increase in staff-hours expended, as the staff switched over to the new system. The next step for the county is to track and report their results.
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Technology Acquisition Project
Case Study
Golden, Colorado, Police Department

This case study focuses on computer aided dispatch (CAD) and records management system (RMS) technology acquisitions. It is one of 18 case studies prepared for the “Technology Acquisition Project” administered by the Institute for Law and Justice in partnership with Government Technology, Inc., and funded by the National Institute of Justice (NIJ), U. S. Department of Justice. This case study was written by Steve Pendleton, President, Information Analytics, Inc.; and Julie Wartell, Senior Research and Technology Associate, Institute for Law and Justice. The report has been reviewed by the participating site but should be considered a draft pending final NIJ review.

Abstract
The Golden, Colorado, Police Department has been a fully automated law enforcement agency since 1990. Utilizing a DOS-based system (CrisNet) from Megg Associates, the Department recorded calls for service and criminal and non-criminal incidents on-line. In 1997, the CrisNet application began to experience unexplained failures. On several occasions, the system’s master index became corrupted, leaving police officials without a records management system for several weeks at a time and in doubt about the veracity of their archives.

In response to these failures and the city’s opinion that the manufacturer was not responding effectively, the city engaged Information Analytics, Inc., a public safety consulting firm, to assist them with an evaluation of the system and advice in resolving the situation. An initial evaluation of the system found no explanation for the failures. As a result, the city decided to replace their current CrisNet system with an upgraded version or a system from a different manufacturer. During the following 12 months, the city evaluated their police and fire department information technology (IT) needs and procured a new a public safety IT system. As a result of this process, the city selected HTE, Inc. of Lake Mary, Florida, to provide the new system. The system included hardware, software, training, implementation, and warranty services. The system applications (to be installed in phases) included computer aided dispatch (CAD), law and fire records management (LRMS/FRMS), case management, juvenile records, citations, warrants, criminal intelligence, document imaging, mug shots, mobile data, and a municipal court system. While HTE manufactures the core elements of the $800,000 system, portions of the system were provided by third party vendors. The mobile data system, for example, was provided by SCA, Inc.; the system hardware was provided by IBM. HTE’s willingness and ability to act as a prime contractor and systems integrator was an important factor in their selection.

Given the unpredictability of the CrisNet system and the fact that the city had not budgeted for a public safety IT upgrade, the city elected to use an expedited procurement method. As a first step, the city engaged an experienced public safety consulting firm to evaluate the CrisNet system. When the decision to replace or upgrade the current system was
made, the consultant helped the city to determine their IT needs, estimate the cost of a replacement system, and carry out the procurement process. During the evaluation and procurement phase, the consultant expended approximately 225 hours on the project. The city was represented by a computer committee, which was composed of representatives from the police, fire, IT, and finance departments. During the actual evaluation of the proposed systems, the committee was expanded to include future users in order to facilitate organizational ownership and capture a broad range of input.

Implementation on the new system began in January 1999. The CAD, LRMS, and FRMS went into operational use in June 1999, and the remainder of the system is expected to be completed by late summer or early fall. Despite the higher than expected cost for the new system, the city looks forward to enhanced functionality and reliability. The addition of mobile data and an integrated court system are also expected to have a significant impact on productivity.

While Golden continues to call on Information Analytics for advice and counsel during the system implementation, the day-to-day responsibility for the deployment is being led by Captain Bill Kilpatrick, Commander of Administrative Services for the Golden Police Department and the HTE project manager.

Background on the City and Police Department

Golden, Colorado, is famous throughout the world as the home of the Coors Brewery. Located on the western edge of the Denver metropolitan area, the city of Golden has 15,000 residents, with a daytime population of approximately 25,000. Despite its small size, the town has a strong commercial base. The Colorado School of Mines and Jefferson County offices are located within the city's borders, and Coors Brewery is just outside the city limits. The city continues to develop strong retail, restaurant, and other service-oriented business bases, as well as expanded warehouse and industrial activities.

Law enforcement services for the city are provided by the Golden Police Department. Established in the late 1800s, the Department currently has 35 sworn and 11 civilian personnel. Organizationally it is divided into two divisions. The Field Operations Division is responsible for patrol, traffic enforcement, and criminal investigations. Thirty sworn personnel staff this Division. The Administrative Services Division is responsible for community services, code enforcement, communications, records, public information, and internal affairs. Five sworn and 11 civilian personnel staff this Division. The Department currently responds to approximately 27,000 calls for police service and records 5,000 criminal offenses yearly.

Assessment and Decision Making Phase

Problem Statement

From 1990 to 1997, the police and fire departments used a CrisNet computer aided dispatch (CAD) and Law Enforcement Records system supplied by Megg Associates of Richmond, Virginia. The application used the DOS operating system and an Advanced Revelation database. Running in a Novell Netware environment, the application was accessed from approximately 20 workstations located throughout City Hall. The GPD
routinely recorded all operational activity on the system. Except for the forms required by other agencies and some written statements, GPD maintained no other record of its activities. At last count, the system contained more than 260,000 entries in the master index.

Around 1996, the Department started to look at replacing the RMS because of repeated problems. There was no money available, but by late 1997 the system had suffered a number of serious failures. In each case, the system’s master index was corrupted and the system was unusable for several days to a week at a time. Given that the Department recorded all its police information with this system, the Chief and other officials were concerned about the viability of the system. In addition, the Department had been awarded a grant by the U.S. Department of Justice to implement a mobile data system.

Based on the system failures and the fact that the CrisNet application did not support mobile data connectivity, the city decided to hire a consultant to help evaluate an alternative course of action. The lead people in the Department and city decided that they did not have a high level of law enforcement IT expertise and could benefit greatly from outside assistance. A neighboring police department had recently gone through the same process and recommended their consultant to Golden. Before finalizing a contract, he became too busy and in turn recommended Information Analytics. Based on a presentation given in January 1998 and the high level of police and IT expertise and lower price, Information Analytics was hired.

**Needs Analysis and IT System Evaluation**

Beginning in February, Steve Pendleton, the lead consultant for this project, began the evaluation. Prior to beginning the project, the city established a computer committee composed of the following individuals:

- Russ Cook, Chief of Police
- Bill Kilpatrick, Commander of Administrative Services
- Al Reffel, Commander of Field Operations
- Carlos Gonzalez, Director of Information Systems
- Lorie Gillis, Chief Financial Officer
- Pat Osborn, Records Manager
- Mark Wallace, Fire Chief

With the potential for a catastrophic system failure, the consultant first focused on alternatives for stabilizing the CrisNet system. Preliminary interviews with the records manager and the IT Director indicated that the vendor was unable to resolve the stability problems. Further, the city mistrusted the vendor because they felt the vendor had been unresponsive to their issues. Given the age of the CrisNet application, replacement of the system was considered a primary alternative. The consultant recommended an IT needs analysis instead of a simple search for solutions to the CrisNet problems.

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1. After the selection process was well under way, the city moved the CrisNet application to a Windows NT environment. After that change, application stability seemed to improve substantially.
The needs analysis included both a judgment of the sufficiency of the current system and a review of how well the CrisNet system was meeting the Department's needs. The needs analysis focused on the following subjects:

- What business functions are supported by the present system?
- What business functions are not fully supported by the present system?
- What general information is being captured in the present system?
- How does the current system benefit the police and fire departments?
- Which features and functions of the present system are especially helpful?
- Which features and functions of the present system could be improved?
- What features and functions could be added that would improve the system?
- To what degree do police and fire personnel use the system?
- What is the average level of computer literacy among users?
- How well has the system functioned?
- What financial and human resources does the city have at its disposal to replace the system?
- What other systems does the city have that might be interfaced to the law or fire systems to enhance productivity or improve the work product?

To ascertain the nature of the failures experienced by the CrisNet system, the consultant also interviewed knowledgeable city personnel and a representative from Megg Associates.

Early in March, Information Analytics submitted its initial report to the computer committee on the CrisNet system. The report offered the following conclusions:

- The CrisNet system provided a broad range of functional capabilities. These functions were most effective in the gathering of data, less effective in disseminating data, and least effective in acting as a decision support mechanism. The CrisNet application version installed in Golden was considered below the expected and required functional norm for supporting the police department.
- The CrisNet application version installed in Golden used the DOS operating system and the Advanced Revelation database management system. DOS and Advanced Revelation are antiquated, and DOS was never intended as a multi-user operating system. Hence the system was architecturally antiquated and would become increasingly difficult to support.
- Megg Associates offered no convincing reason or suggested resolution for the failures that had plagued the CrisNet system. As a result, it was determined that the city's implementation of CrisNet was unstable and in danger of an unrecoverable failure.
- As the police and fire departments took on more responsibility and grew, the need for more effective information technology (IT) was also growing. The CrisNet application version installed in Golden did not supply interfaces to external systems such as the E911 system or a mobile data system, which would significantly enhance the efficiency of information processing for both departments.

In light of these findings, the consultant recommended that the city replace the CrisNet application. The consultant's report detailed three options for accomplishing this goal. First, the city could upgrade to the latest version of CrisNet. Second, the city could identify
an acceptable replacement product and purchase it through a sole source. Third, the city could develop a Request for Proposal (RFP) and obtain a new system through a competitive procurement. Of these recommendations, the consultant recommended the third option, since it would focus the users on articulating their needs and help to control the cost of the replacement system.

**Procurement Phase**

*Request for Information*

After reviewing the consultant's report, the computer committee elected to conduct a competitive procurement. While Megg Associates could propose their most recent version of the CrisNet application, the city could also evaluate other vendors and solutions. Concerned about the stability of the CrisNet application, the city wanted to expedite the procurement. To do this, they chose to use a Request for Information (RFI) instead of a Request for Proposal (RFP). The basic difference between the two documents is that an RFP typically describes the functional and architectural requirements of the system in great detail and requires the vendor to respond directly to each requirement. The RFI typically, and in this case, provides a general description of the agency’s needs and asks the vendor to describe how their standard product meets those needs. The RFI would be used to develop a short list of vendors, which could be evaluated directly by means of product demonstrations and customer references. The RFI also minimized the city's consulting costs. Finally, the RFI could be used to develop a budget for the replacement system.

During the early part of April 1998, Information Analytics developed the RFI and a list of prospective vendors. After approval by the committee, the RFI was sent to 19 prospective vendors on April 20th. A week after release of the RFI, the consultant also made follow-up calls to the vendors to answer questions and encourage a response. Nine responses were received by the May 11th due date.

Given the large number of proposals that were received, the committee directed Information Analytics to conduct an initial evaluation of the responses. Based on this evaluation, the committee would then continue the evaluation of the highest rated vendors. The consultant’s evaluation reviewed the completeness of the proposals, price estimates, proposed operating systems and database management systems, available system interfaces, information about the vendor’s experience and stability, the scope of the proposed solution, and other relevant information. After reviewing the responses, the committee decided to evaluate four vendors further.

*Vendor Questionnaires*

Since the city had not included specific functional or architectural requirements in the RFI, the consultant next developed more discriminating requirements for the finalists. These

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2 In this project the RFI provided vendors with a general description of the city’s public safety IT needs without defining specific functional requirements for the replacement system. Responding vendors were required to describe their applications and provide references, pricing, and implementation schedules.
requirements were then included in a questionnaire used by evaluators during the vendors' oral presentations. In developing the questionnaires, Information Analytics sought to replicate the breadth and depth of an RFP in order to provide the committee with a highly discriminating evaluation instrument. Given the breadth of the city's IT requirements, Information Analytics developed three separate questionnaires: CAD, RMS, and Shared or Peripheral Systems. Dividing the questionnaires into these basic functional categories also allowed for natural break points in the presentations and allowed future users to attend those sessions in which they had a particular interest.

To provide sufficient evaluative depth, the questionnaires addressed a variety of technical and functional topics. From a technical standpoint, the questionnaire inquired about the architecture of the proposed systems, the programming languages that were used, the operating system and database management applications, and other relevant technical information. Reflecting the consultant’s philosophy that public safety applications should be chosen primarily on their functional capabilities, the bulk of the questions concerned the functional capabilities of each system. To facilitate the functional evaluation by non-technical personnel, the questionnaires were organized by work functions. For example, the CAD questionnaire sequentially addressed call taking, dispatch and unit-control, CAD administrative functions, and reports and search methods to develop a logical picture for the evaluator.

By using a standard questionnaire, the committee was able to control vendor presentations, ensuring that each vendor addressed the same subjects and no significant area was missed. To incorporate the views of future users, the committee invited selected staff members to participate in the oral presentations. To facilitate feedback from this large group of observers, each question had three potential ratings: unsatisfactory, satisfactory, and exceptional. Observer comments were also solicited.

To avoid a stilted presentation and allow the vendors to point out the benefits of their systems, the lead evaluator typically directed vendors toward a given functional area and then allowed the vendors extensive latitude in the order and style of their presentations. Once a functional area had been covered, if any questions remained the lead evaluator directed the vendor back to those areas. In order to ensure that both vendors and city evaluators had sufficient time to view the proposed systems, only one finalist was scheduled to present on a given day. Vendors were also supplied with advance copies of the questionnaire so that they could prepare, making the best use of both their time and the city’s.

By the end of July, each of the four semi-finalists had completed their oral presentation. Information Analytics then compiled the questionnaires and provided a report to the computer committee. After discussing the report and the presentations, the committee decided on two finalists. The vendors who did not make the final list both had reasonably good CAD applications that had been proven in sites of similar size and complexity. However, one had only just begun to develop a law enforcement RMS application and had no fire RMS application at all. The other vendor was in the middle of developing a new law enforcement RMS application and also did not have a fire RMS application. As a result of the immature state of the records applications, neither was well integrated with the proposed CAD systems. At this stage of the evaluation, price was not a decision criteria.

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3 These same staff members were also nominated to participate on implementation teams later in the project.
Finalists

Interestingly, the two finalists were at opposite ends of the scale in size, system architecture, and in almost every other way. HTE, Inc., of Lake Mary, Florida, proposed a traditional mini-computer architecture and a very mature application set. Running on a proprietary IBM AS-400 mini-computer, there was concern that the HTE solution was antiquated and might be too restrictive. But HTE had many factors in its favor. First and foremost, reference sites reported no reliability problems with the HTE applications. Second, the HTE application set was functionally broad. It provided CAD, law and fire records, intelligence, case management, municipal courts, warrants, and many other modules. More importantly, all these applications were well integrated. The HTE product set was also deep. Functionally, the applications exceeded the CrisNet application and equaled others that the committee had seen. Fourth, HTE’s corporate stability was exceptional. Having been in the municipal software business for more than 15 years, HTE had 1600 municipal customers, including more than 600 public safety agencies.

The other finalist was Vision Software of Castle Hayne, North Carolina. Utilizing Windows NT, SQL Server and a Microsoft Windows user interface, the Vision product represented the leading edge of the public safety software industry. The committee was excited by the promise of the Vision technology since it was based on the Microsoft Windows platform and used a flexible, open database. According to the company’s proposal, their products had equivalent breadth and depth to the HTE applications. Like HTE, Vision had been supplying public safety systems since the late 1980s. Vision’s systems had been developed and deployed on Microsoft DOS until 1996 when they migrated to the Windows NT platform. However, Vision’s corporate stability was not obvious. Vision was significantly smaller than HTE, with fewer sites and personnel.

Prior to selecting a vendor, the city wanted to assess the corporate strength, project management capabilities, and other services of each finalist. To do this, the computer committee asked Information Analytics to conduct a customer satisfaction survey of each finalist’s reference sites. In order to obtain relevant information about the vendors’ performance, the list of survey sites was limited by the following criteria:

- Sites were to have a similar population to the city of Golden.
- Systems in these sites were to have been installed within the last two years if possible.
- The sites were to be using the same applications as those being evaluated by the city of Golden.

To obtain consistent information, the interviewers again used a standard questionnaire. The following questions were included in the survey:

- Number of calls for service
- Numbers of various RMS records
- Date the system was purchased
- Modules purchased
- System price
- Had the system been accepted? If so, when? If not, what was the current status of the project?
Did the system implementation correspond to the vendor's original project schedule?
If there were delays in the project, what caused the delays?
Was the customer satisfied with the contracting process? If not, why not?
Was the customer satisfied with the vendor's project management? If not, why not?
Was the customer satisfied with the vendor's training program? If not, why not?
Was the customer satisfied with the vendor's customer support? If not, why not?
Based upon their experience with the project, what were the vendor's strengths?
Based upon their experience with the project, what were the vendor's weaknesses?
Based upon their use of the products purchased, what are the products' strengths?
Based upon their use of the products purchased, what are the products' weaknesses?
Would they do business with this vendor again? If not, why not?

Approximately 30 sites were contacted, and 11 interviews were completed. While each site was asked the same list of questions, interviewees were also encouraged to elaborate on their experience with the vendor. This provided additional information that might not have been captured by the questionnaires. Once the survey was completed, the consultant submitted an analysis of the results to the computer committee.

Not surprisingly, the report highlighted different issues for each of the finalists. For example, of the five HTE sites surveyed, it was significant that two reported they would definitely buy from HTE in the future, two reported they would consider other vendors as well, and one reported that they would not buy from HTE again. Of the six Vision Software sites surveyed, five of the six sites reported that they would buy from Vision again, but four of the sites reported significant delays or problems implementing the system.

After the site survey was completed, the computer committee also scheduled a visit to each company and nearby reference sites. In the case of HTE, the computer committee traveled to HTE's corporate headquarters and to their installation in Kissimee, Florida. Vision Software invited the committee to attend their annual user's conference and visit reference sites in Altamonte Springs, Florida. The committee felt it was important to have the consultant along on the trips because he guided them in what to ask and what to look for. Although the city made a substantial investment on the trip, these visits ended up being a significant factor in the final decision.

While the survey information had provided the committee with a broad view of each finalist, the site visits allowed each committee member to get a more intimate view of the vendor and their products. By attending the Vision user conference and visiting user sites for both vendors, the committee members were able to ask many pointed questions and see the products in operation. Committee members were also able to ask questions about system administration, staffing, maintenance, and other subjects that were not the direct responsibility of the vendor. During the site visits, the committee was able to talk to IT specialists, records clerks, dispatchers, police officers and commanders, and many other
users about their experience with the systems. The site visits clearly supplemented the telephone surveys in many areas.

The committee members also got a chance to see each company up close. Through the Vision user conference and the visit to HTE corporate headquarters, the committee was able to meet and talk to vendor personnel who were not involved in the sales process. Throughout this trip committee members had the opportunity to talk to project managers, support engineers, and other vendor personnel about their jobs and see how they responded to customers. Such conversations provided the committee members with a better understanding of the corporate cultures and circumstances.

**Final Selection**

Based on all the information that had been gathered and extensive deliberation, the computer committee selected HTE to supply the new system in September. The committee cited several key factors as their reasons for choosing HTE. First, they felt that HTE had more experience and greater corporate and financial stability. Second, HTE offers a broad line of municipal applications that spans public safety, parks and recreation, finance, and many other municipal functions. Thus the city could implement other municipal IT solutions in the future. Third, the HTE solution is built on a solid computing platform, the AS-400, and maintained by a strong computer vendor, IBM Corporation. While the committee acknowledged that the AS-400 is not a leading edge system, they felt that the solution set could provide high reliability without a significant systems administration or maintenance requirement. Fourth, the HTE application set offered a high degree of integration (although several of the systems were from third party vendors). HTE also had a demonstrated history of interface development. The fact that several other metro Denver cities had purchased HTE systems in recent months was a significant decision point as well.

The final system configuration included CAD, law and fire records management, case management, juvenile records, citations, warrants, intelligence, document imaging, mug shots, bar coding equipment, mobile data applications and hardware, and a municipal court system. At almost $800,000 for this system, the computer committee had asked the City Council to spend more than the original estimate of $350,000 to $750,000. However, all agreed that the breadth of the solution and the high degree of integration between the HTE applications justified the cost.

In their evaluation of Vision Software, the committee was most concerned about two issues. First, the Vision product line was broad but not deep. The Vision applications covered most of the functional areas of the CrisNet product but did not offer as much functionality as either the CrisNet or HTE products. A second consideration was Vision's corporate strength. Vision had grown dramatically since the introduction of its Windows product line by sales and installed sites. Despite the presence of outside investors, the committee was concerned about the company's long-term viability in a notoriously unstable marketplace.

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4 Original cost estimates did not include the mobile data system. This component made up more than one-quarter of the final system cost. Golden had received $30,500 through COPS MORE 96 for mobile data/laptops.
**Contract Negotiations**

**Overview**

Contract negotiations between the city and HTE began in late October and were completed at the end of December. Since the consultant was familiar with public safety IT contracting, the city asked him to act as their lead negotiator. The consultant was able to tell Golden when HTE was overcharging for an item or on what issues they should be firm. Signature authority remained with Police Chief and the city’s chief financial officer (CFO). The city’s Corporation Counsel provided legal oversight of the contract documents.

While the computer committee had selected HTE, a contract was not a certainty. From the city’s point of view, the contract negotiation process had two significant components: price and contract terms. With the system initially priced at more than $900,000, the HTE price proposal was substantially higher than the cost estimates provided to the city council in May. In the CFO’s opinion, the city council would authorize an expenditure of up to $750,000. To bolster the city’s chances of reducing the price, they authorized the consultant to undertake a comparative pricing analysis. Once again, the consultant contacted HTE sites and obtained pricing data. Using this data and their knowledge of IT price proposals, the consultant made a detailed analysis of the proposal. From this analysis, the city was able to detail the actual price paid for the proposed applications by other jurisdictions.

Final agreement was also conditioned on the development of mutually acceptable contract terms. As expected, HTE opened the negotiations by recommending that the parties use their standard sales contract. The city agreed to use the HTE contract as a starting point but required extensive modifications. As with most vendor contracts, the language was slanted towards the vendor and did little to protect the customer. For example, the contract did not recognize HTE’s role as a prime contractor and system integrator. This made it more difficult for the city to hold HTE responsible for delays or failures caused by HTE subcontractors and suppliers. The contract terms also treated HTE like a supplier by beginning warranties and making payments due on delivery. The city argued that HTE was an integrator of a complex system and that the city had a right to see the delivered items operating before the warranty commenced or payment was made.

**Negotiations**

Despite the knowledge that the contract negotiations were an important step, the city’s team entered the negotiations somewhat unorganized. Other than the consultant’s review of the contract terms and the price survey of other HTE sites, the team had no formal strategy for the negotiations. In addition, until the day of the call, the consultant was functioning as an advisor and not the lead negotiator. His last minute appointment as the lead left no time for the city to advise him of their specific requirements for the contract and the negotiating boundaries. Because of the lack of coordination, HTE was able to get the city to name a target price for the system during the first session. This gaffe effectively placed a minimum price on the system. Despite this initial mistake, the city recovered well and was able to reduce the price to under $900,000 by mid-November.

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5 The increased cost could be partially explained by the addition of several components to the system, but justifications would still have to be developed for the City Council in order to receive approval for the new system.
Once the list of hardware and software was agreed upon, the pricing negotiations centered on making sure that the contract documents added up correctly and the payment terms were defined. HTE wished to recognize revenue immediately. They believed that their products were tangible off-the-shelf goods and that the city should pay for them on delivery. The city felt that the components were being combined in new ways and was unwilling to pay for them until their operation was demonstrated. Further, the city wanted to withhold a portion of the payments until the entire system was operational in order to ensure completion of the project.

In the spirit of negotiation, both sides compromised. HTE agreed to specific tests that would demonstrate the operation of the components they were delivering prior to payment. The city agreed to allow all the warranties to commence after the complete system was operational. The parties also reached agreement on the payment terms. By granting HTE 50 percent payment for hardware and software products when they were delivered, with the remainder due when their operation could be demonstrated, the city was able to create an effective hold back. HTE also agreed to bill their services as they were incurred instead of receiving a portion of the service funds up front.

As a part of the contract, HTE also offered the city a unique 30-day money back guarantee. This guarantee provided that if the city did not like the HTE applications for any reason they could return them without penalty during the first 30 days after delivery. While this guarantee seemed like an important protection at first, it proved to be almost impossible to carry out a realistic test in the first 30 days. Prior to any testing, the AS-400 computers and software applications had to be installed. Once they were installed, city employees would have to conduct the testing. Since none of the employees had been trained on the HTE applications they were unable to independently test the system. As a result, the training classes held during the first 30 days were the only semblance of testing conducted.

The city’s decision to use an RFI instead of a more detailed RFP also created issues during the contract negotiations. Without a formal set of system requirements and scope of work, the city was faced with either accepting HTE’s proposal or developing their own functional requirements and scope of work. To resolve this problem and move forward with implementation, the parties agreed to develop the scope of work after contract signing. If they could not agree on the scope of work, the contract would terminate without prejudice. While this plan eventually resulted in the development of an acceptable scope of work (SOW), the process was hampered by HTE’s unfamiliarity with developing a SOW and the city’s desire to contain its consulting fees.

**Implementation Phase**

**Overview**

The system implementation began in January 1999. Golden planned to go live with everything at the same time but was warned that it was unrealistic. Some modules were

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6. On many occasions, the contracts were returned because of incorrect quantities, column totals, or other minor errors.

7. The HTE contract went so far as to make the customer liable for payment either on delivery or ten days after the goods had been shipped, regardless of whether they had been received.
delayed a bit, but this was not the fault of HTE. CAD and police and fire records were operational by early June. Both the city and HTE assigned project managers to coordinate the project. Other HTE sites suggested that Golden not accept a particular HTE project manager. In this instance, the HTE project manager had been recently promoted from a position as a trainer, and she also acted as a trainer on several occasions. Golden’s project manager, Captain Bill Kilpatrick, was assisted with system implementation by several key staff members. Mr. Rocco Snart from the city’s IS Department trained as the AS-400 administrator and completed most of the other hardware modifications required for the new system. The Records and Communication managers were the respective team leaders for the police records and CAD implementations.

The implementation project began with a kick-off meeting in Golden. During this meeting, the two project staffs were introduced. The team discussed project scheduling, training programs, data that would be supplied by the city, and other important project issues. Shortly after the kick-off meeting, the AS-400 computers and HTE applications were delivered and installed. Team leaders for the various modules completed system configurations so that the system would match Golden’s operations, and required data was entered.

Some training occurred prior to implementation; HTE started working with “behind the scenes” people in January. They would spend one or two days explaining the new system and give them homework, then come back and do more. It was a gradual but effective approach. For CAD, HTE first trained two people on the entire system and then the remaining users all at once—one and one-half days, one day prior to implementation. A train the trainers approach was used for the RMS. Two officers with an interest and aptitude were trained, then proceeded to train the remaining line level users with two days of hands-on training. A few system problems were identified during the training (and during implementation), but HTE was able to make the changes and users were (and still are) notified with memos. The training was very specific to the particular system, and staff felt that was a weakness—the instructors could not answer certain questions about integration or interface with other related systems. Although HTE support was considered “very good,” they provided very little documentation, so Golden relied on a neighboring city and their own notes and memos for a “user manual.” Post-implementation support was to be provided by HTE as a percentage of the contract. There was also a clause that stated that HTE could not raise costs more than a certain amount for the first three years.

**Data Migration**

Data migration in Golden was a relatively minor issue. After evaluating the cost and time implications of migrating data from their old system to the HTE applications, police and fire officials decided not to migrate any call for service or records data to the new system.

Unlike the migration of operational data from the old systems, Golden was required to program the new HTE systems so they would function according to Golden’s practices.

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8 Golden City Hall houses both the police and fire departments. A recent remodeling of the facility made it an ideal location for the central computers and associated equipment. The computer room had both an uninterruptable power supply (UPS) and a back-up generator, which would provide power to the systems in case of an external power failure.

9 City officials were also concerned about the veracity of the data because of the repeated failures of the CrisNet system.
This process involved entering unit numbers, officer and employee profiles, call types, response procedures, and many other items. While Golden was able to use the profiles created by a nearby jurisdiction that had recently purchased from HTE, much of the information had to be entered manually.

**Implementation Issues**

In general, HTE met their proposed implementation schedule with the exception of several third party subsystems. HTE also remained within the projected budget.

While the implementation proceeded on schedule, two significant issues arose during the implementation. The first was the completion of the scope of work (SOW). By agreement, HTE assumed responsibility for drafting the SOW. The city felt initial draft of this document, prepared by HTE’s first project manager, lacked important details and was returned to HTE with several suggestions. At this point, HTE assigned a new project manager, and as a result, work on the document stopped for a time. When the new project manager did resume work on the SOW, the city’s requirements for the document stretched her abilities and available time. After numerous revisions, the document was finally completed (although it was still not signed off as of August). That this process took until mid-May is evidence that the process for developing the SOW was flawed. As a statement of responsibilities that could be used to guide the implementation effort and create shared expectations, the SOW failed; by the time it was finished, the implementation was almost complete. One might conclude that the city’s continued insistence on developing the SOW kept HTE focused on completing the implementation. In effect, it is possible that the SOW acted as a 100 percent hold back, since the contract could be voided entirely if the parties could not agree on the SOW. In retrospect, many involved believe that the implementation process would have been better facilitated by the inclusion of detailed requirements in the procurement documents and by the city’s insistence that interfaces and other responsibilities be detailed prior to contract signing.

The second issue concerned the third party products that HTE had included in the bid. As the system implementation moved forward, the lack of participation by the companies supplying the document imaging, mobile data, and mug shot subsystems was evident. Despite the expense of these systems, the suppliers failed to survey the site, provide detailed system designs, or coordinate their work with HTE. Golden expressed concern about these deficiencies to HTE on several occasions, even halting payments on one occasion and notifying HTE that they might be in breach of the contract. Unfortunately, the situation did not improve significantly. As of July 1st none of these systems had been installed. While HTE’s failure to control their subcontractors may have been unavoidable, the lack of detailed system specifications may have contributed to the problem.

**Impact Phase**

**Evaluation and Replacement Process**

Golden’s evaluation and replacement process was somewhat unusual. Most agencies either plan for periodic replacement of IT assets or do so through a pre-funded project. The city of Golden was surprised by the recurrent failure of its CAD and RMS application and was forced to conduct an emergency replacement. The replacement of the CrisNet...
system was made all the more urgent since Golden maintained all of its files on-line. These circumstances heavily influenced the city’s evaluation and replacement process in several ways. First, not having purchased a technology system in more than seven years and having a small IT staff, the city elected to enlist the aid of an experienced IT consultant. Second, the instability of the CrisNet system dictated an emergency procurement process. As a result, the city chose to utilize an RFI rather than an RFP.

Even though the system has only recently been deployed, some lessons about the process have already emerged. First, the city’s decision to use an RFI rather than a more detailed RFP had both positive and negative results. On the positive side, by not conducting a needs analysis and developing detailed procurement specifications, the city was able to accelerate the procurement process by six weeks or more. The RFI process also allowed the city to estimate the cost of the replacement system without making a procurement commitment. The city was also able to contain their consulting fees.\(^\text{10}\) Finally, Golden felt that they got more bidders/vendors with an RFI.

But the use of an RFI had negative results as well. The RFI did not provide the vendors with detailed functional requirements for the system. The proposed systems were based on the vendors’ standard products, and the configuration of peripheral systems was especially vague. One person stated that “we didn’t really know what we were getting.” This forced the city and their consultant to spend additional time during and after contract negotiations defining the exact requirements for the system. It also meant that they had to spend considerable time working with the supplier to define the correct components for the document imaging, mug shot, and other peripheral systems. While there is no specific evidence, it is suspected that the RFI’s general requirements induced the vendors to pad their proposals to cover the cost of any unknown risks. As such, the initial proposal prices were considerably higher than the negotiated prices.

With this process, Golden took some risks. The contract only requires HTE to deliver their standard applications and does not contain specific functional requirements. If the system does not meet Golden’s requirements or is at odds with promises made by HTE personnel during the sales process, the city has little recourse. Without a needs assessment, the city also ran the risk that the final solution would not provide the same functionality as the current system or that it would not support some parts of the user’s business process. Given the instability of the CrisNet system, the city felt this decision was warranted.

**Computer Committee**

While the police leadership did not initially consider the computer committee a significant strategic issue, in retrospect the participants believe the committee improved the process in many ways. Members of the standing computer committee represented major functional areas of the Department, and their knowledge helped make up for the lack of a formal needs assessment. Staff input into the process was greatly increased for each functional area.

\(^{10}\) It is not certain that the total consulting fees were less, as the consultant spent considerable time during and after the contract negotiations reaching agreement with HTE as to the proper performance and delivery standards.
As the evaluation and procurement evolved, each member built a larger body of knowledge about what they would need to meet the needs of their area and what the proposed products could supply. The committee members also developed respect for each other and each member’s ability to evaluate the proposed systems. Because of their involvement in the selection of the system, the committee members developed a sense of ownership in the new system and were better prepared for the system implementation.

**New Capabilities Enabled by the System Replacement**

While system stability was the major impetus for the city to replace their public safety IT systems, the new system also provided new capabilities. Generally the new capabilities fall into three categories: new systems, functional enhancements, and system interfaces.

**New Systems**

Early in the project, Chief Cook identified mobile data as a priority. Because Golden was almost exclusively an on-line agency, officers were required to come to the station to complete their reports. While in the station, officers were, of course, unavailable for service calls and other work. The obvious answer to this problem was to make the records management system available from the field. To accomplish this goal, HTE will install rugged Panasonic CF-27 laptop computers in police vehicles and fire apparatus. Equipped with a cellular modem, the laptop computers will use the cellular telephone infrastructure to communicate.\(^{11}\)

In addition to records connectivity, the proposed mobile data system will also provide field units with a direct connection to the state’s criminal information system, motor vehicle files, and other state and national resources. The mobile data system will also enable dispatchers to send assignments and other digital messages directly to field units without using the voice radio. Units equipped with mobile data computers (MDCs) will also be able to send messages to each other. These capabilities will greatly improve field communications for both the police and fire departments and reduce the time spent completing reports.

Less frequently used, but no less important, will be the new document imaging system. This will allow the police department to maintain a single archive for all case information. Through this system, officers will be able to scan witness statements and other documents into the case record. The document imaging system will also allow the Department to store digital photos of evidence, crime scenes, and so on as part of the case record.

**Functional Enhancements**

The new system offers Golden a number of new functional capabilities. One of the most significant is the addition of computerized mapping. CAD users will now have a computer-generated map of Golden that mirrors the CAD status monitors. The map will show calls for service and last known unit locations overlaid on a street map\(^{12}\). The mapping system will also allow investigators to plot criminal and non-criminal incidents on a map in order to

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\(^{11}\) The technical term for this connection is Cellular Digital Packet Data (CDPD).

\(^{12}\) Golden is also considering implementing an Automated Vehicle Location (AVL) system in conjunction with the mobile data system. If this system is implemented, the CAD map will show the actual location of field units in real-time.
analyze the spatial relationship of events. The new system also includes criminal intelligence, case management, and internal affairs modules.

Several features of the new RMS stand out as advantages over the old. With the old RMS, information was not easily extracted; the new RMS has a much larger amount of accessible information. The new RMS also has canned reports as well as unique querying capabilities. Finally, there is now more reliability, a redundant system, and integration with laptops and the fire system.

System Interfaces

The new system will also provide Golden with productivity enhancing interfaces. The most significant of these may be the interface between the police records and court management modules. Previously, the systems were provided by different vendors, causing citation, summons, and arrest information to be entered twice. The new system will allow the information that has been entered by the police to be imported into the court system, thus eliminating the duplicate entry. In addition, police officers will be able to review court records from their workstations. The new system is expected to generate substantial labor savings and simplify some police tasks by providing access to case statuses and dispositions.

In addition to the records-court interface, the new system includes interfaces to 911, the state criminal information system, and the previously mentioned mobile data system. The 911 interface will automatically download the name and number of 911 callers from the telephone system to the CAD application. This will save time processing the calls and reduce transcription errors. The new system will provide CAD and records users, like MDC users, with access to the state’s criminal information system. From here, criminal history, wanted person, stolen property, and other law enforcement files are available.

Effect on Agency Personnel

Overall, the new systems did not have as big an impact on department personnel as it would have in some agencies. Golden attributes this to the fact that most officers were already comfortable with computers. The newness was mostly in system functionality. The project manager even noted that the “cops were more patient than we anticipated.” One person interviewed noted that the grumbling heard from personnel was more about change in general.

Patrol officers use the RMS every day to enter reports. Currently (until the laptops are implemented), they take notes in the field and then enter the reports on computers at the station. One officer noted that the system was easy to learn, and there are plenty of people to turn to for assistance. He added that the functionality was not extremely different (for his uses) than the old RMS. He uses it to look up names, plates, previous contacts, and BOLO’s. He is looking forward to the laptops being integrated with the RMS and with the Colorado and national criminal history systems.

Some staff are not as excited about the new systems as others. One dispatcher feels that the new CAD is not geared toward a one-person dispatch center – you need multiple screens and systems going at once. He added the new interface made it difficult to track and enter information for two different incidents at the same time (i.e., a citizen phoning in
a request for service and an officer calling in a traffic stop from the field). The dispatcher
did say that the new system tracks names and other administrative tasks better, but
overall it is more difficult to use. In addition, some functionality has changed. One
example he gave was the inability to search on code types when entering incidents; now
they have to know the codes or look them up on paper.

The Chief wanted a system that would do more than the existing RMS. He wanted to get
records and searches into the field “to keep officers where they belong,” but give them all
the tools they would have in the station. He was not interested in cutting edge technology
because it has too many risks and costs too much money. He also wanted data to drive
department decisions and a system that could grow as the community grew. Although the
Chief is very happy with what has been and plans to be implemented, he says the
challenge is for maximum use of the technology – that the department has not yet realized
the technology’s potential. In the long run, he feels that this integrated system will make
policing in Golden more efficient and effective.

Summary
Golden considers the entire acquisition process a success. They attribute this to a
number of factors:

- Taking the time and effort to get it done right
- Doing preparation prior to going on-line
- Getting input from the officers and other participants
- Public safety being a priority in Golden
- Being well prepared to face City Council and having the support of the city Finance
  Director
- A good working relationship with the consultant.

Several felt they could have gone through the process without a consultant, but it would not
have been as thorough or as good. First of all, it was nice to have a knowledgeable
outsider to relate and confirm the Department’s issues (need, costs, etc.) to City Council.
In addition, the consultant was able to negotiate with the vendor, which reduced the friction
that often occurs between the vendor and the agency. The Records Manager summed it
up when she said that in 1991 when Golden got their first RMS, no one knew anything
about computers. This time it went much smoother, especially with the help of the
consultant – “this time they knew the what, when, and how.”

Golden spent a lot of money for a small city—and a lot more money than they originally
anticipated—but feel strongly that it was money well spent. And they continue to have the
support of the Council and community. Eventually, Golden may expand this to a citywide
system; HTE offers modules for several facets of municipal government. Unfortunately,
this system does not talk to other law enforcement agencies in the area. Several other
departments had gotten new systems in the recent past and or have gotten them since,
but there was no discussion or coordination in developing one, large integrated RMS.
References

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This case study focuses on Intranet technology acquisitions. It is one of 18 case studies prepared for the “Technology Acquisition Project” administered by the Institute for Law and Justice in partnership with Government Technology, Inc., and funded by the National Institute of Justice (NIJ), U. S. Department of Justice. The author of this case study is Julie Wartell, Senior Research and Technology Associate, Institute for Law and Justice. The report has been reviewed by the participating site but should be considered a draft pending final NIJ review.

Background on the Project and Study Site
This case study looked at the acquisition and implementation of Intranet technology and its related applications within the Jacksonville Sheriff’s Office (JSO). At the time of the study, the Intranet had been in place for about 16 months. The Intranet applications that were examined include the Jacksonville Research and Analysis Mapping System (JRAMS), the Jacksonville Photo Imaging Capture System (JPICS), and the Computer Aided Dispatch (CAD) reporting system. There were many people involved in the project, but the key people include Beth Horn, Information Systems Manager; Bill Chitty, Planning Captain; Nathan Chitty, Information Systems Analyst; Rod Sanford, CMSI Contract Programmer; and George Brown, Information Systems GIS Analyst. In addition, there was input from the JSO Technology Committee (which reports to the Undersheriff) and various users at all levels.

Report Organization
The sections that follow provide background information on the JSO, summarize the technology solution, and explain special grant funding and purchasing procedures in the JSO. Because the entire project includes the acquisition and implementation of Intranet technology and several applications, the rest of the report discusses each major system separately, i.e., Intranet, CAD information, mapping (JRAMS), and photo imaging (JPICS). Each system is discussed in terms of a technology acquisition model involving four phases: (1) assessment and decision making, (2) procurement, (3) implementation, and (4) impact.

Jacksonville Sheriff’s Office
The JSO provides law enforcement and correctional services for the city of Jacksonville and Duval County with the exception of three small beach cities and the town of Baldwin, which have their own police departments. Duval County, located in the northeast corner of Florida, is 840 square miles and has a population of over 700,000.
JSO personnel include 1,400 sworn, 350 civilian, and 650 correctional staff. The JSO is led by an elected Sheriff with an Undersheriff, three Directors, and nine Chiefs (two of which are civilian). Two of the Chiefs command the East and West Patrol Divisions and Assistant Chiefs command the six zones. Each zone has specialized teams, some of which include COPS, DUI, Traffic, and Walking Beats. The centralized Detective Division is broken into Crimes Against Property, Crimes Against Persons, and Interagency Investigations, while Organized Crime and Intelligence are separate units.

The mission of JSO’s Information Services Management Division (ISM) is “[to] continually improve the efficiency and capability of the JSO by effectively implementing and managing their information system resources” (JSO Information Services Plan, 1996). The Information Services Plan gives a detailed blueprint for Fiscal Year 1996-97, with the next two years described in general terms to allow for changes in technology. There are three goals and numerous objectives. The goals include: increase quality, timeliness and type of information disseminated in the JSO and to related agencies by creating an integrated CJIS; expand the use of technology to increase the service level of the JSO to the community; and provide an efficient and fault-tolerant operating environment for all information systems in the JSO.

The Information Resource Management Section, headed by an Assistant Chief, is broken down into three units. Planning is responsible for “gathering, formulating, interpreting, and managing relevant information from internal and external sources with the aim of improving police service to the community.” Information Systems Management’s purpose is to “continually improve the efficiency and capability of the JSO by effectively implementing and managing information system resources.” And the Crime Analysis Unit’s duties include “collecting, analyzing, and disseminating data relevant to crime and law enforcement activities . . . provide management, line personnel, and neighboring law enforcement agencies with useful data” (JSO Annual Report, 1997).

**Summary of the Technology Solution**

The system in place in the JSO uses Intranet technology to connect its 2,400 employees between headquarters, the jail, and several satellite facilities. The primary applications available (at the time of the study) to JSO users include crime mapping, mug shot retrieval, and CAD queries and reports. In addition, users can access the computer service order database and information relating to various units throughout the agency (maintained by the units themselves).

Prior to the Intranet, there was no method of mass information sharing through technology. Much of the information was either unavailable to all users or very difficult to obtain with existing systems. To get a crime map, an officer had to make a request to an analyst; for CAD statistics or reports, a commander needed to ask someone in Information Systems; and computerized mug shots simply did not exist. Several people in the JSO decided that Intranet technology was the answer. The JSO Intranet went “live” in September 1997 (about three months after the idea had begun to be seriously examined) with the first application, the ISM Service Order database. From that point, it has evolved and continues to grow with new applications being developed as needed. Applied Mapping (JRAMS), Computer Management Sciences, Inc. (JPICS), and internal JSO staff developed the applications currently on the Intranet. Each application took varying amounts of time and is discussed in further detail later in the report.
Grant Funded Projects and General Purchasing Procedures

In the fall of 1995, the new Sheriff made a variety of organizational changes, including the hiring of the current ISM Manager. She recognized immediately the need for substantial improvements in the computer systems. Working with the Planning Unit Captain, they re-applied for grant money (the initial application had not been approved) to maintain a juvenile services program. The grant was for one year, renewable for up to four years.

Much of the funding came from the Edward Byrne Memorial State and Local Law Enforcement Block Grant, and the JSO called their program Retrieving Integrated Computer Information (RICI). The following is a breakdown of the yearly funds:

- **RICI-1 Total**: $175,000 (Grant funded - $131,250, City match - $43,750)
- **RICI-2 Total**: $314,047 (Grant funded - $235,535, City match - $78,512)
- **RICI-3 Total**: $295,000 (Grant funded - $221,250, City match - $73,750)
- **RICI-4 Total**: $250,000 (Grant funded - $187,500, City match - $62,500)

RICI-1 covered a seven-month period and funded contractual services to install a fiber optic backbone at police headquarters, training, and network hardware and software and associated maintenance. RICI-2 provided funding for a Database Administrator (for half of one year), contractual services for network wiring of the headquarters building, training and travel, and network hardware and software. RICI-3 funding was for Database Administrator and Information Systems Coordinator positions, contractual services for the development of the GIS application, training and travel, and equipment. RICI-4 continued funding for the Administrator and Coordinator positions, an incident data application, and the conversion of the pawned property system. (Note: this study was completed four months into the RICI-4 grant period.)

Since a 1996 departmental study, all information technology acquisitions go through ISM and are approved by the Undersheriff. In addition, a technology committee meets weekly to review issues and recommend decisions. Whether purchasing or developing in-house a new application, Requirement Analyses are usually written. These documents are completed in different ways by different staff; generally, one person from ISM is the lead and writer and four to 15 users (depending on the application) serve on a committee.

Intranet

Assessment and Decision Making Phase

The JSO had Internet access for several years when the former head of the applications side of ISM decided that the Intranet might be an effective way of communicating information. He started learning about Intranet technology in July 1997. Although the initial goal was to give JSO units a place to publish and exchange information, application development was also an important longer-term objective. No specifications or concept papers were written for the Intranet plan; it was being developed based on several people’s vision. There was no single, direct funding source for the initial Intranet architecture. Many of the pieces already existed, and various grants and application projects contributed funding to add and upgrade servers and workstations.
**Procurement Phase**

There was no official procurement process for the Intranet technology for this project. Internet technology had existed in the JSO for several years. Grant funds allowed the JSO to make state and county-contract purchases of servers and workstations in order to have an infrastructure capable of maintaining an efficient Intranet and its associated applications.

**Implementation Phase**

The JSO Intranet home page (maintained by ISM) presently includes a variety of information and applications (see Exhibit A below). The major applications are discussed within this study. In addition, there is information from units such as Special Events, Patrol (meeting minutes), Gangs (intelligence), and Crime Analysis (statistics), as well as other resources (such as a personnel directory and written directives). The revised front page, which came on-line in March 1998, also includes “headlines” and a wide variety of department-wide statistics and graphics, ranging from response times by zones to male versus female arrests. All Intranet capable machines are set up to have the JSO home page as the default home. This was considered low-key marketing. There was no official mass marketing or formal training on the Intranet or its applications; it has been largely through word of mouth and users who express a special interest.

**Exhibit A: JSO Intranet Home Page**
Prior to implementation, voluntary training classes were offered by ISM. Each unit was asked to send one person to learn how to convert Word and Excel to html and put the files in the proper directory in order to update the page. In addition, they were asked if there were any unit-specific applications they would like built. The JSO Intranet home page went “live” in September 1997 with the first unit-info pages and the ISM Service Order page. The laptops used by patrol officers have limited Intranet (and no Internet) access—a static IP address is set for each laptop.

The Intranet exists behind a JSO firewall and is only accessible by JSO personnel (there is discussion of giving limited access to others such as the District Attorney). An ISDN line links remote sites, and it can also be accessed remotely through a dial-in server. The architecture at the time of the study included 2 Novell servers, 3 NT servers for web, GIS, and file services, and 2 SQL servers for data warehousing and transactional processing. There are plans to purchase another SQL server and restructure which applications are on which servers, i.e., 7x24 applications on one server and daytime applications on another. JSO has approximately 500 workstations; about 20 percent of these are not Intranet capable because they are old and slow. When JSO decided to upgrade their systems and go to Intranet technology, all servers were put in one central computer room. This greatly improved system reliability and maintenance.

**Impact Phase**

The Undersheriff stated that “it is nice to have information accessible to anyone that needs it . . . when you want to know something, it’s handy.” Intranet technology is a good example of an “information enabler.” The Intranet enables users to develop new applications not possible in the past. The JSO Intranet continues to evolve with more and more information on it. Individual unit pages continue to come on-line or are updated. Other advantages of Intranet applications are that workstations only need an Internet browser, slower workstations can still effectively use all applications, and the interface is common and user-friendly. Presently, there is no tracking of Intranet usage, although some are considering it for the future.

Some users feel that certain information is not timely, and that there should have been a greater focus on training. There are no users’ manuals or any formal mass marketing. Others feel that it is very user friendly, even for the non-computer literate user. The Information Resource Management Assistant Chief admits that they are offering the tools (which the go-getters have found) but not a lot of training. He feels the biggest impact of the Intranet is that it sped up the obsolescence of hardware and forced the JSO to replace computers.

All applications being developed or purchased for the JSO are now also considered for the Intranet. Many of them will be stand-alone/network but have specific Intranet capabilities. Some of these applications include: Property/Evidence (being done by CMSI, completed by 9/30/99), Alarms (3-4 months off), Investigative Case Management (finishing needs analysis, to be completed by 9/30/99), and Automated Field Reporting incident data (similar to CAD for basic querying on incidents by victim name, type of crime, etc., to be done by ISM, probably a year off). In addition, there are future plans to use the Intranet for field training patrol officers. Instead of having classroom-style roll call training and information sessions, this could be done electronically through the laptops. An example might be testing officers’ knowledge of policies and procedures.
Computer Aided Dispatch Information System (CADIS)

Assessment and Decision Making Phase
JSO hired a consultant to do a management and staffing study in 1996 as a follow-up to a prior study in 1990. A new CAD system (SCC/PrinTrak) had been installed in March 1996 and was supposed to have good reporting capabilities. The consultant asked for a variety of CAD statistics and reports to finish the study, but they were not easily available. An ISM Analyst needed to do some programming and manipulating to get the data that was requested. This was typical for CAD – any staffing or workload reports needed to be individually generated, and the department relied on one person to handle these requests.

As the Intranet came into being and the discussion ensued of what information and applications should be included, several people from Planning and ISM thought that CAD data might be useful. This way, one programmer would not have to handle all requests; the querying and reporting capabilities could be distributed. The Planning Unit, responsible for watching staffing levels for management, was the first target audience. The ISM Analyst initially planned on using the reports he had created for the consultant and modifying them to be useful on the Intranet.

Procurement Phase
An ISM Analyst did all work on the CAD Intranet application. He used existing hardware and software to create the database and front-end. CAD data is exported from Tandem (the SCC server) as .dbf files to a special data storage device. It is then imported, cleaned, and put into an SQL server on a nightly basis (using a program that was written by the ISM Analyst). The programmer/analyst started creating the reports in Tango (Intranet rapid application development software) because it was chosen by the former applications supervisor and easy to use. He ended up switching to Active Server Pages (ASP) because it was more powerful, easier to use, and runs well on Microsoft’s Internet Information Servers (IIS).

Implementation Phase
The SQL server was first populated and the initial reporting functionality occurred in January 1998. The interactive reports available on the Intranet are a combination of the reports created for the consultant in 1996 and other requests that the Analyst had during development (see Exhibit B for front page/query screen). The functionality of the page is continuously being upgraded. One interesting example of functionality is the link between the CAD reports and the JPICS photo system (see Exhibit C for example report). Static reports were made available in December 1998. The static reports function was created because some of the very large reports were very difficult and time consuming to make transactional. If the report already exists, it can be retrieved quickly (as it is already an html page); if not, then the report is created and the requestor is notified in one or two days.
Impact Phase

The intended purposes of the CAD application on the Intranet were to provide information that was previously not easily accessible, to assist patrol commanders in efficiently deploying resources, and to identify areas with the highest calls for service. All of these were sufficiently fulfilled with the functionality; the question remains as to whether it is
being used to its potential. One Division Chief noted that he uses the CAD application on the Intranet at least once per week. He gets reports on response times, officers missing arrival time (forget to press it on MDT), and other “hot topics.” He believes that patrol commanders should be using it at least a couple of times per week. Several users stated that CAD reports used to take two to three weeks to obtain, but now the information is available instantly. The Planning Captain feels that there is an immense amount of good information, queries, and reports in the application, but that it is not used as often or extensively as it could be. This is due to a lack of marketing and training, as well as attitudes more supportive of traditional, reactive policing.

Jacksonville Research and Analysis Mapping System (JRAMS)

Assessment and Decision Making Phase
The JSO’s street centerline file was created in 1992 and has not been maintained well. JSO hopes to get a new, updated one soon. A GIS Analyst was hired with 911 funds to assist with the maintenance of the street file for CAD but has assisted ISM with other GIS-related duties. Around January 1997, ISM started thinking about how to give JSO users (primarily patrol management) the ability to do simple mapping queries without submitting a paper request to Crime Analysis, which often took several days to get a map produced. They began to investigate what other law enforcement agencies were using, and were particularly interested in the new Environmental Systems Research Inc. (ESRI) software.

JSO would need to purchase software, MapObjects and Internet Map Server (ISM), hardware (everything that was chosen went above ESRI minimum recommendations), and programming services. A user feedback committee was established representing Chiefs, zone Assistant Chiefs, and patrol Lieutenants (no sergeants or officers were included because they were not expected to use it). The user committee was given a questionnaire and “demo” of other crime mapping web sites. The GIS Analyst took these ideas and built them into specifications for the new application.

Procurement Phase
The typical procedure for systems or application development in the JSO is to look at vendors during a one-day meeting where they display their existing systems and environment, demonstrate their software, and go through interviews. There are no city standards for software, but they generally use Microsoft, including SQL servers.

The requirements and specification documents were completed in March 1998 and were given to the prospective vendors. Three vendors were invited to come in separately. Two were local, one of which was Applied Mapping, and the third was Geographic Information Services (GIS), the largest ESRI business partner. A committee was formed to critique the vendors. They found that Applied Mapping and GIS could both fill their needs, while the third one could not. Applied Mapping was chosen because they were local, already a part of the state’s sole source contract list, ESRI certified, and able to provide training. In May 1998, a purchase order was signed totaling $18,484 for hourly programming services and training and technical assistance. The money came from the RICI 3 grant. JSO gave Applied Mapping the needs analysis document stating what they wanted the application to do, and Applied Mapping began work in June 1998.
**Implementation Phase**

The initial implementation was in August 1998. While Applied Mapping was creating the application, an ISM Analyst did the front-end interface programming and database design. ISM let the user group know when JRAMS was ready and asked for comments and feedback, but received little. There was a formal email announcement to all users about the new application (see Exhibits D and E for the JRAM front/query page and a sample map).

**Exhibit D: JRAMS Front Page**

![JRAMS Front Page](image-url)
Impact Phase

Although JRAMS was created with patrol management as the primary audience, many patrol officers have found it invaluable. Based on one community policing officer’s knowledge of the Intranet applications, he has now found himself as a primary problem solving resource. Don had been using the CAD Intranet application to identify multiple call addresses and found that the officers, sergeants, and lieutenants were finding this extremely useful. As a regular Intranet user, he was one of the first to try crime mapping and decided it was very easy and offered even more good information.

Don related the following “success story.” While experimenting with JRAMS, he noticed a problem with residential burglaries in Sector Oscar 3 (west side of town). He talked to the burglary division detectives, who gave him some names. He manually mapped out where they lived. Three out of five had photos in JPICS, where he found all of the names and information. He put the information out to patrol in the “reading file” for roll call. Some officers wrote it down and contacted one of the suspects. There was a pursuit and arrest, and the suspect admitted to several burglaries and identified his partners.

Don now makes monthly maps of residential and commercial burglaries, auto thefts, and robberies and posts them at roll call. In addition, he has created “idiot to idiot” written directions for using the Intranet/CAD/JRAMS, as he felt people do not use them because they do not have time or are intimidated.

Prior to JRAMS, Crime Analysis regularly put out very large but not very current maps, so officers had to make special requests. This often included creating the data to be included and would take awhile because the Unit was so busy. Although JRAMS has filled the gap of information availability, it still has its negatives. It runs slowly on some computers; it presently contains only calls for service (not incidents or arrests); and the
user cannot easily make a map of one sector and then go back and modify one field – it is necessary to rebuild the entire query. This last problem might have been solved if the JSO had not run into problems with the vendor. There was no contract with Applied Mapping, only a verbal agreement that JSO would get the source code. This did not happen, and at the time of the study, the City Attorney was fighting with Applied Mapping for the rights to the application. JSO had money and time for phase II and improvements but was unable to proceed without the source code.

Jacksonville Photo Image Capture System (JPICS)

Assessment and Decision Making Phase
JSO started thinking about the need for a computerized mug shot system in August 1996. The old “system” consisted of Polaroids in big books sorted by demographics (race, age, sex, and height). The two goals were to do computerized lineups and to browse and search for photos from a description or name. The decision was also made to put a limited version of the application (view only) on the Intranet because it would be cheap and offer everyone access. The requirements analysis was completed in July 1997. In the fall of 1997, JSO started looking at vendors and existing systems. The only ones that fit JSO’s needs were too expensive, so they decided to do it “in house.” NOTE: JPICS is a stand-alone application, not designed solely for the Intranet. The browsing is Intranet capable, while the capture and other functionalities are not. This study focused on its Intranet-specific application.

Procurement Phase
In January 1998, JSO contracted with Computer Management Sciences, Inc. (CMSI) for an on-site programmer. They requested someone with Visual Basic, database and image manipulation experience. CMSI is one of about seven companies on the list of possible city sole source contracts. JSO had used CMSI many times for needs analysis and programming services. The first task for the programmer was to evaluate and purchase the appropriate hardware and software, while the second task was to create prototype screens. The prototypes were completed in April 1998.

Implementation Phase
As required by the grant that was funding the application, implementation had to be by September 1998; JSO went on-line with beta photos and a working application (see Exhibit F for the JPICS front/query page and Exhibit G for an example search result). In October, JPICS went live with real booking photos, criminal registrants, and suspects. The decision was made not to scan in old photos but instead to build up the system from implementation point on. The initial users were records/ID (only view access through Intranet), jail (2 capture stations with remaining floors view access through Intranet), detectives (1 capture station and then view through network and Intranet), the criminal registration unit (1 capture station) and the juvenile detention center (1 capture station). A one-hour voluntary class was offered to designated trainers, but many extra people showed up. Users who may have “accidentally” come upon the application call the programmer to get training as needed, and patrol officers often go to detectives for assistance.
The six capture stations (for the stand-alone application) are 300 Mhz, 8 MB video card, 120 MB RAM, and special Kodak cameras costing $8,000 each. The data is stored in the SQL server and the application front-end was written in Visual Basic 5. In addition, there are several third party controls—for imaging, better navigation, and visual appeal—and high-end graphics cards for true color. Every large photo also has a thumbnail size, and all are in jpg format. All photos are available immediately on-line and importable to all graphics programs. Mainframe arrest records are replicated to the SQL server every minute, and this data can be searched before a new photo is taken. The JSO ID number stays the same, but a new JPICS record is created for each booking.

Exhibit F: JPICS Front/Query Page
Impact Phase

The initial purpose of the application was to start with a basic tool and eventually add on new functions and features as requested. JSO is giving out the source code to anyone that requests it, and that agency can then customize it to their needs. JPICS is not available through the laptops presently (due to limited bandwidth and therefore low graphics capabilities), but they are working on getting limited access with thumbnails only, possibly just for supervisors. In the first three and one-half months, 615 criminal registrants and 76 suspects were entered.

The detectives are still using the Polaroid books until the JPICS database is expanded. With only three months of photos available, they feel it is not as effective as it will be in time. The primary use of JPICS for the detectives is to search on a name and find a photo (about once per week). In addition, one detective estimates they make about 90 percent of the photo lineups and assist patrol with the remainder (about once per month). They feel the system is very easy to use. Using the old books, it took about two hours to create a photo lineup. With the new system, it now takes about 15 minutes (of which seven minutes is for printing).
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This case study focuses on Internet/Intranet technology acquisitions and related applications. It is one of 18 case studies prepared for the “Technology Acquisition Project” administered by the Institute for Law and Justice in partnership with Government Technology, Inc., and funded by the National Institute of Justice (NIJ), U. S. Department of Justice. The author of this case study is Julie Wartell, Senior Research and Technology Associate, Institute for Law and Justice. The report has been reviewed by the participating site but should be considered a draft pending final NIJ review.

Background on the Project

This case study focused on the acquisition and implementation of Internet/Intranet technology and associated applications within the Kansas criminal justice community. The overall project is a statewide Criminal Justice Information System (CJIS) that allows local and state law enforcement to share data and information through a virtual private network (VPN). The CJIS project is entirely Internet/Intranet-based. There are a number of other systems and applications that run on a separate, statewide network. Although the entire project is touched on in this case study, primary emphasis is on the acquisition process for the Internet/Intranet technology.

Role of the Coordinating Council and Advisory Board

The Kansas Criminal Justice Coordinating Council (CJCC), created by statute in 1994, is leading the effort. The CJCC, assisted by the Criminal Justice Advisory Board (CJAB), has 20 agency representatives from local and state law enforcement, prosecution, courts, defense, corrections, sentencing, the youth authority, information systems, education, and health. The CJAB was used to build a coalition between state and local agencies; the state would have been unable to convince the Legislature without broad-based local support. As vital as the CJAB was to project success, many also credit as important factors the leadership of the Kansas Bureau of Investigation (KBI) and the assistance of Steve Davis of MTG Management Consultants. The key people involved in Kansas CJIS are Carey Brown, CJIS Director; Neil Woerman, Director of Special Projects and Chief of Staff, Office of the Attorney General; Charles Sexson, Assistant Director, KBI; Ken Justice, Kansas Highway Patrol and State NCIC CITO; and Ron Rohrer, Information Resource Manager, KBI.

An immense amount of planning went toward the CJIS effort. A strategic plan was created in April 1996 and updated in July 1997. As described later, the plan includes project background, vision and mission statements, goals, initiatives, plans, a schedule, and a budget.
**Report Organization**

After briefly summarizing the technology solution, this report discusses technology acquisition as a four-phase process involving (1) assessment and decision making, (2) procurement, (3) implementation, and (4) impact.

Attachment 1 is an organizational chart showing the governance structure for the CJIS, and Attachment 2 shows the CJIS “network.” Attachment 3 is a brief report providing an overview of the Local Application Project, which is integrated with CJIS. A separate case study was also completed on the statewide AFIS (Automated Fingerprint Identification System) that was part of the Kansas CJIS.

**Summary of the Technology Solution**

The completed CJIS will include the following subsystems:

- Computerized Criminal History System (CCH)—arrests, court dispositions, custody and supervision
- Kansas Incident-Based Reporting System (KIBRS)—law enforcement incident reports
- Automated Fingerprint Identification System (AFIS)
- Automated Statewide Telecommunications and Records Access (ASTRA) Network—central computer, network, and local terminals for law enforcement and criminal justice communication.

The central component of CJIS has a number of servers, including three that are Internet-based: CJIS Web (KBARS), CJIS Mail, and CJIS Public Access. CJIS Web is housed at KBI, while the Mail and Public servers are located at the Department of Information Systems and Communication (DISC). Any web browser offers access to CJIS information. General information includes project status reports and meeting minutes, links to other sites and resources, and bulletin information. In addition, there is online access to some CJIS Central Repository information such as criminal history, hot files (misdemeanor warrants, missing persons, sex offenders, etc.), and KIBRS data. The Public Access server will offer the same accessibility but for a nominal charge. The Mail server is Microsoft Exchange, and all CJIS users who currently do not have email accounts with their agency will have accounts.

A large number of vendors were involved in CJIS. Paradigm4 lead the reengineering of the Central Repository (to include the front end applications of the various subsystems and web server); Business Software & Equipment (BSE) created the local law enforcement interface; and FishNet Security handles security issues using CheckPoint, Entrust Technologies, Internet Security Systems, Security Dynamics, and Netscape systems. The total CJIS budget is $12 million. The major expenditures were $2.8 million for AFIS, $3.6 million for the Central Repository, $2.5 million for the ASTRA network, $2 million for local systems; and $1 million for network security.
Assessment and Decision Making Phase

Problem Statement

Implementation of Sentencing Guidelines in 1994 was a deciding factor for the state to make some long needed changes. There was a need to quickly access complete criminal history information for sentencing purposes, and at the time, it was not readily available. The state admitted to being very behind in the use of technology. The Kansas Legislature created the Criminal Justice Coordinating Council (CJCC) in 1994 to bring together key policy makers from major agencies to oversee the state’s criminal justice information systems. The CJCC, with assistance from the Kansas Sentencing Commission (KSC) and the KBI, began with a plan to automate records and eventually saw the need for a much larger, more encompassing criminal justice information system.

In 1995, the KSC audited the state’s criminal history repository. The audit showed a large percentage of records not entered, inaccurate, or missing information. As a result, the state contracted with MTG Management Consultants for a needs analysis of the state’s information systems and the ASTRA network. The analysis examined the data collection and dissemination processes, the technology environments of several counties, and system shortcomings. In addition, a data dictionary and business function model were developed. The needs analysis found distinct problems relating to governance, policy, forms and procedures, management, data, and technology.

Records Automation Project

Several federal initiatives also played a role in the initial Records Automation Project and subsequent criminal justice information system. These included the Criminal History Records Improvement Program (1990), Crime Control Act/Edward Byrne Memorial State and Local Law Enforcement Assistance Program (1990), and National Criminal History Improvement Program (1994).

The Records Automation Project, which began in September 1996, was a precursor project but was integrally linked to CJIS. Automating records was the short-term goal that was the basis of the much larger, far-reaching system that the CJCC envisioned.

CJIS Strategic Plan

An elaborate planning process, with participation from a variety of state and local agency personnel, was completed before going forward with CJIS. The outcome was a detailed, thorough Strategic Plan, based on data collection and analysis, strategy development, and implementation planning. The mission of CJIS, which drove the plan’s development, is “to create and maintain an accessible, and appropriately secured, criminal justice information repository with accurate, complete, and timely data on individuals and events for criminal justice and non-criminal justice users that supports

1 MTG eventually served as the consultant for the entire process. Project staff were very satisfied with MTG’s assistance and felt they played an important role in overcoming interagency politics, convincing the Legislature of the need for CJIS, and keeping the people involved and the project going.

effective administration of the criminal justice system, public and officer safety, and public policy management in a cost-effective manner within the state of Kansas."

Moreover, the strategic plan has nine goals for CJIS; briefly, these are to

1. Develop and maintain an accurate, comprehensive collection of criminal history information that meets local, state, and federal standards for data quality and timeliness.

2. Ensure compatibility with the emerging national criminal justice information environment.

3. Increase use of the system by providing on-line access to the appropriate information for the system’s primary and secondary customers.

4. Ensure the systems’ ability to migrate over time with technology advancements.

5. Increase cost effectiveness by reducing the manpower associated with system inputs and outputs at both the state and local levels.

6. Ensure the state’s ability to manage and continue to expand the system’s functionality.

7. Increase public safety by developing and implementing a centralized criminal justice information repository.

8. Provide operational, statistical, and policy data seamlessly to all authorized members of the criminal justice community.

9. Maintain a CJIS that respects the privacy rights of every citizen in Kansas.

The above goals are being accomplished through ten strategic initiatives, each of which involves several projects.

Project staff felt this strategic planning process was important to promote the CJIS concept and to gain credibility and buy-in for a state project.

Data Accessibility and Management Needs

Prior to 1998, accessibility to statewide information was still extremely limited. The network connection was slow, and only text-based data could be downloaded; law enforcement outside of Topeka could not see fingerprints or photos stored at KBI. In addition, the present transmission protocol, through Tandem Computer switches, was not Y2K compliant. The CJCC and project staff wanted a new system that would “fix” all of the existing automation and data management and dissemination issues. In addition, they wanted this system to use the Internet; be secure; provide timely and accurate data; be paperless; provide fast, low cost communications (via email); be personal computer-based; and use Microsoft solutions (NT, SQL, VB, Exchange, and Office).
Options Considered

One option discussed was to develop a private network. This would have cost $2.5 million a year more than the virtual private network (VPN) (a cost shared between KBI and local law enforcement) and would have entailed purchasing hardware, doing installations throughout the state, and managing the network. Another option was to use the existing Kansas Wide Area Information Network (KANWIN). KANWIN is a frame relay backbone that supports TCP/IP, Novell Internet Exchange Protocol, and SNA. Security was extremely important in the decision to develop a VPN. The primary reasons for top-notch security were the use of an open system architecture, the need to share electronic data using public Internet service providers, and FBI requirements. Proper security meant protecting data and machines on the KBI LAN as well as transmissions over the Internet. In addition, they wanted to be able to identify the user and the machine being used, monitor for unauthorized intrusion, and analyze network vulnerability.

Project Organization and Staffing

The decision to go forward with CJIS included a decision to increase and re-organize KBI staff. Chuck Sexson was made an Assistant Director and was put in charge of CJIS and the Information Technology Unit. He was told by the KBI Director that he would be given new staff, could reorganize the existing staff, and could do whatever he needed (attend conferences, purchase resources, etc.) to make the project work. Although there was some initial resistance to a sworn officer managing a civilian unit, employees eventually came around when they saw what a success CJIS was going to be.

Procurement Phase

RFP and Selection Process

Four RFPs were issued for the entire project. The first was for consultant services to conduct a needs assessment and develop the strategic plan. The other three were issued for the AFIS replacement, CJIS (to include the statewide network switch and the Central Repository initiatives), and the local system interfaces (see Attachment 3). A great deal of work and time went into the creation of the CJIS RFPs. Project staff, with the help of the consultant, went through an extensive standards process, defined CJIS requirements, and created a conceptual design.

All of the RFP processes included bidders’ conferences, but site visits were done only for AFIS and CJIS. The AFIS project was also the only one of the four in which benchmarking was done. The consultant contract was awarded to MTG.

Eleven vendors were interested in the CJIS project during the pre-bid phase: PRC, Deloitte & Touche, Oracle, Hodges & Reed, SAIC, Bull Information Systems, CPI, Datamaxx, Printrak, IBM, and CCBS. Of these, four submitted proposals, and all were invited to an initial round of negotiations. One proposal was submitted by Paradigm4,

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3 Note again that this case study is focused on the use of the intranet and will only touch briefly on the related projects.
and the other three were from vendor consortia—Printrak/PRC/CPI, SAIC/Datamaxx/CPI, and Datamaxx/CPI. All except the Printrak group (which was too expensive and did not have the depth to take on CJIS in addition to everything else) were asked back for a second round of interviews.  

Upon further research, CJIS staff found issues with the costs, depth, and experience of both the SAIC and Datamaxx groups (although they still wanted to purchase Datamaxx’s thick client terminals). The final decision was to award the switch and central repository contract (CJIS) to Paradigm4, with a smaller contract to Datamaxx for ASTRA end user software and hardware. Paradigm4 was chosen because they had previous experience in public safety; they were very conversant in the preferred technologies and environment; and they received a good reference from the state of Florida (for which Paradigm4 was building a system with similar technology).

**Contract Negotiations**

Kansas used a unique method, called “negotiated procurements,” for their contracting. Instead of the more common lowest bid or fixed price options, everything in the contract is negotiable except the scope of work. One word of caution from the Kansas experience was that the negotiation team must be very knowledgeable about the proposal and about contracts.

Because Paradigm4 was selected as the primary vendor, this included developing a number of subsystems as part of the larger CJIS. Paradigm was to provide the Message Switch (and backup), Central Repository, Justice Web Server, Public Access subsystem, system management tools, e-mail, and document imaging. Within the Central Repository, there are criminal history, an incident-based reporting system, transaction log, hot files, and customer and training information subsystems. The Justice Web Server allows authorized users to access Message Switch functions (NCIC, NLETS) and Central Repository data (CJIS, hot files, KIBRS). The Public Access subsystem will offer non-CJIS Internet users criminal history look-ups for a fee and access to road reports, missing persons, offender registration data, and crime reports.

Design meetings were held between Paradigm4 and all of the significant justice agencies, but especially with KBI and CJIS staff. This was considered to be a collaborative decision making partnership. The first design document was too broad, missed a lot of issues, and underestimated the schedule and number of staff-hours. A second design document was completed in September 1998, and although the number of hours was greatly increased, the Paradigm4 project manager still considered it an aggressive undertaking. Paradigm4 had eight to ten staff working full-time on CJIS, as well as two to three for specialized tasks. Since the re-design, they have been working diligently to stay under budget and within a reasonable time frame.

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4 There were two proposals submitted for AFIS—Printrak and Morpho. Printrak was awarded the contract.
CJIS Security Acquisitions

The security side of CJIS was handled separately, using a sole source procurement option. In September 1997, the security design was accepted by the FBI, and KBI was able to begin buying equipment. Up until September 1998, the state standard CISCO equipment was still being strongly recommended over the proposed new options. Only two weeks before the new network was to be connected, KBI was finally able to get the more secure VPN approved. The sole source purchase was with Fishnet Consulting, a Kansas City company specializing in security systems. The implemented solution came about as a result of the CJIS Security Plan and an assessment of the various firewall and other available products. Fishnet could provide a packaged system, including the preferred CheckPoint firewalls, Internet Security Systems (ISS), and Entrust Technologies. In addition, Fishnet suggested products from several other vendors, including SecureID tokens by Security Dynamics (now RSA Security) and Netscape Directory Server.

CheckPoint, with StoneBeat, provides redundant firewalls. SecuRemote, a client-side encryption software, provides the VPN. For an additional layer of security, the KBI uses Entrust Technologies, a two-key cryptography solution through a certificate authority server. The technology uses exchange of the public key (to encrypt the transmission from the server) and the private keys (to decrypt the messages on each receiver’s workstation). Security Dynamics also supplies SecureID tokens to authenticate each user to a server. Finally, a digital certificate is needed to identify the public key, the name of the private key’s owner, and other encryption information. KBI purchased the Netscape Directory Server to handle the digital certificates. The CJIS budget covered the initial costs for 4,000 tokens and 2,500 certificates. To monitor network traffic and detect suspicious or abusive use of the host or network, KBI included RealSecure and Internet Scanner by ISS in the Fishnet purchase.

System Hardware

The CJIS message switch (and its backup at the Highway Patrol Academy) is on a 200-MHz Dell PowerEdge 6100 Pentium Pro with 512MB of RAM using MS NT Enterprise. The primary message switch is located at KBI and resides on a 100MB LAN connected to the KBI LAN. The internal network was installed for $108,000 and costs $18,000 annually to maintain. A 10MB line connects KBI to the Kansas Division of Information Systems and Communications (DISC), who maintains the statewide frame relay network. Sites throughout the state can purchase any type of workstation that will support a LAN connection or modem. The CJIS project is responsible for purchasing routers and circuits so each of the 105 counties has at least one state-funded network connection. KBI will be administering the mail server that is housed at DISC, but it was still undecided who would administer the public server (also housed at DISC). The location and administration of the servers was an important issue.

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5 Kansas policy states that any purchase over $2,000 has to be bid, but an exception was made due to the uniqueness of the needs, the newness of the technology, and the urgency of getting the security in place ahead of the network migration to the Internet.

6 The KBI started out using Entrust Technologies for the certificates. Security Dynamics (now RSA) then came out with a competitive product. The KBI agreed to try their product and compare the results between the two. At the time of writing, KBI was using both Entrust and RSA.
KBI acquired the hardware for CJIS through the Paradigm4 contract. State software standards are Oracle and UNIX, and some of the prospective vendors proposed these as platforms. CJIS project staff opted for a less expensive and open system architecture so development could be the same for the majority of their “customers” (about 750, mostly very small agencies). They chose Microsoft SQL server, Windows NT, Exchange, and Visual Basic. They needed the cheapest, easiest, and yet inclusive products so local agencies could and would purchase them. Even though some KBI data processing staff were hesitant to leave their comfortable AS/400 environment and others wanted to be more consistent with the state standards, CJIS staff pushed for the lower cost and open architecture. They wanted to avoid vendors with proprietary applications and architectures that lead to difficult and costly maintenance and support. The hardware platforms for the chosen software environment were also much less expensive and were competitively available from more vendors than the UNIX/Oracle alternative.

As depicted in Attachment 2, there are multiple layers to the CJIS “network.” The Message Switch, Criminal Repository, CJIS Web, and Document Imaging servers are all connected to the KBI LAN. In addition, the Security System is also run through the KBI LAN. There are standard firewalls between KANWIN/Internet and “open” CJIS. There are additional DISC firewalls between the Public and Email Servers as well as “secure” CJIS.

**Implementation Phase**

Overall implementation started in 1997 and will continue through 2000. Some pieces of CJIS went into production in October 1998. The secure network went on-line in November 1998, and the CJIS web server in June 1999, but the majority of CJIS completion was planned for the fall of 1999. Local case and records management applications for law enforcement, prosecution, and probation officers were installed in a few sites on a pilot basis in December 1998 (see Attachment 3 for more detail). Full installations began in March 1999 and were scheduled to continue throughout the year. In total, KBI will provide a minimum 56K-circuit and router connection to more than 300 criminal justice sites in 105 counties.

**Security Systems and Policies**

In September 1998, FishNet implemented a pilot installation of the CheckPoint and Technologies. KBI was the first agency to use the integrated products. Until that point, no agency had ever transmitted information via the Internet to NCIC because of the tight security restrictions. By November, the NCIC had amended its policies to permit Internet traffic and was convinced KBI had proper security in place under the new policies. The FBI gave its approval for the KBI to go forward. Further implementation of network security continues throughout the project as new subsystems have gone online.

The user security procedure is a four-step process. Each user has a SecurID keyfob token, about the size of a key chain, which gives the user a numerical password that changes every minute—it is based on two-factor authentication. It takes “something you have” and “something you know.” Once the ID and password are entered, a public encryption key is used for verification. Finally, the SecuRemote software encrypts and decrypts the data as it is transferred.
In an attempt to prevent accidental or purposeful abuse of the new systems, KBI instituted several new policies regarding security, network, and Internet use. The “KBI Personal Computer and Network Security Policies” is signed by all KBI employees who access KBI or KCJIS data. This ensures that each employee is aware of the computer usage policies and virus protection procedures, has a valid user account, and understands that activity can be tracked. The “Vendor Employee Computer and Network User Agreement” is signed by all employees of vendors and contractors who access KBI or CJIS data. This serves the same purpose as the previously described form. The “Acceptable Use of the Internet/Email” policy is designed so employees will be aware of appropriate and unacceptable uses, and of policies and procedures. This form is also signed.

Public Web Server

The Public Web Server was due to go on-line in June 1999 with full capabilities available by October, but has been significantly delayed while the underlying foundation work of the KBI’s Central Repository is finished. As of November, the CJIS web site (www.kbi.state.ks.us) offers access to the public only for general information (see below). One can view the mission and goals of the project or download a number of project documents, such as Requests for Proposal, Data Element Standards, Records and Reports Manuals, and Governance Membership Lists.

By clicking on the KBI Criminal History option, the following screen appears. This is the point where the user needs to enter the various secure IDs and passwords before going any further.
System Maintenance and Vendor Communication

The maintenance and support proposal received from Paradigm4 included having three people assigned to modifications, updates, software, and support for three years. In addition, KBI was hoping to negotiate an extended “warranty” because the project was behind schedule. CJIS staff believe that the biggest difficulties in the project timetable were establishing one before a design was done, not completing a valid detailed design, and failure of Paradigm4 to commit enough resources to achieve the proposed schedule. Although delayed, CJIS staff are happy not only with the products, but that Paradigm4 is honoring the fixed price nature of the contract. Paradigm4 suggested that project implementation could have gone smoother if several things occurred. They would have liked better communication between vendors; and they felt there was a lack of timely responsiveness between vendors. They also felt the customer should have been a more aggressive mediator between the numerous vendors on design and other scope issues.

Marketing and Training

While original “marketing” of this type of project began in 1993, active education and training for CJIS began in August of 1998. A mailing went out to all users, and approximately 500 representatives from local agencies attended a series of three conferences held at the Kansas Highway Patrol (KHP) Academy in Salina. The conferences were one or two days each and had training and breakout discussion sessions. The first conference’s focus was “here’s what’s coming,” the second covered technical issues, and the final one had more technical issues and an installation schedule. A fourth conference was conducted strictly on security; KBI wanted to answer
the questions of “how do I know if I’m secure?” and “how will my network interface?” In
addition, a series of six regional sessions were held throughout the state in December
1998 to demonstrate the local applications and update agencies on the project status.
The first round of training finished in February 1999. Web-based training was due to
start in the summer of 1999.

In November 1998, Paradigm4 and BSE trained KHP and KBI staff in many of the
products and tools that will be used to manage and enhance the systems. This type of
training will continue throughout the project. The Highway Patrol has done the training
on the Datamaxx terminal interface and will be doing the Paradigm application
functionality training as well. They are using a “train the trainers” approach, so each
agency is sending one or two people.

**Staffing**

Additional KBI technical staff were hired for the implementation of CJIS. Key people
include an Information Resource Manager and an information technology expert to
handle security issues. The KBI Information Technology Unit now has six people. In
addition, the hotline and field auditing staff had some paperwork reduced and were then
re-trained (on the job) to provide a Help Desk for IT issues (six people) and security (two
people). One employee remains to handle the traditional functions. The questions have
ranged from “how do you turn on the computer?” to very technical programmatic issues.
Some customers had problems at the beginning, but as the project has progressed, the
Help Desk service has been improved. They also put together a Frequently Asked
Questions handout.

**Interface with Regional Justice System (ALERT)**

Another CJIS implementation issue that the state faced was the need to interface with
ALERT, the existing Kansas City regional justice system that serves more than one-
quarter of the state’s population (as well as part of Missouri’s population). In addition to
the bi-state nature of the system, there were other technical as well as political obstacles
to overcome. Although many have been overcome, CJIS staff realizes there will
continue to be related challenges in the future.

**Impact Phase**

In one year, the KBI went from ten micro-computers and a bunch of dumb terminals to a
new network and 150 micro-computers. Similar impacts occurred in almost all the other
agencies involved in CJIS activities at both the state and local levels. As of March 1999,
CJIS was available to 250 Kansas law enforcement offices with 4,000 employees, and
they expect to reach 750 offices with 12,000 law enforcement officials by the end of the
year (Korzeniowski, 1999). The KBI Director summed up the project’s impact when he

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7 Unfortunately, many locals had no idea what their network even looked like and wanted KBI to assist.
There were not enough KBI staff to support all of the requests, and they recommended to the locals to
hire security expert consultants.

8 When the Help Desk employee responded, “Didn’t you attend training?” the befuddled officer said, “Yes,
but the computers were already on.”
stated, “Four years ago, Kansas ranked at the bottom of criminal history—we were a joke. Now, Kansas is the only state allowed to send FBI criminal history information through the Internet.”

**Benefits for State and Local Agencies**

KBI agents have experienced great benefit from the new network. They are able to quickly collect information and graphics that were previously inaccessible. A couple of years ago, an officer or agent needing a criminal history record from the KBI had to mail in a request, receiving a written response several weeks later; the result now can be downloaded in about three minutes (if the record is complete and automated). Besides timeliness, other benefits being realized by the state include improved accuracy, reduced paper and paper handling costs, low-cost data circuits (Internet), fast statewide communication (via email), image transferability, off-site backup, and security awareness and protection. In addition, there have been and will be numerous benefits to local jurisdictions. These include faster, accurate reporting; access to new data; free email; faster, low-cost circuits; image retrieval; Livescan capability; and off-the-shelf components (Schaefer and Rohr, 1999).

**Challenges**

There were a number of challenges faced in implementing CJIS (Schaefer and Rohr, 1999). Funding projections and sources were estimated accurately except for the high-level security. In addition, there were unplanned annual maintenance, staffing, and security consultant costs at the state level. At the local level, there were unanticipated hardware/software acquisition costs and security outsourcing. Many of the locals had no idea what they needed or how to manage the new system. Because there were so many agencies involved in the project, there were turf issues regarding location of systems and maintenance of data. Because so few people and agencies had email in the planning stages, communication was difficult and costly. Finally, deployments of the systems throughout the state and new support responsibilities were also obstacles that needed to be overcome.

**Key Factors for Success**

Even with the plan and governance structure, some feel that CJIS was just too big to implement as one project. Instead of tackling the whole thing at once, they believe, it would have been easier to develop subsystems individually. The enormity of the one system was a drain on staff, and communication with and collaboration between multiple vendors was difficult. Another lesson learned was that the funding entity should be heavily involved in the project (the Sentencing Commission managed all of the grants and distributed the money but was not an active player). Although some interviewed felt there were very few turf battles between Advisory Board members, others noted that the CJAB mitigated several of these battles—often between historical combatants. With respect to support, the courts generally supported Phase 1 for law enforcement and hope law enforcement will, in turn, continue to support the courts during Phase 2.

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9 The initial budget was $18,000 for one firewall, while the final cost of the security system was $485,000.
Several people involved in the project attribute at least part of the success to the strategic plan. They feel it kept them on track and gave them direction. Another reason for the success was that it was well financed. Besides grant money, the Legislature saw the need and was willing to spend a large amount of the state’s money. Lastly, others attribute the success (and would recommend this to others tackling large-scale projects) to the governance structure and quick successes for customers. The governance structure, set up across agencies, kept in mind the project’s impact on the needs of everyone involved, such as keeping the cost down for locals and the availability of information for citizens. The quick successes gave the customers results and not just promises, which allowed for better buy-in.

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10 Funding was a big issue in 1999 and is again this year as different entities try to re-allocate state funds to other areas, especially in extremely tight times.
Attachment 3: Local Application

Assessment and Decision Making Phase

One goal of CJIS was to address needs of the local agencies while fulfilling the state’s need to receive electronic submission of CJIS information. The idea was to create local applications for law enforcement, prosecution, and supervision to interface with the statewide CJIS. KBI’s first, unsuccessful attempt to get information from the local agencies lasted from 1989 through 1993. That effort was largely unsuccessful because it offered little that helped local agencies. The primary difference with the current CJIS project was that the local agencies were involved from the beginning. Users had input, and the new system would benefit the officers and agencies in addition to benefiting KBI by eliminating some of the latter’s data entry load.

The original plan was to create a system for the small agencies—the majority of law enforcement, prosecution, and probation entities in Kansas.

Procurement Phase

The local applications contract RFP was released in mid-1997, and three vendors submitted proposals. They were Business Software and Equipment (BSE), CTA, and a small family business that had done programming for local justice agencies in Kansas. It was not feasible for the small firm to take on such a huge project. CTA came in with a high cost and no previous experience. Although BSE did not have criminal justice experience, they had done client-server work and TCP/IP applications across multiple jurisdictions and proposed a reasonable price. The contract was awarded to BSE in the summer of 1998.

BSE and the state put together separate design teams for each of the applications. Some groups went more smoothly than others. Users on the design teams pushed for more functionality than the original RFP specifications, and BSE agreed to deliver some of the items. Getting the users’ buy-in during the design stage was imperative to creating a successful system. The local system was created in Microsoft Access, but some of the larger agencies (who were not included in the original plan) saw the system and wanted one, too. BSE was awarded a separate contract in the fall of 1999 to develop a similar application in Visual Basic/SQL Server for the larger jurisdictions.11

BSE felt that the original RFP schedule was unrealistic and negotiated a new one. They worked with selected agencies throughout the state to implement the initial interface but also had to work within certain development constraints based on Paradigm4’s progress. Because the overall project was so complex and had multiple committees, vendors, and new policies, minor changes caused massive delays. Some of the delay was caused by the inter-linking aspect of the applications and the fact that they shared a common code base for the core of each version. BSE had 15 people working on the project at various times.

11 The original MS Access-based version could not support enough users to work in larger agencies. The Visual Basic/SQL Server-based version should be deployed during the spring and summer of 2000.
Implementation Phase

Local applications for law enforcement and prosecution were installed in a few sites on a pilot basis in December 1998. Although KBI was using their web site and other marketing tools such as newsletters to police chiefs and associations, and had visited six geographically dispersed sites for demonstrations, some agencies were still not aware of the project and its progress. Full installations began in March 1999 and were scheduled to go throughout the year, depending on the demand. In total, the state will provide a 56K circuit with router connection to each of the 105 counties in Kansas. Those connections, plus ones paid for directly by additional agencies as part of the network upgrade, will also serve as the path for electronic data submission. Local law enforcement is presently sending the information to KBI via EDI/Secure Socket Layer (SSL) transmissions.

The state covered the cost of the application, but the jurisdictions were responsible for buying hardware and other necessary software (such as Microsoft Office), installing the software, and restructuring their networks. Based on pricing from DISC, KBI had promised the locals that network connections would cost them $365 per month, but in the end it turned out to be higher. While Byrne grant money ($277,000) has covered the excesses for the first year, CJIS is trying to find a way to continue to make the project cost effective for the locals. Some of the local jurisdictions are using separate grant money to fund hardware and network modifications.

Training and installations were done regionally. Training for law enforcement lasted two days—one and one-half days on the application functionality and a half-day on system administration. Computers were transported in a trailer, and a hotel classroom was used for 15 students at a time. The state paid for one person to be trained from each installing agency, and agencies can pay to send additional people.

BSE provided a one-year warranty for the software, starting with delivery of the software to the state, but had not yet negotiated a maintenance or upgrade contract. Several agencies noted BSE was very responsive and customer-oriented and had provided “corrections” to the system as needed. As part of the original contract, the state has an unlimited license to distribute the software to any agencies within the state and shares ownership of the applications. The state strongly encourages agencies going to new applications to use BSE, and future modifications and upgrades will be through BSE. The state, because it has ownership, could provide the code to someone else if BSE were to no longer support the applications.

Impact Phase

One accomplishment of the CJIS-local law enforcement project was to bring the state and local agencies into a partnership. In the past, it was often the state telling the locals what they had to do, what they had to buy, and how to do it. With CJIS, the locals were able to have a voice in the governance structure, input in the design of their applications, and a smooth process of communicating information. Many people interviewed agreed that the project would not have succeeded had they not obtained input from users at all levels of the local agencies. One person added that it was a cost and ease of use benefit to give the local agencies the ability to make acquisitions through blanket state contracts and purchase orders.
Local agencies had various reasons for wanting the new BSE application. Some did not have a computerized records management system, others wanted a more user friendly system for officers and records clerks, and some valued the ease of data transfer to KBI. The system was still relatively new to most agencies and each was finding benefits in different ways. One of the larger jurisdictions was concerned with the robustness of the application, but was looking to test it and get upgrades over the year. They were really enjoying the new ease of transfer of data—getting it out of Access rather than a proprietary system.
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This case study focuses on crime analysis and mapping technology acquisitions and related applications. It is one of 18 case studies prepared for the “Technology Acquisition Project” administered by the Institute for Law and Justice in partnership with Government Technology, Inc., and funded by the National Institute of Justice (NIJ), U. S. Department of Justice. The author of this case study is Julie Wartell, Senior Research and Technology Associate, Institute for Law and Justice. The report has been reviewed by the participating site but should be considered a draft pending final NIJ review.

Background on the Project

This case study looked at the acquisition and implementation of crime analysis and mapping technology in the Malden, Massachusetts, Police Department. In 1997, the Malden Police Department (MPD) applied for and received a COPS Problem-Solving Partnership grant to use crime analysis and mapping technology to combat commercial burglaries. The Department had no crime analysis capabilities at the time, and through the grant was able to purchase hardware, software, and consulting, and to staff an analyst position. A unique aspect of this project was a new and very effective partnership with the Malden Chamber of Commerce. The key person involved in Malden crime analysis and mapping is Steve DiNoto.

The MPD serves a population of 51,000 and covers 5 square miles. There are approximately 100 sworn and 6 civilian personnel. The command staff consists of four captains in charge of patrol, criminal investigations, executive responsibilities, and training/research. Crime/Disorder Analysis reports directly to the Chief and consists of one analyst who serves all aspects of the department. The MPD is in the process of shifting from three patrol sectors (each covering one-third of the city) to 18 patrol neighborhoods (defined by a city survey about ten years ago). The analyst handles requests from patrol, investigations, crime prevention, and management.

There is presently no information technology unit or plan within the Malden Police Department. The acceptance and utility of the crime analysis/mapping system has prompted more technological changes in the near future, such as a new CAD/RMS. In addition, the crime analysis success in Malden has spread to neighboring jurisdictions. Some are purchasing similar systems as well as making philosophical and functional changes in their departments. In general, Malden’s implementation of a crime analysis unit and process has greatly enhanced policing operations, management accountability, and problem solving.
Summary of the Technology Solution

In 1997, the MPD had no means for crime analysis and mapping. Through a grant, Malden was able to begin doing crime analysis, using a newly developed application, off-the-shelf software, and established procedures. The primary technological solution was the creation of a customized mapping and analysis application called CrimeInfo. It was developed by Charles River Technologies using the MapInfo Geographic Information System (GIS) as a base. As part of the consulting contract with Charles River Technologies, Malden also purchased and fixed up a Middlesex County base map. The total cost for software, data, and customized development and installation was $10,000. In addition to the above, Malden purchased a CD ROM of demographics; downloaded digital photos from the MIT (Massachusetts Institute of Technology) web site; and uses crime, arrest, and calls for service data from their CAD/RMS. By the end of 1998, Malden’s new crime analysis/mapping system was up and running.

Assessment and Decision Making Phase

As community policing was sweeping the nation, the previous Chief saw the need to get involved in crime analysis as part of this effort. He realized that the department needed to advance in computer technology to survive. Hence, the MPD decided to apply for a grant to start crime analysis and advance problem solving in Malden. The grant started in July of 1997, and MPD received a one-year, no-cost extension.

For the grant, the Department chose to focus on reducing commercial burglaries, which had been on the rise unlike most other crimes. Because the victims were Malden businesses, they would be an obvious partner in combating this problem. At the time, the MPD had not yet done much outreach with business, and the business community’s perception of the Department was not overwhelmingly positive. The initial approach by the MPD to the Malden Chamber of Commerce was misunderstood; the Chamber’s role in the partnership was not clearly defined, and some on the Board felt they were simply being asked for work and money. After the misunderstandings were cleared up and the Chamber realized the Department only wanted input and support, the partnership has gone extremely well.

One of the first tasks of the project was to form an advisory committee. This committee was made up of the Police Chief, Chamber President, several Chamber Board members, the Mayor’s top aide, the grant evaluator (a local college professor and facilitator of the meetings), the Crime Analysis Director, a police captain, one or two patrol officers, commercial sector representatives, and the local media. In addition, several others from neighboring jurisdictions attended the meetings, including police chiefs, Chamber of Commerce presidents, and patrol and MIS officers. The committee looked at equipment options, surveyed the business community (to ascertain business demographics, crime and safety priorities, and perception of the police), and made collaborative decisions about technology implementation. They met monthly for about one year until the system was up and running; and they now meet as needed for special decisions. The monthly meetings provided an opportunity to discuss concerns and craft joint solutions.

Another project start-up task was to provide whatever analysis was possible with the limited technology. A department employee developed some ad-hoc programs, and the analyst used raw data from the mainframe to perform manual analysis. This method
sufficed until the new application could be developed. The desired goals of the crime analysis/mapping application were (1) a heightened awareness among patrol officers, (2) the ability to identify crime patterns, and (3) the ability to do strategic planning analysis. They also wanted to ensure that the application was comprehensive, flexible, intuitive, and easy to use.

**Procurement Phase**

For the actual procurement of the system, Malden used a comparative bid process (required for purchases over $1,000). They needed to get at least three proposals. In February 1998, based on his research and knowledge, the crime analyst contacted ESRI and MapInfo (two of the largest desktop GIS providers), and BIS (the current CAD/RMS vendor for Malden). The quote from BIS, during a telephone conversation, was higher than the others and primarily included data conversion/translation. Because Malden had to meet more needs for less cost, BIS was eliminated from the process. ESRI sent one of its partners, Omega (maker of CrimeView), to Malden for a presentation. Although they gave an impressive presentation, their quote was also high, and they were unable to satisfactorily answer several of the committee’s questions. The committee decided they wanted a product that was more customizable and the ability to work closely with the developer. In addition, Malden was concerned that service might be more difficult to obtain since the location of ESRI and Omega were on the opposite coast. The MapInfo partner, Charles River Technologies, had a reasonable price, was willing to work closely with the MPD during development, was very customer-oriented, and was located nearby.

The presentation evaluation team included the Chief, patrol commander, system administrator, investigations lieutenant, administrative/grant captain, analyst, one or two officers, and a Chamber Board member with a technical background. The decision to go with Charles River Technologies, based on monetary and managerial issues, was unanimous and quick. After discussions about what the vendor would provide, Malden signed a purchase order with Charles River in March 1998.

**Hardware and Software Purchases**

The grant funds covered hardware, software, training, and attendance at a conference. Hardware purchases included five workstations, two laptops, and an LCD projector. MapInfo, Streets Pro Plus and Claritas Demographic Data rounded out the software purchases. CrimeInfo, the customized software application, was developed by Charles River Technologies. The application license cost $495, and two licenses for MapInfo Pro v. 4.5 were purchased for $2,190. The purchase order specified a cost of $6,000 to include 80 hours of consulting (for integration of data, interface changes, and additional functionality), installation and training, and 90 days of free telephone support for MapInfo. Both the vendor and the MPD agreed that many more hours were put into this project, which was a benefit to both in the long run. Even though all software and hardware were purchased through state contracts, the MPD felt the city’s purchasing process was cumbersome and slowed their process down.
Development of Crime Analysis and Mapping Application

Because the crime analysis/mapping application was being custom developed for MPD, several people had input into its functionality and design. The captains were asked for criteria for what they wanted officers to be able to do. They came up with a list of about 50 ideas, including the capability to query and map calls and arrests by sector, time of day, and modus operandi. Based on this input, the analyst worked with the consultant on the technical design. The vendor used a shell that he had created and added multiple data layer integration and analysis functionality. With two people working on development part-time, and additional requests and changes coming from MPD, the final product took a little longer than originally anticipated.

The successful development of CrimeInfo would not have occurred without key elements from both sides (vendor and police department). Charles River brought an expertise in GIS and programming while the MPD brought a vision, functional objectives, and law enforcement knowledge (critical for useable, effective software).

Data Required

A variety of data was needed for the system. The StreetPro v.4.0 Middlesex County base map (streets, water, railroads, landmarks, etc.) and Claritas block group demographic data were obtained through Charles River Technologies. This cost $725 and $350 respectively for five user licenses. Malden downloaded digital photos (1/2 mile resolution) from the MIT web site and gets all of the crime, arrest, call, and sex offender data from their own CAD/RMS. A major part of the overall application development was the creation of a method to export and import the necessary data into the new program. Because there were data fields which department personnel wanted to analyze but which were not currently captured, some modifications to the CAD/RMS and data entry process were required. For example, call types for burglaries were distinguished only by in progress and not in progress; this was changed to distinguish commercial from residential as well.

In addition to CrimeInfo, the analyst uses several other software packages for reporting, analysis, and presentations. These include MS Office, Spatial and Temporal Analysis of Crime (free from the Illinois Criminal Justice Information Authority), SPSS, StatView SE & Graphics, and FileMaker Pro. The various off-the-shelf applications were purchased through the department budget or obtained through a local university and neighboring police department.

Implementation Phase

CrimeInfo was created as a point and click interface. There is a floating icon-task bar containing everything the user needs to run the program. The only typing necessary is for specific address and name requests. Users can search by call type, charge, modus operandi, address, buffer, demographics, and name (only in arrest and sex offender databases). They can also do trend analysis by quarter, by neighborhood, with any dataset. Although the grant specified the implementation of crime analysis technology to target one problem, commercial burglaries, Malden decided from the beginning that it could be expanded and used to deal with other crime and disorder issues.
Example of GUI:

The system was installed locally on several computers throughout the department. The first application installed for the officers was the same as the one for the analyst, but there were several problems. Officers were trying to use more functionality (through the MapInfo menu bar) than intended on the icon-task bar and were continually crashing the system. The exit and save default for MapInfo was also a problem. The re-release of the program eliminated much of the menu bar and provided a different save/exit option. Each computer is equipped with a zip drive, and officers can receive zip disks by request to save their work. The department has plans to implement a LAN by the end of the year, and the crime analysis/mapping system will be moved at that time.

Training on the new application was given to the analyst by the vendor. The analyst, in turn, did the department training. All department personnel were required to attend eight hours of training in December 1998. Four hours were on the mechanics of the system and four hours were on the application of the system to problem solving. In addition, the analyst created a “workbook” with screen shots, explanations, and examples. There has been a lot of one-on-one training since.

One of the most effective capabilities of CrimeInfo was the ability to use the data from the CAD/RMS in a relatively straightforward, easy process. At least once per day, the analyst uses the Procomm Plus terminal emulator and adhoc programming (done by the vendor) to do “captures” of calls, incidents, arrests, and sex offenders. Each are brought in as a
separate text file and geocoded in CrimeInfo (using the menu). Due to the importance of the sex offender dataset, it goes through one extra step, through MS Excel, and is manually geocoded for 100 percent accuracy.

Primarily using CrimeInfo, but in conjunction with the other technology, the analyst can provide a wide array of products. He does bulletins of emerging trends and trend prediction, maps and charts of annual statistics, and patrol allocation recommendations. In addition, he uses the software to identify and analyze problems and make tactical recommendations based on brainstorming with officers. Since Malden implemented their version of Compstat, there has been an increase in requests by the Officer in Charge and Chief. No other city departments were using GIS prior to the MPD. This has led the MPD to do some statistics, maps, and analyses for other city departments and local agencies upon request. These have included grant applications and community relations projects.

An example of straightforward, simple analysis functionality is shown below.
The graphics that follow are examples of map products.
Impact Phase

Benefits of Crime Information

CrimeInfo is one tool in the crime analysis arsenal of the Malden Police Department. The combined technology and the commitment to “doing” crime analysis have been very positive for the department. Even before the implementation of CrimeInfo, the crime analyst was able to show success using off-the-shelf software and his experience and training.

For example, there was a rash of gas station holdups in Malden and Medford (the neighboring city). The analyst was given all of the case information and was asked what the department should do. Based on his analysis, he recommended additional people in a specific area on Thursday and Friday between 1800-2000 hrs. At 1745, within the designated area, a gas station called about a suspicious vehicle. The detectives stopped the car and were able to get previous victims to identify the suspect, leading to his arrest.

According to many, CrimeInfo has been everything Malden anticipated and more. They are extremely pleased with the system and continue to find more uses for it all the time. Besides tactical applications, Malden is using CrimeInfo for strategic decision making as well. One example is for the redeployment of officers to a Community Service Sector Plan. Various maps and data were produced showing the distribution of calls for service, incidents, and arrests with five different sets of proposed boundaries. With this information, the police unions and the Department were better prepared to choose the
optimal plan. At the time of writing, one agreed upon plan was in negotiations, and the Analyst had provided more in-depth data and maps based on this chosen plan.

The Chief admitted that the system and capabilities had gone beyond his expectations. He would like to see more officer involvement because he feels it is such an excellent tool—to show where problems are (“we can’t hear about everything”), hold people accountable, and reduce the time and resources needed to fulfill requests. For example, sex offender searches would take an officer over two hours to do without the system; now the streamlined process takes two minutes (“about five clicks on the computer”). This saves time for the officer, the department, and the public. The Mayor suggested that MPD might want to start mapping and analyzing incidents from the graffiti hotline (captured by the Mayor’s office).

The vendor noted that upgrades to CrimeInfo (as he sells it to additional agencies) will likely be free to Malden because they were so instrumental in the original development. The vendor-customer relationship in this project has been truly beneficial for both sides. They both were flexible, understood each other’s positions, and had the same goal—a good product. This success may have also been partially due to both parties being so small, which reduced the bureaucracy and complexity of each interaction.

Some advice given by the vendor to others was, “Don’t expect much from a shrink-wrapped product and no support—expect to pay for everything additional.” His example was that many crime mapping products do not include the difficult processes of data integration and geocoding. A related recommendation comes from a Chamber Board member. He strongly encourages law enforcement agencies to use computer-related businesses and community members as resources from the “get go.”

**Officer Acceptance**

Not all officers interviewed have added CrimeInfo to their repertoire of policing tools. One noted that his duties were mainly reactive and he still liked to “use napkins and memory.” Another felt that resources should be spent on more basic things, like ensuring that all the computers in the cruisers worked, before getting to the “bells and whistles.” There was a concern from the police unions that they were not involved in the process as much as they should have been. A lieutenant mentioned that although he uses the system once or twice a week, he rarely sees the detectives on the computer. A captain summed it up well when he said, “The more aggressive guys jumped on it, but [with] any technology in older departments with older men, you get resistance.” He added that the department should not move too fast and should let the officers get used to it before going for more.

A lieutenant echoed these sentiments. He believes that the system is user friendly—for those who have existing computer knowledge. This lieutenant said that the main difference with having the new technology is the ability to look at trends and patterns graphically. He noted that the biggest advantage he has seen is in regard to working with the community. Officers and detectives are now able to go to community meetings better armed with information and maps. In addition, management is able to see where crimes are occurring and deploy resources appropriately. Like the Chief, he believes the technology is not yet being used to its potential.
Next Steps and Recommendations

Based on the success of crime analysis/mapping in Malden, the MPD recently applied for but did not receive a COPS More grant to expand the technology into a tri-city analysis application. Although very disappointed, MPD is not completely deterred and is providing crime analysis assistance to one of the other cities while they implement their own program. In addition to advancing the analytical and operational capabilities of the MPD, the Chamber President felt this project was an important bridge – educationally and relationally – between the business and law enforcement communities. Chief Aucoin is now on the Chamber Board and has been an excellent resource for Malden businesses on public safety-related issues. In addition, the partnership has been part of an ongoing police department problem solving process, which started by choosing to attack commercial burglaries, and which is expanding continually.

Referring to the overall success of the project, the analyst noted, “You can have the best innovations and technology but it will not work without the focus.” Many people interviewed agreed that the project would not have been as effective without the right leadership and the right people. Several elements contribute to the success of implementing a new technology, they said. Besides having the necessary technology available, departments need a plan, sufficient funding, appropriate personnel, and training. Chief Aucoin added, “Knowing the Mayor and city government are behind you is also very important.” Even the people directly involved in the whole project were amazed at how much they accomplished – new technology, vision, and a strong partnership – in 18 months.
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Abstract

In September 1996, the North Miami Beach Police Department (NMBPD) began discussing the need to replace their legacy computer aided dispatch (CAD), records management (RMS), and mobile data systems. The Department prides itself on being forward thinking and open to the use of technology to increase efficiency. Spurred by a strong community policing orientation, the Department’s executive staff wanted to provide patrol officers and detectives with full access to departmental information systems through the use of personally assigned laptop computers. Unfortunately, the Department’s current information systems were not up to the task.

The CAD and RMS systems in place at that time were DOS applications with fragmented flat-file databases. Designed at a time when mobile data was a rarity for smaller jurisdictions, the systems were not accessible from the Department’s mobile data network. Hence, officers in the field could not submit inquiries to the Department’s CAD or RMS systems. As more users were added and more demands were made on the legacy applications, system performance was beginning to lag as well. Finally, when NMBPD implemented its community policing initiative, timely data analysis became more important. The design of the Institute for Police Technology and Management (IPTM) applications did not adequately support the Department’s analytical needs under community policing.

As a result of these shortcomings, an internal study group was formed to define the Department’s requirements. This resulted in development of a Request for Proposal (RFP), released in November 1999, for an integrated police information system. As a result of the RFP process, Open Software Solutions, Inc. (OSSI) of Greensboro, North Carolina, was selected as the prime contractor. The OSSI solution included CAD, RMS, and mobile data applications and a message switch from New Beginnings Solutions, Inc. OSSI was also contracted to provide data conversion, training, and installation services.

Implementation of the system began in early 1999. The original implementation schedule called for an 18-month development and implementation. However, after 13 months, all of the major systems have been installed and the project is ahead of schedule. According to the NMBPD project manager, the Department is very pleased with the new systems and believes their original goals will be more than satisfied by the OSSI systems.
Background on the City and the Police Department

The City of North Miami Beach is located midway between Miami and Ft. Lauderdale and is adjacent to the interchange where I-95, the Florida Turnpike, and the Palmetto Expressway meet. Known as the “Crossroads of South Florida,” North Miami Beach is part of the thriving Miami-Dade County region. Centrally located within the region, North Miami Beach has become a major regional shopping area and office location. The city is comprised of 18 neighborhoods, with a resident population of approximately 35,000.

The North Miami Beach Police Department (NMBPD) is a full service police agency. Staffed by 107 sworn officers and more than 50 support personnel, the Department is lead by Chief William B. Berger. It has three major divisions—administration, special services, and uniform services—and provides an array of specialized services. The Department’s investigative unit handles all criminal investigations in the city, including arson investigations. The NMBPD K-9 unit provides canine services in the city and on contract to several nearby municipalities. The city has its own traffic enforcement unit, which conducts routine traffic enforcement as well as fatal accident investigations. NMBPD also has a full-time vice and intelligence unit, which works with local, state, and federal investigators routinely. The NMBPD marine patrol unit includes two full-size vessels and four personal watercraft. Other units include an honor guard, dive team, special response team, and bike patrol. The only major service that NMBPD does not currently have is E911. Emergency communications services for the city are currently provided by Miami-Dade County Communications; however, NMBPD plans to assume this responsibility in the near future. The city currently handles 30,000 calls for service and completes approximately 9,000 crime reports per annum.

Assessment and Decision Making Phase

Problem Statement

In 1989, NMBPD began using the Call Trak computer aided dispatch (CAD) system and the Police Trak records management system (RMS) provided by the Institute for Police Technology and Management (IPTM). Both are character-based DOS applications that ran in a Novell Netware environment. By 1996, the Department and the IPTM databases had grown substantially. Because of the increase in users and the size of the files, the performance of the IPTM CAD and RMS systems was unacceptable.

The architecture of the IPTM products was also a problem for NMBPD. Instead of being one application, the RMS was actually a number of different applications tied together by a main menu. Each application had its own database that was separate from every other module. The application databases had no master name index, either individually or collectively. As a result, if the same person was entered in the arrest module and the field interview module, there was no indication to the user. Further, if the same person was entered into the arrest module more than once, the application was unable to link the records automatically. The lack of a master index created significant reporting problems, since the applications had to search every name every time an inquiry was run. In practice, if a query with two or more variables was submitted to the RMS applications, it could take the system 30-45 minutes to search all the files. The IPTM applications also

http://www.zfour.com/Community/nmb/community.htm
had problems with record locking. If one user was reviewing a record and another user tried to open the same record, the application frequently froze and had to be rebooted. Occasionally, a user machine would crash while it was connected to the IPTM system. This generally corrupted the database or indexes and required a two- to three-hour repair process. Field operations were also hindered because the IPTM software did not support field reporting directly.

The IPTM applications were also functionally unable to meet the Department’s expanding needs. For example, because of the flat file database format, the Department had to export crime and activity data for analysis. Thus, in order to support crime analysis activity, Steve Tesch, the records management supervisor, had to use a multi-step conversion process. With this system, Tesch first exported the IPTM flat files to Microsoft Access through a program that he wrote. Through Access utilities, the data was then converted to a dBase file format. The dBase data could then be plotted on a street map using a popular mapping system (ArcView) from the Environmental Systems Research Institute (ESRI). On average, this convoluted process consumed several hours every time it was performed. This both delayed the analysis of the data, and was an inefficient use of staff time. Since the Department relied on data for management reports, daily activity reports, trend and pattern analysis, and community reports, the inability to access data efficiently was one factor in the decision to procure new technology.

Another motivation to upgrade the police information system was the Department's mobile data system. In 1989, the Department hired two separate firms to develop a mobile data system. Working together, they used a Tandy notebook computer running on AA batteries, modified the IPTM software, and loaded it into the laptops' internal memory. Using a small radio/modem built into a stainless steel briefcase with an extendable antenna, officers would transmit their report data to the station. At this point, it was imported into the main database. Unfortunately, the IPTM system used Word Perfect for narrative files, so NMBPD had to figure out how to load Word Perfect onto the laptops and transmit those over the radio, too. Once all this worked correctly, the technologists had to figure out how to hold the field reports until they were reviewed and approved. In the end they worked out all the kinks, but it was a long and less than ideal process.

In 1991, the Department also added car-to-car messaging and an interface to the state’s criminal information system. While the system was ahead of its time, it had some limitations. For one, the mobile data system was aging. Developed in 1989, it used computer technology that was out of date. For another, transmission speeds on the system were slow, since it ran on the Department's own radio frequency. To make the system work, NMBPD had to develop almost all system components from scratch. Keeping these various pieces working was a challenge and required substantial time from the IT staff. Functionally, it was never possible to interface the mobile data system with the IPTM files directly.

When the study group began their work, there was a strong desire within the Department to obtain a mobile data system that was more seamlessly integrated and to implement a fully integrated field reporting system. The study group envisioned officers having the ability to complete incident, traffic accident, arrest, and field contact reports directly from their vehicles. They also wanted investigators to have access to departmental information systems via the laptops during field interviews and crime scene investigations.
Needs Analysis

Based on the degraded performance of the IPTM systems and the need for more advanced technology to support community policing and other initiatives, the Department formed a Technology Committee in September 1997. The Committee had representatives from virtually every major area of the Department. Deputy Chief Andrew Scott chaired the Committee, and the Information Services Manager was appointed as the technical expert. Shortly after the Committee started its work, the IS Manager was terminated and the Chief appointed Detective Kevin Morrell to replace him on the Committee. Detective Morrell had previous information systems experience from his service in the armed forces and was a part-time computer networking consultant.

The process of developing the actual RFP was a collaboration between the unit representatives and Morrell. Morrell describes the process this way:

I broke the process down into several stages. First I formed a team by getting one rep from each unit. That rep acted as a spokesperson from that unit and was asked to provide a “wish list” of things they wanted to get in a new software solution. Several revisions of the wish list went back and forth (keeping the wish list realistic) until I finally had enough solid information to begin creating an RFP. I also took several rep’s to see canned products from various software vendors. Many other software vendors were invited to give us demo’s of their canned products. All of this was done while I was creating the RFP and keeping the unit liaisons up to date on a time line.  

During RFP development, Morrell and others also contacted some of the vendors to research their systems. While they did not tailor their requirements to fit any one vendor, knowing what the vendors could offer was helpful in the development of the RFP.

Budget and Funding

One of the important steps taken during the assessment phase was to develop a budget for the new system. By surveying other departments and talking to vendors, Morrell was able to put together a prospective budget of $1.5 million. While this is a significant sum for most agencies the size of North Miami Beach, NMBPD has access to the state’s Law Enforcement Trust Fund (LETF). This trust fund directs money obtained from the seizure of cash and property linked to illegal drug sales back to the departments that are involved in the seizures. A primary purpose for the LETF funds is to purchase new technology. With an LETF allocation of approximately $3 million for 1997, the Department was well funded for the technology upgrade project.

Procurement Phase

Request for Proposal

Based on the Technology Committee’s recommendations, Detective Morrell developed an RFP for a new CAD, RMS, and mobile data system. To ensure the longest possible

2 Personal comments from Detective Morrell.
lifetime for the system, the RFP required a system based on Windows NT and able to operate under the Novell network operating system. After completing the RFP, Morrell sent it to the city’s Purchasing and Legal Departments. These departments added the city’s standard terms and conditions prior to release.

The RFP was released in November 1997. RFPs were sent to the city’s standing technology vendor list and to those responding to an advertisement in a local business review. Following the RFP release, the city held a mandatory-attendance bidder’s conference in December. Approximately seven vendors attended the conference. After reviewing the RFP, many commented that no vendor could supply what was being required. Others complained that the Department was not allowing enough time for proposal development. To accommodate the vendors, NMBPD extended the deadline for proposals until the end of January 1998 but did not change their requirements. Of the vendors that received the specifications, NMBPD received proposals from three: OSS, HTE, and Pamet Systems.

**Vendor Assessment and Selection**

The three proposals represented a broad spectrum of technological, functional, and corporate capabilities. The systems proposed by HTE and Pamet were mature, functionally broad applications. Both systems are based on the IBM AS-400 mini-computer. While the AS-400 is one of the leading departmental computers and still sells extremely well, it is considered aging technology by many IT professionals. On the other hand, the HTE system is also one of the most popular public safety packages, with more than 600 installed customers, including many in the south Florida area. OSS, on the other hand, is based completely on Microsoft’s Windows NT and its latest database technology, SQL Server. Since they use leading edge technology, OSS naturally does not have as many clients as HTE or Pamet, nor have they developed the same functional depth.

Interestingly, to meet the NMBPD mobile data requirements, all the vendors chose mobile data system subcontractors. Both HTE and OSS proposed a system from Software Corporation of America, while Pamet chose a system from Cerulean Technology.

After receiving these proposals from the three vendors, Detective Morrell, the IT Manager, and a few others from the Committee reviewed and scored them. Morrell then called other agencies that were using one of the three systems, including sites that were not listed in the vendors’ proposals, to ask them about their experience. According to Morrell, the key question they asked each site was, “If you had to do it all over again, would you buy another system from your vendor?” Members of the Committee also visited nearby agencies to follow-up on the telephone survey and to ask users about their experience with the system.

In addition, each proposer was invited to demonstrate their product at NMBPD headquarters. According to Morrell, the demonstrations were very helpful. HTE and OSS showed their knowledge of the field and solid product offerings. Pamet, however, had not integrated the Cerulean mobile data system into its product line at that time. They could show mobile data functionality, but they could not show the degree of integration accomplished by the other two vendors. After this demonstration, Pamet ceased to be a serious contender, while HTE and OSS continued to be close competitors.
Although the Committee thought the AS-400 architecture was antiquated and unnecessarily expensive to maintain, HTE was a company of 800 employees that had substantial financial stability. While OSSI had exciting technology and was willing to partner, corporately they were considered a risk. The Committee also thought the price for the OSSI system was too high.

During discussions with OSSI, North Miami Beach discovered that the SCA mobile data software cost approximately $350,000. In discussions with OSSI, it was agreed that OSSI could reduce this cost to approximately $100,000 if the city would allow OSSI time to develop the new software and use a message switch from New Beginnings Solutions, Inc., of Tampa, Florida (NBSI). Since OSSI had no mobile system of any kind at the time, Morrell and others realized that they could help design the new system and make it function according to their specifications.

Once the Committee had selected OSSI as the top contender, members of the Committee made additional sites visits to OSSI customer sites in High Point, North Carolina, and Seminole County, Florida. Committee members also visited the St. Petersburg, Florida, Police Department to view an installed site for the NBSI message switch.

After completing their evaluation, the technology committee selected OSSI of Greensboro, North Carolina, as their vendor. According to Morrell, OSSI was selected for numerous reasons. With respect to architecture, the Committee felt that Windows NT represented the future of computing and not the past. The openness of the Windows platform ensured that numerous office automation and other applications would be available for their use. While OSSI was a small company, the Committee was convinced OSSI was serious about its business; and the Committee was impressed by OSSI's willingness to act as a partner. While none of the vendors could meet every functional requirement of the RFP, OSSI was willing to enhance current software or develop new functionality. The offer of a custom designed mobile data system was also an enticing prospect. Since NMBPD had designed their own system before, they were unsure of how well they would fit into an off-the-shelf solution from Cerulean or SCA.

**System Cost**

According to Morrell, the total cost of the CAD, RMS, and mobile data project will be approximately $1.6 million when it is complete. Of this amount, OSSI was paid $870,000, including approximately $660,000 for software licensing and a mug shot capture station and $210,000 for implementation fees. In addition to the capital cost, OSSI receives $50,000 per year for maintenance and support.\(^3\)

Since the OSSI applications run on Intel workstations and servers, NMBPD decided to obtain their own system hardware. For this project, the Department spent approximately $500,000 to upgrade their system hardware, workstations, and networking infrastructure to support the new system. To support the new mobile system, 130 of the existing laptop computers were replaced over an 18-month period. At the same time, the Department purchased CDPD (cellular digital packet data) modems to effect the migration from their

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\(^3\) OSSI originally quoted maintenance at $108,907 per annum, but this was reduced in return for NMBPD’s agreement to beta test OSSI’s new mobile application.
private radio network to the commercial network. By switching mobile networks, NMBPD also added $49 per month for each of the 150 laptops equipped with a cellular modem.

**Contract Award and Negotiations**

Once the Selection Committee made their vendor recommendation, the decision required the approval of the NMBPD Deputy Chief, Chief of Police, City Manager, City Attorney, and City Council.

North Miami Beach has a decentralized purchasing system that places the primary responsibility for vendor selection and contract negotiations in the hands of individual City departments. NMBPD negotiated directly with OSSI. Detective Morrell stated that contract negotiations were the most time consuming portion of the acquisition process. The negotiations during the procurement phase, took nearly a year to complete. Morrell said that 90 percent of the issues involved system costs and payment schedules.

In the end, NMBPD agreed to waive the performance bond requirement in exchange for a beneficial payment schedule and a holdback of monies until final acceptance. This allows NMBPD to withhold $200,000 for application software until OSSI successfully delivers software that meets the complete specifications in the Scope of Work. The contract also set forth a 90-day acceptance period for each application software module delivered by OSSI.

During the contract negotiations, NMBPD negotiated implementation tasks and costs in detail. However, they failed to recognize that a contractual clause requiring NMBPD to pay travel and on-site living expenses for OSSI personnel was not included in the implementation fees. NMBPD later realized they had not budgeted these costs into the total system costs. As a result, they had to make a new budget request to cover those expenses. The total adjustment is expected to be less than $10,000.

Detective Morrell, the NMBPD project manager, says good, open communication with Gary Davis, the OSSI project manager, has kept the project moving forward. OSSI appears to be responsive to NMBPD needs and requests. At this point, Detective Morrell considers OSSI a strong partner in the project.

**Solution Description**

The solution proposed by OSSI is composed of their existing VISUAL CAD and Pistol 2000 RMS applications. The mobile data subsystem will be developed specifically for North Miami Beach and will incorporate a message switch from NBSI. To meet NMBPD needs, OSSI also agreed to add numerous functions to the CAD and RMS applications and develop numerous system interfaces.

The proposed police information system uses a client-server architecture. The CAD and RMS application servers run under Windows NT, while the network operating system is Novell Netware. In this design, OSSI applications run on both the client workstation and the application server.

The NMBPD CAD system runs on two servers. Although OSSI had previously only deployed single server CAD systems, Detective Morrell insisted that OSSI provide a hot
back-up server. Working together, they tested a software mirroring application called Vinca. This application allows every transaction to the primary server to be replicated on the back-up server within a second or less. Thus if one server fails, the other is available to take over.

Each CAD server is a Dell model 2300 with one 450 MHz processor, 512 MB of RAM, and 18 GB of RAID 5 disk storage. The RMS application is housed on a single Dell 4200, dual Pentium 233 processor server. This server is equipped with 256 MB of RAM and 13 GB of RAID 5 disk. The NBSI message switching software runs on a Dell 2300 which is identical to the CAD servers.

The only hardware actually provided in the OSSI contract was a mug shot capture station. This was configured as a Windows 98 workstation with video cards and mug shot capture board. The system included a Canon video camera and lighting components.\(^4\)

**Computer Aided Dispatch**

To meet the city’s requirements for CAD, OSSI proposed their existing VISUAL CAD application for three call takers and two dispatcher/supervisors. This consisted of CAD configured for a single agency with standard call taking and dispatching functions. The system includes subsystems for address verification, unit recommendations, premise history, a business and alarms file, and a calls for service reporting module. Each CAD workstation is equipped with a mapping system that allows the location of calls for service and other information to be displayed geographically.

In addition to the standard functionality of VISUAL CAD, OSSI added the following new functions.

- To assist dispatchers in coordinating unit activities, OSSI will add a “**” symbol to the status window to indicate the primary unit for a call.
- So that NMBPD can be more responsive to public needs, the new CAD system will include a Watch Order Module. This module will allow NMBPD to enter and track requests for extra patrols at specific locations, such as homes where the residents are on vacation. To extend the utility of this function, patrol officers will be able to record watch order activity via the mobile data computer. For planning purposes, the module will also include a report of all active watch locations sorted by beat.
- Finally, to manage the process of impounded and repossessed vehicles, OSSI will develop an automated Repossession and Private Tow file similar to the one NMBPD has in their legacy CAD system.\(^5\)

**Records Management**

The OSSI Pistol 2000 RMS package is built on the Microsoft platform. It uses Windows NT as the workstation and server operating system and Microsoft's SQL Server as the relational database. Pistol 2000 provides a broad range of law enforcement record keeping modules as part of the standard package. These modules include:

- Incident/Offense

\(^4\) Contract and Agreement, City of North Miami Beach, Exhibit A.
\(^5\) Contract and Agreement, Exhibit E, Section I, Part C.
In addition to these components, NMBPD also purchased the following optional RMS modules:

- Traffic Citations
- Pawn Shop
- Field Contacts
- Florida Accident Reporting
- Florida Uniform Crime Reporting
- Property and Evidence
- Training

To meet NMBPD's operational needs, OSSI has also agreed to provide a new check box to indicate when a report was “Confidential” or had been “Sealed.” When these classifications are indicated, the report cannot be released. In addition, like most departments, North Miami Beach has large number of false alarms. To help them control this problem, OSSI will develop a module for tracking false alarms and billing owners if they violate the city's false alarm ordinance.

**Mobile Data and Field Reporting**

An important element of the NMBPD information system is its mobile data and field reporting subsystem. One of the Department's primary reasons for buying a new system was to extend its IT systems further into the patrol officers' work environment, thus increasing officer availability and bolstering the community policing program. To meet this demanding goal, the OSSI mobile data subsystem provides digital field communications, access to numerous law enforcement information systems, and the ability to complete most reports from the field.

While mobile data systems have been providing officers with a handy messaging system for many years, the OSSI design for North Miami Beach has raised communications for mobile workers to a new level. Not only will the OSSI design enable digital messaging, but OSSI has also agreed to develop an interface to the Department's Exchange server so that officers can retrieve email from the field as if they were sitting at their desks in the station.

In addition to the new communications capabilities, the OSSI system will enhance the officers’ ability to investigate crimes and provide services. First, the system will enable inquiries not only to the OSSI records management system, but also to the Dade County Criminal Justice System, Florida Criminal Information Center (FCIC), and the National Criminal Information Center (NCIC). Second, OSSI will supply a mapping tool that can be
used with the mobile data computers to map active CAD events, open CAD events, and CAD event historical inquiries.

Finally, the OSSI mobile data subsystem will be augmented with a new field reporting system. In cooperation with NMBPD staff, OSSI is developing a new application that allows officers to report criminal incidents, field interviews, and traffic accidents directly on the mobile data computer. The incident report portion of the system will include:

- Initial Incident/Offense Entry
- Access to VISUAL CAD Call Data
- Entry of Supplemental Report
- Code File Synchronization

The accident reporting module will be integrated with the records management system and will include an interface to a Microsoft OLE compliant, third party sketch tool for diagrams.

To extend the functionality of field reporting, OSSI will also add review and update functions. These functions will create a holding queue for all reports before they are officially committed to the records system. The module will also help ensure that names and locations entered into field reports are correct.

**Message Switch**

Without a message switch to control the traffic between the mobile units and the fixed location workstations and servers, the network would quickly come to a halt. Unlike wired users, mobile users must be monitored constantly. Because of gaps in the CDPD and radio coverage, mobile units drop out of coverage routinely. Applications designed for a wired network where loss of connectivity is a rare occurrence are not equipped to operate in such an environment or, for that matter, to communicate with applications that operate in that environment. Thus, a special purpose computer called a message switch is inserted into most mobile data systems.

For North Miami Beach, OSSI proposed a message switch from New Beginnings Solutions, Inc. (NBSI) of St. Petersburg, Florida. The NBSI switch tracks all mobile users and the messages they send. If a user drops out of coverage momentarily, the switch will hold inbound or outbound messages and validate the user when they return to a covered area. The NBSI message switch is also instrumental in connecting not only mobile users but also wired users to outside information systems. For these interfaces, the switch acts as a traffic cop, routing inquiries and answers from users to the appropriate information systems. The switch also acts as a security agent by vouching for the authenticity of the users who are sending inquiries to other systems and by logging all message traffic. Since NMBPD has access to a proprietary Motorola data radio network as well as the commercial CDPD network, the NBSI switch will also act as a concentrator, allowing units on either network to communicate with mobile or fixed location resources without worrying about which network they are on.
**Miscellaneous Applications**

While the OSSI CAD and RMS applications offer a broad range of functionality, the NMBPD requirements stretched OSSIs capabilities. In order to meet the requirements, OSSIs agreed to develop some new features. OSSIs also sought to satisfy some requirements with third party applications. The functionality required by NMBPD included software applications for fleet maintenance, asset forfeiture, subpoena management, and internal affairs. In summary, OSSIs and NMBPD agreed to handle these requirements in the following manner:

- NMBPD would use Current Software’s *ExtraFleet 2000* for fleet maintenance.
- To support the Department’s asset forfeiture activities, OSSIs agreed to develop a new module for the Pistol 2000.
- Prior to the bid, the NMBPD was using a Microsoft Access database for subpoena tracking. OSSIs and NMBPD agreed that the Department would develop a new system for subpoena tracking using Microsoft’s Exchange server.
- To handle internal affairs investigations, OSSIs supplied a copy of the National Institute of Ethics’ *Award System* software.\

**Implementation Phase**

The OSSIs contract was signed by the city on November 10, 1998, and project implementation began soon afterward. System implementation for this project was unusually complex due to the numerous subsystems included in the project; the development of new modules, added functionality, and system interfaces; and the fact that NMBPD was responsible for the IT infrastructure. From the beginning, the NMBPD staff and the OSSIs project team worked together closely. To further facilitate the process, prior to the deployment of any systems OSSIs developed a Detailed Design Document for the functions that were being added to existing products, new modules, and interfaces.

According to Detective Morrell, the project was divided into three phases. These phases were designed so that existing applications and technology could be brought on-line while new functions and interfaces were developed.

Although NMBPD has a substantial amount of law enforcement information stored in its IPTM system, it was determined early in the project that migrating data to the new system was not cost effective. A list of the names included in the IPTM database will be entered into the OSSIs RMS in order to alert officers that previous records for a subject exist, but beyond this no data will be moved to the new system.

**Phase I - CAD**

During Phase I, the project team installed the CAD servers and application software. The most challenging aspect of Phase I was the development of the CAD geofile. The city had hoped to obtain the geocoded map data required for the CAD address and map files directly from Miami-Dade County. Unfortunately, the county was unable to provide the necessary information. As a fall back, the city approached the local utility company, Florida Power and Light (FP&L), which maintains an excellent street map file of south

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6 Ibid, Exhibit B.
Florida. After obtaining the data from FP&L, the city delivered the data to OSSi, which in turn had it loaded into the CAD by the mapping subcontractor.

Once the base CAD system was up and running, the NMBPD staff tested the system thoroughly prior to training. The first level of training when it began was for system administrators. To ensure that sufficient staff could assist with maintenance of the CAD system, North Miami Beach sent two communications supervisors and three IT staffers to the training class. System administration training precedes all other CAD training for the simple reason that the CAD system must be configured to handle NMBPD units and calls for service before using it in an operational environment. As is common for many CAD vendors, system administration training consisted mainly of an OSSi trainer instructing while leading the students through the configuration of the NMBPD CAD.

Once system administration training was completed and the CAD system was ready for use, CAD trainer training began. By training NMBPD staffs to be trainers, the agency could train new personnel on the CAD system in the future without calling in OSSi. Trainer training lasted for two days, and NMBPD had three staff members attend this course. Once the trainer training had been completed, user training began. To keep the communications center running, North Miami Beach divided its 15 users into three groups. Because the staff had used a CAD application before and the VISUAL CAD application is graphical and almost self-explanatory, each group required only one day of training before implementing the new system on April 7, 1999.

**Phase II - RMS**

Phase II ran in parallel with Phase I to some degree. During this phase, the base RMS system was installed. While the RMS has been running in a test environment since May 20, 1999, the system is not fully operational for two primary reasons. First, in order to meet NMBPD’s needs, several functions were added to the RMS modules. Second, as noted earlier, NMBPD has reported criminal incidents from the field for almost a decade. The Department now has no facilities to enter handwritten reports into the RMS and must wait for OSSi to complete the new field reporting application. In the meantime, some reports such as arrests, field interviews, and tickets are being entered into the system.

**Phase III - Mobile Data Subsystem: Basic Functions**

During the earliest stages of the project, Detective Morrell and one of the line officers traveled to OSSi headquarters in North Carolina. Drawing on their experience with their own mobile data system and their knowledge of law enforcement, the officers worked with an OSSi programmer to design the mobile data subsystem. After a week of screen and function design, the officers returned to North Miami Beach, while the OSSi team completed the coding of the system. Delivered slightly before the CAD was operational, the subsystem was first tested by Morrell and the IT staff. Field officers were then trained for approximately eight hours on how to use the system by Morrell and other field training officers. The day after CAD was implemented in April, the mobile data subsystem was turned on. Initial functions included car-to-car messaging and local/FCIC/NCIC queries. After 30 days of testing the basic mobile data application in the field, it was rolled out to all units equipped with a laptop computer. NMBPD is now waiting for OSSi to complete the interface from the mobile computers to the Department’s Exchange email server, the field reporting subsystem, and the traffic accident reporting module.
Analysis and Summary

While the North Miami Beach project is not yet complete, early reports suggest that it will be a success both technically and strategically. Because of the Department's experience with computer systems, they were better prepared than many agencies to understand and articulate their needs, to assist in the implementation of new systems, and to partner with the vendor in developing a solution that fit their unique needs. Through this solution, NMBPD is apparently on its way to extending its information system further into the field so officers can provide better service to the community.

Assessment and Procurement Phases

Like many agencies, NMBPD chose to use a technology committee to catalog and articulate its IT needs. Due to time constraints and a lack of technical currency, many of the representatives to the Committee expressed their needs in non-technical terms. Detective Morrell was then left to sort out what each "wish list" was really seeking. Although this agency is very familiar with technology, even the casual observer knows that technology moves very quickly. As a result, the process of developing an RFP from the "wish lists" was difficult for Morrell. Also, this method did not force the representatives to understand the final requirements completely. During implementation, this has resulted in some misunderstandings about what the staff wanted the system to do and what the RFP and contract required it to do. Another downside of the committee process was that each member had a "real" job to do at the same time. Detective Morrell reports that this sometimes made it difficult to get feedback from the members on a timely basis.

During their evaluation of the vendors and their proposals, the Committee used several different methods of obtaining relevant information. They read and scored the proposals. They scheduled on-site demos so they could meet the vendors and see their products. They called reference sites to collect personal experience data as well as pricing information. Not content with the reports of those who might have something to lose, the Committee went to reference sites and asked front line users what they thought of the systems. By using all of these evaluation techniques, it is a certainly that the Committee gained more insight than if they had only used one or two. Given the complexity and risk of this project, the additional investment of time and money to make a thorough evaluation was clearly justified.

Implementation Phase

As noted earlier, the implementation is still in progress. OSSl is currently a month ahead of schedule for their project deliverables, and the projected date for project completion is February 2000.

From all reports, the implementation process has gone well for NMBPD. While one cannot say exactly why, NMBPD took many steps that contributed to a successful implementation. First, the cooperative development of the needs analysis helped to involve a broad cross-section of users in the process. In this way, the Committee gathered more information and encouraged organizational ownership. Second, the development of the Detailed Design Document at the outset of the project clearly articulated the requirements for the vendor to successfully complete the project. Third, the combination of technical and domain experience on the core NMBPD team meant that they were able to lead the
process rather than being lead by a vendor. It also meant the Department was in a position to design and implement their own IT infrastructure, significantly reducing the cost of the final system. Fourth, the Department's experience with technology systems meant that the entire staff was better prepared for the project. The staff was better able to evaluate the proposed systems, and users did not require as much training. Fifth, dividing the project into phases allowed the teams to concentrate their efforts on a portion of the project at a time, thus reducing the complexity.

**User Acceptance**

Initial feedback from users seems to be positive. According to Diane McCullough, a Communications Supervisor, the end user training was sufficient for them to be comfortable working with the CAD after one day of training. McCullough also indicated that the CAD documentation was acceptable and that CAD on-line Help allows Communications personnel to enter standard operating procedures in the help file.

In a story passed down to us from Detective Morrell, one patrol officer associated with the mobile data project explained to the Municipal dispatcher why he seldom used the radio anymore to take or finish calls. He said he was using the new software and stated, “This thing does everything but handle the call for you!”

**New Capabilities Enabled by the System Replacement**

Although North Miami Beach comes from a technologically enabled past, the current project promises to extend their capabilities even further. In the NMPBP, unlike many departments, these capabilities will not be the result of new systems but mostly of enhanced replacement systems.

The new CAD will be crucial for the Department to establish an independent public safety answering point for its citizens. By adding mapping to this system, call takers will be able to visualize the location of the caller and see the geographic context of the call. By making this map available in the car, patrol officers will realize the same benefit. Thanks to the Special Watch function, NMBPD will be better able to protect both residences and businesses.

With the enhanced functionality of the new mobile data system, officers will be able to receive suspect, driver’s license, and missing person photos in the field. Their interaction with the dispatchers will be more efficient because of the interface to the CAD system. Once the field reporting system is implemented, officers will spend even less time off the street completing administrative tasks. Incident reports will be completed by officers directly from the crime scene. Evidence recovery, accident, and field interview reports will also be submitted directly from the field. Most importantly, now that the RMS system will be accessible from mobile terminals, officers will be able to perform important investigative functions without tying up the dispatchers or travelling to the station.

NMBPD is also looking forward to the day when they can complete accident reports online. As with most municipal police agencies traffic accidents are a sizable portion of their work; and reports for more serious accidents require sketches of the accident scene. Once the new accident report application is available, the officers will be able to complete the reports and sketches on their portable computers. A final advantage of the new mobile system is the range. Since the old system operated on the North Miami Beach radio system, its range was limited to 16 miles from the tower at headquarters. With the new
CDPD system, officers can communicate with the system from anywhere in the United States that has CDPD service.

Not all of the new capabilities are the result of the mobile data system. Using the most modern relational database available from Microsoft, NMBPD crime analysts will now be able to research historical data, create reports, and disseminate them to officers in the field in hours instead of days.

**Impact Phase**

It is difficult to judge the impact of any technology before it has been operational for a time. NMBPD appears to be well on their way to creating a successful project, but the impact of the technology has only begun to be felt. Clearly, officers are excited about the new systems. Where they have not yet received some modules, Detective Morrell says they sometimes express impatience and frustration. But like the patrol officer who said the mobile data system did everything but answer the call, officers are clearly expecting the system to have substantial benefits.

Not content with a well run acquisition and project, NMBPD continues to play a smart technology game. Now that the base systems have been deployed, Detective Morrell has had each business unit designate an IT liaison. These people receive all trouble reports or system issues from members of their unit and pass them along to IT and the project management team. In this manner, end users get immediate feedback for some problems. For other problems, the IT liaisons are saving the IT staff time by learning to articulate the problem reports more succinctly. The IT liaisons also function as a single point of contact for the IT staff.

To properly manage expectations, Detective Morrell attends regular staff meetings and provides project status reports. He also uses Department email to provide project updates to end-users. For their part, OSSi provides regular progress reports and Detective Morrell disseminates this information within the department.
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Contact Information
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Technology Acquisition Project
Case Study

Monroe County, Florida, Sheriff’s Department

This case study focuses on laptop and wireless mobile data communications technology acquisition. It is one of 18 case studies prepared for the “Technology Acquisition Project” administered by the Institute for Law and Justice in partnership with Government Technology, Inc., and funded by the National Institute of Justice (NIJ), U. S. Department of Justice. The author of this case study is Raymond Dussault, Research Director, Government Technology, Inc. The report has been reviewed by the participating site but should be considered a draft pending final NIJ review.

Background on the Project

This case study focuses on the wireless mobile data communications system implemented by the Monroe County Sheriff’s Department in South Florida. Despite the department’s size—it is relatively small, serving around 80,000 residents—and its isolated location, several unique aspects of the project provide excellent information for other law enforcement agencies.

The mobile wireless system is actually part of a larger intelligence gathering experiment called the Two Eyes project. This project was funded by a $187,000 research grant from the National Institute of Justice’s Office of Science and Technology (OST), rather than by more traditional funding sources. The broader project includes a crime analysis and data gathering component, a Wide Area Network (WAN), and the wireless project.

In addition, unlike other jurisdictions that choose either radio wireless or CDPD wireless transmission standards, Monroe County—since this was developed as part of a study grant—was in the unique position of implementing both types of wireless data transmissions and drawing conclusions from the experience. Finally, while the program was initially developed as part of an intelligence gathering project, the mobile wireless system was quickly put to a field test when a hurricane swept the jurisdiction in September 1998.

The project has been developed and managed by Deputy Terry Armstrong, director of the department’s information management section. Because of the elected Sheriff’s ambivalence to technology, the strong independence that Sheriff’s departments enjoy in Florida, and the unique nature of the project’s funding, Deputy Armstrong has been able to operate with a great deal of independence on this project.

Summary of the Technology Solution

Prior to the beginning of the Two Eyes project, the Sheriff’s Department was not using any type of mobile technology. At one point several years before, they had tried early mobile technology applications and found them to be difficult to use and prone to breaking. Through this project, they have been able to switch several units over to full computers; and in addition to being able to test two types of wireless technology, Monroe County also
selected two different types of pen-based mobile computers. They are the highly ruggedized PCMobile and MicroSlate 500P. Both are Pentium grade systems with high resolution screens.

Each laptop either has a touch screen or pen-based touch screen, where officers can move from field to field with a single tap on an on-screen icon. Eight of the units make their connections through a UHF radio band, while the other five use cellular digital packet data (CDPD) connections. The laptops are able to access the Internet and the Miami-Dade Police Department network, and are tied into the FCIC and NCIC computer networks.

For the transfer of data, vehicles are outfitted with either 460 MHz radio backbone and digital modems supplied by Digital Radio Systems, Inc., or Airlink Pinpoint CDPD modems. The viewer software was developed by an independent contractor for Monroe County. That contractor was WinForce, Inc., owned by Andy Dimartini. The product is called WinForce.

For the Sheriff’s Department, all this new technology means current data retrieved quickly in the field that can be used during every aspect of the job, from traffic stops to evacuations.

**Background on Monroe County**

Monroe County, Florida, has a peculiar geography, encompassing a moist chunk of South Florida real estate known as the Everglades, and then stretching down highway U.S. 1 to the very tip of America.

For Monroe County sheriffs, it has always been an interesting challenge to watch over the sparsely populated Everglades area as well as the 42-island chain that makes up the Florida Keys, culminating in Key West just 90 miles north of Cuba. Adding to its other challenges—including a coastal border that is continually assaulted by drug runners from Caribbean and Latin American countries—the number of residents can quickly swell from 80,000 to over a quarter million on a good holiday weekend.

**Need for Wireless Mobile Data Communication**

Monroe County is primarily a string of islands that trail off the end of Florida. Within the county, patrol units often are isolated from the main Sheriff’s office and substations. They were limited in the information they could obtain from dispatchers. This project was spurred both by need and creativity, as Deputy Armstrong had long believed that access to crime maps and data would prove invaluable to officers in the field.

That belief spurred Armstrong’s first efforts to find funding for an experimental crime mapping project. The crime mapping project is not focused on here, but it was the desire to make that data available in a mobile environment that prompted purchase of the mobile technology now in use.

The focus of the OST grant research project was mapping and crime analysis through mapping. According to Armstrong, it just so happened that the mobile platforms are part of that. Moreover, the project provided an opportunity to demonstrate the value to patrol of mobile computer access to the Florida Criminal Information Center (FCIC) and the National Criminal Information Center (NCIC).
“I’ve always felt that real time mapping is useful if you have a platform that can be used in a mobile environment. Until just the last few years, that hasn’t been possible technologically, but it is now,” said Armstrong. “Over the years, FCIC and NCIC have become such an important part of law enforcement that law enforcement cannot function without it. . . . So in addition to being interested in mapping, I always wanted to provide a way for officers to gain better access to FCIC/NCIC data.”

Armstrong feels strongly that, along with car-to-car messaging and quick access to traditional dispatch data, “mobile computing with access to FCIC/NCIC data is a fundamental service.” He is confident that “mobile computers as network devices are going to continue to pop up everywhere.”

In this section of South Florida, during storms or other disasters, radio traffic can quickly reach overload, eliminating any chance of acquiring investigative-type data like warrant history in a reasonable amount of time. When dispatchers are overwhelmed with sending officers from one emergency scene to the next, access to warrant or wanted data becomes problematic. For officers with mobile computers, that overloaded dispatcher can be bypassed. Officers can go directly to FCIC/NCIC and are not only rewarded with quick data access but also more in-depth data than previously available. A dispatcher cannot provide a mug shot, but in-field, full-color computer screens can.

Assessment and Decision Making Phase

Unlike many other departments, the Monroe County Sheriff’s Department gave one individual, Deputy Armstrong, a great deal of autonomy. Supervising a staff of four technical people within his information services division, he was free to imagine what technologies he thought would help his and other departments and then move forward—as long as he could find the funding.

Starting with his own thoughts on crime maps and mobile computing, the deputy first developed a rough plan he wanted to pursue and then began to research vendors. Because he was not seeking internal funding initially, Armstrong was not required to get his plans pre-approved. He met with vendors from all over the country, including modem manufacturers, software developers, and hardware resellers. Sometimes he traveled to the vendor sites, but primarily he asked vendors to come to him for demonstrations, and he piggybacked off of conferences and other official trips.

During the same period, Armstrong began to look for funding. He examined several grant possibilities, including COPS More, but none of those fit the rather experimental and broad nature of the project he was proposing. Finally he hit on NIJ’s OST division and applied for a grant under its technology development program.

“I had been looking at the concept of this project for several years, and when I found the OST opportunity I wrote the application myself,” said Armstrong. “It is a case of, ‘You better be careful of what you wish for because it might happen.’ ”

It was not until NIJ indicated that they would approve the application that Armstrong discussed the project details with the Sheriff. Until that point, no one else at all had been involved in the process. There were no committees, no meetings, and no other officials were consulted.

The OST grant was for $187,000. Since starting the project in early 1996, the Department has also spent, from its own budget, $50,000 to $60,000 on consulting services and labor.
directly related to the establishment of a CDPD network, and $27,000 on mobile computers that were not covered by the initial grant. The Department pays $49 per month per unit for the CDPD service. Funding for the CDPD backbone and the additional computers were approved by the Under-Sheriff out of the annual budget. The specific cost of the mobile project was difficult to pin-point, largely because the Department did not view the mobile computing aspect of the Two Eyes project as a separate entity.

**Procurement Phase**

The products used in the Two Eyes project and the mobile computing solution are a mixture of off-the-shelf and custom designed solutions. Armstrong indicated that he had extremely good relationships with all vendors and consultants involved with the project, and that the procurement decisions were based almost entirely on his own instincts and personal experience.

**Product Requirements**

From early mobile computing experiences in the late 1980s, Armstrong had developed a belief that the future of mobile computing solutions for law enforcement would lie in ruggedized computers. Hence, he sought out the toughest units money could buy. 

"First they had to be tough. Second, they had to conform to hardware specifications of NCIC," said Armstrong. He required a rubber keyboard, to protect from weather and spills, and tough screens and casings. To meet NCIC requirements, he looked for computers with full-color screens that could support a GUI interface like Windows 95, the software they are using, and a dial up network.

In addition, Armstrong’s personal requirement—one that he admits was based on his own instincts—was that the mobile computers use passive pens or touch screens.

"I think that anybody who tries to use a GUI, which is what NCIC 2000 and FCIC 2000 are going to be based on, in a portable environment with police officers, is pretty much going to be doomed unless they can do away with the use of a mouse or mouse utility," he explained. "That means that you either have to go to a pen or you have to go to a touch screen."

Armstrong also pointed out that officers are often running applications under duress; and they do not have much time to be focusing on a keyboard. They need to be able to quickly view whatever a device can provide, he said, "so that they are not constantly shifting out of focus, from out the window to a perpetrator or suspect or ongoing activity, to inside on this little screen." He also recommends applications with “big buttons.” Many officers do not like using keyboards, and the application in Monroe County uses large icons that can be tapped easily.

"On a desktop, these oversized (graphic) buttons would look terrible," Armstrong said, "but in a car they are imperative... You keep it just as simple and as big as you can so they are not having to dwell on the screen object. You want to keep them attenuated to what is going on around them, not necessarily what is going on on this computer. The computer is just something for data—end of story."
Further defining that interface, Armstrong only looked at units that used passive pens, since he believes electrostatic pens would be easily broken and lost. Replacing the pens could add significant cost to the system in the long run.

**Products Selected**

In the end, these detailed requirements narrowed his search down to two products—PC Mobile and MicroSlate—and the department has purchased an equal number of each. Fully outfitted and mounted in the car with modems, each unit runs between $9,000 and $10,000.

They tried two different brands literally because they felt they had the money on hand to do it. Neither brand has surmounted the other in popularity. Officers who are regularly using a MicroSlate model seem to develop loyalty to that one and vice versa with PC Mobile.

As the Department did not set any targets for the total number of units they wanted in the field, it is difficult to pin down a specific start and stop date for the mobile leg of the Two Eyes project. However, the process from initial research to the first set of 14 units took about 18 months.

**Implementation Phase**

Due to Armstrong’s independent situation, the limited number of mobile units, and his hands-on approach to managing the project, the installation phase went very smoothly.

**Customizing the Products**

The most difficult challenge has come in writing new computer code and programs to create interfaces between the Department’s old COBOL-based data and the new GUI interface for officers. All of that code and the interface programming was written by his own programming staff because he felt having someone else write the program and then work out any glitches would quickly become prohibitively expensive.

Another area of customization involved the mounting of the mobile computers. While the department went with the standard, off-the-shelf mounts offered by the respective companies, Armstrong had specially designed pedestals built that raise the platforms up and are easily movable for officers. This addition adds $150 per unit to the system.

**Training**

Mobile computing-specific training in the department has been fairly limited. Since one of the major benefits in Armstrong’s eyes is the NCIC /FCIC access, all officers assigned mobile computers are required to take a four-hour training class in NCIC/FCIC use. This training assists in understanding the basics of NCIC and is a requirement to access FCIC. Armstrong was also selective about the officers who received computers; all recipients were already familiar with the basics of computer operation and Windows 95 software.

Officers did receive some basic informal training on bringing up CDPD and how to use the department interface, but that was it. Other training issues have been largely addressed by experience.
According to Armstrong, using a computer is pretty basic to most of his officers, but they don’t always know all the information that is available to them.

“That’s an information quality thing that they have to deal with, not a technical thing. Technically, they are very simple. Power them up, turn them off, let [users] know that the batteries can cause a problem if you leave the machine in the car, and if the car is turned off and the computer is turned on, the battery is going to go dead,” said Armstrong. “That happens to them one time, and that’s the end of that. So it’s not really difficult, because they all have computers.”

**Impact Phase**

**Advantages of CDPD**

Since our visit to Monroe County, the Sheriff’s Department has phased out all of their UHF units and now uses only CDPD connections. Their decision to choose CDPD entirely was based largely on the higher transmission and connection speeds.

“I am definitely sold on CDPD,” said Armstrong, “It is so much faster when accessing the Internet or networks that there is really no choice between CDPD and UHF—for us, CDPD is the best possible route.” This was especially important when officers were accessing images like mug shots, which Monroe County’s patrol officers access regularly through FCIC. Still, the department continues to be sold on the value of mobile wireless computing no matter which connection choice is made.

“In both cases, having the laptops in the field has been invaluable,” added Armstrong. “When you have a lot of users on the radio, you can end up having to wait for a turn just to get on. Especially during Hurricane Georges in 1998, we saw this problem. That waiting time means that you are not able to be doing the job at the same time. For my officers with laptops, there was no waiting, and it relieved the backlog for other users and lightened the load on dispatchers.”

**System Maintenance and Expansion Issues**

Since the first wave of officers were selected based on their openness to new technology, the initial installation went smoothly; and there have been no problems that required post-installation attention from vendors. As the project expands, it is reasonable to wonder if the Department’s informal approach to training will crumble under the weight of officers with less general exposure to computers. Also, because of the informal nature of Armstrong’s project management, it is difficult to assess this project in terms of “on time” or “on budget.”

However, mobile computing has been well received in the Department. And with respect to impact, the project showed its value within a year of implementation when radio dispatchers were overloaded and the 400 mhz system was taken down by Hurricane Georges in 1998.
Hurricane Georges

Hurricane Georges had wreaked a week’s worth of havoc throughout the Caribbean before it turned its eye toward Key West. Immediately the Sheriff’s Department began a tense daily vigil.

Soon it became obvious that evacuation was necessary. Evacuating 40,000 people from anywhere is a daunting task; evacuating 40,000 people out of a chain of islands linked by a single highway, often only two lanes wide, is so difficult it is humbling. But by September 23, 1998, that is exactly what Monroe County deputies knew they had to do.

Hurricane Georges, a category two storm, had already leveled homes on dozens of islands, leaving hundreds of thousands of people exposed to the elements, when the decision was made to begin evacuations in the Keys. Within a few hours, the laptop computers began making their presence felt.

The storm and evacuations meant that a dramatic increase in the numbers of deputies on patrol was a necessity, and that meant more voices cluttering up the traditional channel of law enforcement communications—the radio. During evacuations, they jumped from the standard five deputies per shift to 25. With more deputies on shift, there were more assignments being handed out by supervisors, more changes in areas that deputies were covering, and more requests for information coming in to dispatchers from the field.

The evacuations were conducted according to a strategic plan that had to take into account that the area’s only route of egress was U.S. 1. To keep from causing a world-class traffic jam that would have been frustrating and dangerous, the county moved people out of the endangered area in groups.

Non-residents went first, then a sweep was made to evacuate all of the Keys’ state parks. Next, the extremely vulnerable residents in mobile home parks were moved out under mandatory orders. The last step was to start with the southernmost islands and evacuate them one by one. When one island was emptied, the public safety agencies moved north to the next island and started evacuations there, all the while continuing their normal law enforcement duties.

Once again, laptop computers lent a hand in these efforts. With direct access to information that previously would have been requested from an overloaded dispatcher, deputies in the field were able to run checks on persons, vehicles, property, warrants, weapons, and even pawn shop records. During evacuations, checks on persons and vehicles were very useful in helping the deputies to cull non-residents from residents, as well as watching out for possible bad guys with outstanding warrants.

On September 25, the storm began to thrash the chain of islands with a vengeance. While the eye hovered over Key West—the most developed and heavily populated island—125-mile-an-hour winds strafed islands further north like Marathon and Cudjoe Key. Even in Key West, the least affected of the southern islands, damage was immense. Throughout the middle and lower Keys, trees were toppled and flung hundreds of feet through the air, and the seas flooded U.S. 1 under several feet of water. High winds literally ripped homes inside out, flung mobile homes around, and left piles of debris.

At one point, a damaged roof led to a temporary loss of the department’s radio system. Deputies with laptops kept the flow of important information going in the field.
In the end, although no one died, the toll was calculated at $500 million in property losses, with 3,000 homes either damaged or destroyed. Power was out for weeks afterward. “Our evacuations went well, with the help of the computers,” said Armstrong, “and we got everyone that would leave out of the storm’s path.”

In the aftermath, Sheriff’s deputies and their laptop computers still had work to do. After Hurricane Andrew devastated South Florida a few years earlier, looters and scam artists flooded hard hit areas immediately after the storm. Monroe County was determined not to let that happen and had the advantage of a very narrow route which people had to travel to get back on the islands.

It was only natural that residents wanted to return home as quickly as possible once danger had passed, and with all phone communications cut off, their urgency was increased. With their direct connection to law enforcement and other government databases, deputies were able to check the ID and auto information of every person wanting to get into the Keys. If you weren’t a resident, you were turned back, and post-storm crime was minimal.

Since Georges, the Keys have been cleaned up. The laptops, though, continue to prove their value.

“I couldn’t work without one now,” said Deputy Chuck Kellenberger. “They allow us not only to get information that we couldn’t reach before, but faster. I sometimes hear another deputy without a laptop request driver’s license or registration information from the dispatcher and, just for fun, I’ll punch the request in on my unit. I always have it several minutes before the dispatcher. It is what automation can do for us. It makes our job easier and gets us back on the road protecting the citizens faster than ever before.”

Summary

Despite unquestionable successes in the field, other departments should examine some of the choices made by the Sheriff’s Department before acquiring similar technologies.

Monroe County’s acquisition process was relatively unique, since it was funded primarily as a research grant. It is an avenue that only a handful of agencies will want to or have the experience to take on. A long-time technology tinkerer, Deputy Armstrong was well-suited for the job; and in far South Florida, quality high-tech employees can be hired at a reasonable rate. In other parts of the country, where high-tech skills are in short supply, luring such talent away from private industry would be problematic.

Still, for some agencies, leveraging a research grant to put a relatively small department on the cutting edge of technology may be alluring. Through the entire Two-Eyes project, Armstrong has not only put wireless technology into the hands of his officers, but he has also allowed them to access federal and statewide intelligence from the field. Further details can be found at the Monroe County Web Site at http://www.state.fl.us/mcso.htm.

A second issue that needs to be considered in depth by other agencies is the type of computers Monroe County chose to invest in. The PCMobile and MicroSlate units are highly regarded machines that have performed well under extreme conditions. They are also two of the most costly units on the market.

Armstrong is convinced that the cost—which he says can run up to $9,000 a unit—is well worth it, as the job of law enforcement puts great demands on equipment. Still, many
other agencies have found that ruggedized mobile units priced at approximately one-third of the PCMobile and MicroSlate units, have successfully handled the challenges of daily police work.

Finally, glare continues to be an issue with all mobile units in the field; and under the hot South Florida sun, even $9,000 units were not a complete solution. Many vendors are working to correct the problem, but none has perfected a solution that we are aware of. Glare coatings work well in some cases but interfere with touch screen capabilities in others. In Monroe County, during bright daylight conditions, officers often have to angle themselves or the computers to get a good view.

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This case study focuses on crime analysis and mapping technology acquisitions. It is one of 18 case studies prepared for the “Technology Acquisition Project” administered by the Institute for Law and Justice in partnership with Government Technology, Inc., and funded by the National Institute of Justice (NIJ), U. S. Department of Justice. The author of this case study is Julie Wartell, Senior Research and Technology Associate, Institute for Law and Justice. The report has been reviewed by the participating site but should be considered a draft pending final NIJ review.

Background on the Project
This case study looked at the acquisition and implementation of crime analysis and mapping technology at the Overland Park, Kansas, Police Department (OPPD). In 1993, Deputy Chief (and now Chief) John Douglass decided that major changes were needed in operations and in the way the OPPD made decisions about crime and community problems. He felt that creating a fully functional, crime analysis support unit would help them accomplish their goals. Over the last five years, OPPD has purchased or developed a variety of crime analysis and mapping software, has expanded the number of crime analysis personnel, and continues to find new applications for the technology. The key people involved in Overland Park crime analysis and mapping are Gerald Tallman, Crime Analysis Manager; and Susan Wernicke, Assistant Crime Analyst.

This report discusses technology acquisition as a four-phase process involving (1) assessment and decision making, (2) procurement, (3) implementation, and (4) impact assessment.

Background on the City and the Police Department
Overland Park, the third largest city in Kansas, is located in the Kansas City metropolitan area. The OPPD serves a population of 138,000 residents and an estimated daytime population of almost 200,000. The city covers approximately 58 square miles and is made up of 240 “town codes” (roughly one-quarter square mile sections), which are used by the various departments for crime tracking and statistics, land use, etc. There are 200 sworn and 75 civilian employees. The Department has 18 patrol units during the day and evening shifts and ten during midnight shifts.

Crime analysis is a centralized function and serves two patrol divisions as well as centralized investigative units, traffic safety, and command staff. The Crime Analysis Unit (CAU) falls under the Administrative Services Division and is considered a high priority for the Chief. Asked why he felt creating the CAU was important, he said, “The crime analysis unit will become the steam that drives the engine.” The CAU was established to support major changes in the way OPPD was doing business. The Unit consists of a
manager, two analysts, an alarm coordinator, and five citizen volunteers. The mission of the CAU is to “. . . provide timely, accurate, and useful tactical, strategic, and administrative crime analysis data to the patrol officers, detectives, and command staff.” (Crime Analysis Unit Products, 1999). The technology and data used by the CAU and OPPD is supported by approximately four staff members from the city’s Information Technology Division and two staff members from the Geographic Information Systems (GIS) section of the city’s Planning and Development Department.

**Summary of the Technology Solution**

OPPD made a decision in 1993 to develop an advanced, effective crime analysis unit to support the tactical, strategic, and administrative operations of the police department. Crime analysts use several primary tools to accomplish their objectives. They created “Target Crime Analysis” to track target crimes, analyze data, and produce reports. They transfer Records Management System (RMS) and Computer Aided Dispatch (CAD) data from the city’s mainframe computer into the CAU’s Target Crime Analysis program (in FoxPro). Microsoft Word is used for reports and bulletins. For mapping purposes, the CAU uses various city programs and data in ESRI’s ArcInfo and ArcView. The Planning Department/GIS Unit has created a number of customized applications for analyst, officer, and detective use in ArcView. Finally, a scanner and a plotter round out the list of hardware allowing analysts to be fully functional.

**Assessment and Decision Making Phase**

When the Crime Analysis Manager was tasked with starting a new unit, the first thing he did was find out what other departments were doing in regard to technology and functionality. He called numerous comparable departments, looked at a variety of off-the-shelf software (FoxPro, Lotus, Access, and several crime analysis programs), and then spent three days with one of the departments before deciding how to organize OPPD crime analysis and what technology to purchase.

The first version of Overland Park’s mainframe RMS was created in 1980. It has changed drastically over the years, with the last major update occurring in 1993. The Records Section is responsible for using the mainframe to produce police reports. While RMS and CAD are searchable, the searching capabilities are slow and limited. The city’s IT programmers are currently working with CAU to create an application using Crystal Reports to query CAD data in an Oracle database.

To perform extensive querying, analyzing, and reporting, Overland Park needed a program that was more versatile and easier to work with than the mainframe. They also wanted to capture more data in a crime analysis-specific application. The crime analysis program of greatest interest to the CAU manager was from the Institute of Police Technology and Management (IPTM). IPTM’s program, MECCA, was written in FoxPro, a program with which he and the IT programmers were familiar. MECCA, however, was not as fully functional as he would have liked, so he decided to solicit IT’s assistance and write his own crime analysis program—thus, the development of “Target Crime Analysis.”

When it came to doing crime mapping, OPPD was fortunate to have the city’s Planning Department already doing work with GIS. As other successful crime mapping law
enforcement agencies have discovered, having expertise and data already existing in your jurisdiction provides a giant step forward in implementation.

The CAU is now pursuing the purchase of two additional technologies, The Communicator and ISYS. The Communicator, developed by Digital Communications Corporation, is a computer aided emergency telephone notification system, designed to contact a large number of citizens with a recorded message—for example, a crime prevention message, crime pattern alert, or survey. As community members become more involved in policing, the OPPD wants to explore as many ways to communicate with them as possible. ISYS, marketed by Oddesy Development, is a type of search engine used to search for words, strings of words, or phrases in multiple types of reports, documents, and databases. In seconds, the program identifies a list of locations, and the user can select and review the documents individually. ISYS should be an excellent crime analysis and investigative tool for searching old reports and crime analysis bulletins, witness statements, databases, etc. It will eliminate a great deal of time and effort in manual searches.

A city Technology Advisory Committee (TAC), with representatives from various departments (including the Crime Analysis Manager from the OPPD), exists to coordinate and monitor the city’s technology needs. The TAC reviews and makes recommendations on technology advancements to the Executive Leadership Team (department directors). The TAC is also responsible for developing the city’s technology standards.

Procurement Phase

By 1994, the first phase of the Target Crime Analysis program (a customized FoxPro application based on the IPTM demo) was being designed by Gerry Tallman and programmed by the city’s IT programmers. Overland Park then decided to purchase the IPTM application code for $2,000 (from the police budget) and modify it to fit their needs. An IT programmer, Chris Woodhouse, was assigned to the CAU for six months full-time and a contractor, Chip Cooper from “Just Ask Computer Consulting,” worked a little over 100 hours (for a total cost of $5,000) on- and off-site for two or three months. The contractor had been chosen based on prior work with the city. Starting with a handful of crimes, the three “designers” added and modified the program and got input from detectives and crime prevention officers (about queries and reports) until they were satisfied. The application was completed in early 1995. The IT programmer continues to make upgrades and changes about three to four times per year.

The graphic that follows shows the front screen of the Target Crime Analysis application.
In regard to the crime mapping technology, OPPD simply latched on to the existing Planning Department/GIS Unit. Initial GIS funding for the city came from a capital improvement project. In 1991, they obtained street centerline files from MJ Harden and spent eight months cleaning them up. In 1994, the CAU asked Planning/GIS to create its first crime mapping application—an address locator to make dot maps. This was created in Unix/ArcInfo, and the data was transferred across a fiber optic connection that was put in between the Planning and Police Departments. The city purchased ArcView for the Planning and Police Departments in 1994, and the GIS staff learned Avenue (programming language). The weekly crime map was converted from ArcInfo to ArcView in 1995, and the daily crime map application was created in 1998. The first version was only printable and put on a few computers. The second version (modified after roll call training and suggestions from line officers) was released in early 1999 and has much more functionality. The crime mapping extension for ArcView, intended for analysts, detectives, and sergeants, went into production in April 1999. This interactive application provides significantly increased capabilities over the daily patrol map application. All applications are designed to draw data from the crime analysis FoxPro database.

As noted earlier, the CAU is trying to purchase two new technologies, The Communicator and ISYS. The Communicator costs approximately $25,000 (the cost is dependent on the number of phone lines needed), and the Chief is attempting to convince the city to purchase it with non-police budgeted funds. ISYS costs $400 per copy, and OPPD planned to finalize their purchase order in July 1999.

In summary, the off-the-shelf software used by OPPD’s Crime Analysis Unit is Microsoft FoxPro, Excel, Word, PowerPoint and Outlook; and ESRI’s ArcView 3.1. The personal computers are 450 MH, Pentium 3, with 5 GB hard drives and 128 MB of RAM. CAU has one HP 750C 36-inch plotter, a Kyocera FP3600A laser printer, and an HP OfficeJet 710 color printer/scanner/fax. In addition, the CAU extracts data from the Police...
Department's IBM 2003 Mainframe. The data in the mainframe includes CAD incidents, offenses, victims, suspects, arrestees, property, witnesses, vehicles, alarms, field interview forms, and store cards. The target crime data is also stored in FoxPro, and additional information and databases are maintained for crime analysis purposes. GIS data, available through the city's WAN network, includes information relating to patrol districts, schools, parks, apartments, bike trails, buildings, streets, neighborhoods, census data, licenses and permits, tax data, and aerial photos.

The Administrative Services Division Commander feels the Crime Analysis Unit “gets a pretty fair shake amongst other divisions in the department.” The CAU does not buy everything possible, and purchases still have to go through a review. Any turf issues happen at budget time; this is where the Captain “sells” things that interest the Chief and must show how valuable the technology is to other groups, not just crime analysis. For example, the Department's new automated mug shot system was spearheaded by CAU but is primarily used by the Patrol and Investigations Divisions. Essentially, the Chief has given CAU just about everything they've asked for and more. The Crime Analysis Manager noted that “buy-in and confidence from the Chief and command staff is vital to having a successful unit.”

Implementation Phase

The Target Crime Analysis program was designed as an executable to be loaded on multiple machines. This saved a large amount of money in training and licenses. The CAU has five FoxPro licenses that are used for additional queries and reports. Mainframe data is downloaded daily into FoxPro for use in Target Crime Analysis. Analysts read all reports for target crimes and use the program to answer media and public requests as well as produce a variety of reports and bulletins. Reports and bulletins are emailed to all officers and faxed to 79 other area law enforcement agencies.

Officers and detectives were given access to Target in 1998. The analysts held a one-hour training class and continue to give one-on-one assistance. Some officers use it and some do not—largely due to individuals’ apprehensiveness about computers in general.

Some examples of Target Crime Analysis reports and bulletins follow.
CRIME SPECIFIC MEMO – created as needed; contains information on a specific crime or crime spree; information from other agencies who have reported similar crimes is included.

SMASH AND GRABS

Since the beginning of the year, Overland Park businesses have suffered several "smash and grab" type burglaries that are very similar in MO. Below is a compilation of the reports that fit this MO. Several eyewitnesses have provided similar suspect descriptions.

The basic MO is as follows:  TARGET BUSINESSES: Cigarette/Cigar stores, Liquor Stores, Sports clothing stores; TARGET DAYS: Sunday, Monday, Thursday; TARGET TIME FRAME: 2200-0415 hrs; TARGET ITEMS: Cigarettes, liquor, clothing, money, tools(?); SUSPECT DESCRIPTIONS: (description); SUSPECT VEHICLES: Utility 4x4’s, usually Jeep Cherokees. Any information should be directed to the CAU or (DETECTIVE), (phone)

(Reports from 01/01/99 through 04/29/99; commercial smash and grabs)

<table>
<thead>
<tr>
<th>REPORT</th>
<th>VICTIM</th>
<th>ADDRESS</th>
<th>DATE/TIME</th>
<th>DAY</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>99000000</td>
<td>BUSINESS NAME</td>
<td>123 MAIN</td>
<td>01/01/01, 0439</td>
<td>MON</td>
<td>Vehicle drove through glass front door. Witness reported (suspect vehicle description) left business after hearing an alarm sound on the business. Same vehicle description of smash and grab in Shawnee sporting goods store burglary on 01/03/99. Owner reported his store at location was burglarized in the same manner. Taken: Large quantity of KOOL cigarettes</td>
</tr>
<tr>
<td>99000000</td>
<td>BUSINESS NAME</td>
<td>123 MAIN</td>
<td>01/01/01, 0620</td>
<td>SUN</td>
<td>Large rock thrown through glass on front door. Taken: Five cartons of Winston cigarettes. Witness/Suspect: Name/Address who lives directly behind the store and reported the first burglary.</td>
</tr>
<tr>
<td>99000000</td>
<td>BUSINESS NAME</td>
<td>123 MAIN</td>
<td>01/01/01, 2315 – 2336</td>
<td>SUN</td>
<td>Glass on front door smashed. RO arrived seconds after alarm sounded. Taken: large amount of sports clothing</td>
</tr>
<tr>
<td>99000000</td>
<td>BUSINESS NAME</td>
<td>123 MAIN</td>
<td>01/01/01, 0322</td>
<td>FRI</td>
<td>Rock thrown through front window. Alarm sounded. Taken: Vodka</td>
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</table>
**WEEKLY ARREST REPORT** – contains names, physical description and other pertinent data on any individual arrested for a “target” crime during the previous week

<table>
<thead>
<tr>
<th>REPORT</th>
<th>LASTNAME</th>
<th>FIRST NAME</th>
<th>M</th>
<th>R/S</th>
<th>DOB</th>
<th>ADDRESS</th>
<th>EMPLOYER/ SCHOOL</th>
<th>ETC</th>
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<td><strong>ADULTS</strong></td>
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<tr>
<td><strong>ASSAULTS/BATTERY</strong></td>
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<td></td>
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<tr>
<td>98066945</td>
<td>Suspect last name</td>
<td>first name</td>
<td>MI</td>
<td>W/M</td>
<td>birthdate</td>
<td>Home Address</td>
<td>Employer/School</td>
<td>Hit victim</td>
</tr>
<tr>
<td>98067377</td>
<td>Suspect last name</td>
<td>first name</td>
<td>MI</td>
<td>W/M</td>
<td>Birthdate</td>
<td>Home Address</td>
<td>Employer/School</td>
<td>Hit girlfriend, CDP</td>
</tr>
<tr>
<td><strong>DRUG OFFENSES</strong></td>
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<td></td>
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<td></td>
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<tr>
<td>98067193</td>
<td>Suspect last name</td>
<td>first name</td>
<td>MI</td>
<td>W/F</td>
<td>Birthdate</td>
<td>Home Address</td>
<td>Employer/School</td>
<td>Poss marijuana</td>
</tr>
<tr>
<td>98067580</td>
<td>Suspect last name</td>
<td>first name</td>
<td>MI</td>
<td>W/M</td>
<td>Birthdate</td>
<td>Home Address</td>
<td>Employer/School</td>
<td>Poss marijuana</td>
</tr>
<tr>
<td><strong>DOMESTIC VIOLENCE</strong></td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>98067186</td>
<td>Suspect last name</td>
<td>first name</td>
<td>MI</td>
<td>W/M</td>
<td>Birthdate</td>
<td>Home Address</td>
<td>Employer/School</td>
<td>CDP</td>
</tr>
<tr>
<td>98067787</td>
<td>Suspect last name</td>
<td>first name</td>
<td>MI</td>
<td>W/M</td>
<td>Birthdate</td>
<td>Home Address</td>
<td>Employer/School</td>
<td>Pushed sister</td>
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<td><strong>SEX OFFENSE</strong></td>
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<td>Suspect last name</td>
<td>first name</td>
<td></td>
<td>W/M</td>
<td>birthdate</td>
<td>Home Address</td>
<td>Employer/School</td>
<td>Fondled breasts of victim</td>
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<td><strong>JUVENILES</strong></td>
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<td><strong>ASSAULTS/BATTERY</strong></td>
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<td>98067453</td>
<td>Suspect last name</td>
<td>first name</td>
<td>MI</td>
<td>W/F</td>
<td>Birthdate</td>
<td>Home Address</td>
<td>Employer/School</td>
<td>Hit classmate</td>
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<tr>
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<td>first name</td>
<td>MI</td>
<td>W/M</td>
<td>Birthdate</td>
<td>Home Address</td>
<td>Employer/School</td>
<td>Hit classmate</td>
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<tr>
<td><strong>DRUG OFFENSES</strong></td>
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<tr>
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<td>Suspect last name</td>
<td>first name</td>
<td>MI</td>
<td>W/M</td>
<td>Birthdate</td>
<td>Home Address</td>
<td>Employer/School</td>
<td>Poss marijuana</td>
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<td>MI</td>
<td>W/M</td>
<td>Birthdate</td>
<td>Home Address</td>
<td>SM-WEST</td>
<td>Poss alcohol, and tobacco</td>
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<td><strong>DOMESTIC VIOLENCE</strong></td>
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<td>first name</td>
<td>MI</td>
<td>W/M</td>
<td>Birthdate</td>
<td>Home Address</td>
<td>CROSS TRAILS</td>
<td>Pushed mother</td>
</tr>
<tr>
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<td>first name</td>
<td>MI</td>
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<td>Birthdate</td>
<td>Home Address</td>
<td>Employer/School</td>
<td>Wrestled mother</td>
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<tr>
<td><strong>SEX OFFENSE</strong></td>
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<td>MI</td>
<td>W/M</td>
<td>birthdate</td>
<td>Home Address</td>
<td>Employer/School</td>
<td>Sodomized brothers</td>
</tr>
</tbody>
</table>
OVERLAND PARK POLICE OUTSTANDING WARRANTS!

(confirm before taking ANY action!)

Name, description, address, Sp 15 & under, $500, Sp 15 over, $1,000

Name, description, address, Susp DL, $1,500

Name, description, address, Sp school zone, $200

Name, description, address, Minor acpt alc., $500

In 1990, Planning/GIS used police patrol redistricting as its first true GIS project (beyond just printing maps). In 1993-94, another patrol redistricting study was undertaken and resulted in the police department reorganizing into two patrol divisions. The CAU made some basic maps or requested maps from Planning/GIS during the first year. All large plots were printed in Planning until the CAU purchased its own plotter. In early 1994, the CAU began producing the Weekly Crime Map and Persons Crime Map. These have gone through a series of upgrades with input from a variety of users. The Weekly Crime Map was intended to graphically display a large amount of crime information and make it available to a variety of people. The daily patrol map application was limited in its capability and was quickly upgraded with input from the officers. The interactive crime mapping extension was developed to make creating maps and layouts easier and uses the city’s Land Information System extension as a base. The analysts have been trained on this crime mapping extension and the command staff has been given a demo.

In addition to the reports and charts produced by the CAU, there are a wide variety of maps that are either produced regularly or as needed. CAU staff prepares Crime Analysis Bulletin Maps for inclusion in the numerous weekly crime bulletins; these typically concentrate on one single crime type. Crime analysts also produce miscellaneous crime maps for officers in support of their efforts to combat a specific crime problem in their patrol area, and non-criminal maps in support of other OPPD operations or for presentation at City Council and Public Safety Committee meetings. Finally, CAU may prepare Court Prosecution Maps, which are "crime scene" maps on a large 3’X4’ scale that detectives use as a visual aide during testimony. Favorable comments from prosecutors and judges have been received regarding these maps.

The recurring maps include those described below.

1) The Weekly Crime Map is actually six maps on one 2’X4’ sheet of paper. The three maps on the left show residential burglaries for the previous 7, 30, and 90 days, and the three maps on the right show commercial burglaries, auto burglaries, and auto thefts for the previous 30 days. Down the center is a series of five charts showing premise type, point of entry, entry tool, time of day, and day of week for the 30-day residential burglary map. It is posted throughout the department (roll calls, Investigations, CPU, public lobbies, and City Council chambers) and is published monthly in the local newspaper.
2) The *Weekly Persons Crime Map* layout is similar to that of the Weekly Crime Map. The top two maps show robberies and purse snatches. The middle two maps show rapes and window peelers, and the bottom two maps show lewd and lascivious acts and the home address of all registered and "known" sex offenders living in Overland Park. Instead of the charts down the center, this map provides the address of the incident and the name and physical description of the arrestee/suspect and vehicle description. This map, because of its content, is only posted in roll calls and the Investigations Division (not released to the public).

3) **Viewable Daily Patrol Maps.** This is an ArcView application that the individual line officer can access from a number of computers. The officer can view and print out a map from any level of detail (division to individual patrol district). The map shows (by different symbols) the location of each "Target" crime for the previous 48 hours. The map is accompanied by a report that depicts the crime type, date and time, address, report number, name and physical description of the arrestee/suspect, and vehicle description.

A graphic showing a Viewable Daily Patrol Map follows.
4) *Interactive Crime Mapping.* This ArcView application allows “interactive” crime mapping. The officer, detective, or crime analyst can easily and quickly create a crime map of selected crime types (including various MO factors), areas, date ranges, etc.

5) *Monthly Statistics Maps.* CAU staff prepares these maps to depict the locations of that month’s residential, auto, and commercial burglaries; auto thefts; robberies; and traffic accidents.

Citizen volunteers, who donated over 2,500 hours in 1998, work on several crucial crime analysis tasks. Volunteers collect, enter, and distribute field interview forms (used for bulletins as well as a weekly report distributed within the OPPD and to outside agencies such as parole/probation); produce a weekly arrest report (which includes information from the Department’s Fugitive Apprehension Unit); update target crime narratives; produce a Monthly School Report; and assist with the weekly and daily maps. Volunteers receive extensive training on all crime analysis systems.
The CAU, city IT, and Planning/GIS all must work closely in order to fully utilize three very different systems, the mainframe, GIS, and Target Crime Analysis. Although there have been some struggles, staff feel they have made big strides in the last year in data sharing and exchange.

**Impact Phase**

In the five and one-half years since OPPD was searching the country for technology and application ideas, the tables have now turned. In addition to local publicity, their use of crime mapping was included in a recently published book and highlighted at a national crime mapping conference. From this and word of mouth, they are now the ones receiving calls and visits from departments all over the country asking them how they do things.

**Benefits for Users**

Many people at various levels and positions in the OPPD had many optimistic things to say about crime analysis technology and products. One person noted that officers now get a great deal of information that was not previously available. He added that the crime bulletins offer a good synopsis and help information sharing across the two police districts. A patrol sergeant says he uses crime analysis as much as he can. He not only uses the regularly published reports, but he also asks for detailed information about assumed patterns. One lieutenant noted that crime analysis helps officers understand the problem and work smarter. Based on crime analysis information, he said, a squad can put together a strategy as well as go back and look at the impact of their actions.

**Challenges**

The crime analysis and mapping-related technology available to people outside of crime analysis received mostly positive feedback, although many have been hesitant to put it to full use. The biggest excuse for non-use is that many officers are technically challenged and find even the most basic application too complex. Others respond that they just need more time to familiarize themselves and experiment with it. Many officers, detectives, and supervisors are more comfortable reading reports and bulletins and working directly with the analysts than using the technology themselves. Some feel the information can be gathered more quickly by asking an analyst than by fighting with a computer program.

**Success Stories**

There are many examples of successful uses of crime analysis technology to identify crime patterns and trends, analyze crime problems, and assess tactical responses. Crime analysis work has been advantageous not only for the department but for local politicians and the community as well. Using current technology, analysts can readily provide statistics, crime trends, and maps to anyone who asks. Everyone interviewed make a point of attributing OPPD’s crime analysis accomplishments not only to the technology but to the people as well. If the technology was not designed or used in the most effective way, and the analysts were not responsive and flexible to various needs, many of these products and successes would not have occurred.
Some examples of successful uses of crime analysis and mapping technology are provided below.

1) **Identifying a trend in heavy construction equipment thefts.** CAU provided a variety of data related to each crime and assisted patrol and investigations in setting up heavy construction equipment checkpoints (similar to DUI checkpoints). This effort was expanded to a Kansas City metro-wide taskforce that the CAU continues to support. Not only has OPPD recovered stolen property, but they, and the other task force agencies, have issued citations for a number of violations as well.

2) **Discovering a pattern of jewelry thefts.** The CAU produced a bulletin on a pattern of high-dollar jewelry thefts from shopping malls. It was sent out on their usual network. Columbia, Missouri (two and one-half hours away) saw the bulletin and identified and arrested the suspect.

3) **Identifying Traffic Accident Locations and Causes of Injury.** Four years ago, OPPD was averaging 48,000 traffic tickets per year. Using crime analysis technology, they identified where the accidents were occurring and causal factors for injury accidents. This compelled the department to make a significant shift from speed enforcement to traffic light enforcement at specific intersections.

4) **Providing Support for School Resource Officers.** Overland Park School Resource Officers (SROs) receive daily reports listing any incident involving juveniles, school employees, or schools. The SROs can then scan the report to see if they recognize any names or if the incident was related to their school; pull the incident report; and do the appropriate follow-up with students, parents, witnesses, probation, etc. This direct contact not only establishes a better relationship between the officer and the students, but also reduces the detectives’ workload.

The Chief summarized the use of crime analysis technology at OPPD when he said, “Crime analysis is a way of taking information and using it as a catalyst for action.”
References

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Overland Park Planning Department, GIS Unit, GIS data list, 1999.

Overland Park Planning Department, GIS Unit, Land Information System documentation, 1999.


Overland Park Police Department, Crime Analysis Unit, Products, 1999.
Contact Information
Gerald (Gerry) Tallman
Manager, Crime Analysis Unit
Overland Park Police Department
(913) 327-6904
gtallman@opkansas.org
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Technology Acquisition Project
Case Study

Pierce County/Tacoma, Washington
Law Enforcement Support Agency (LESA)

This case study focuses on records management systems (RMS) technology acquisitions. It is one of 18 case studies prepared for the “Technology Acquisition Project” administered by the Institute for Law and Justice in partnership with Government Technology, Inc., and funded by the National Institute of Justice (NIJ), U. S. Department of Justice. The author of this case study is Steve Pendleton, President, Information Analytics, Inc. The report has been reviewed by the participating site but should be considered a draft pending final NIJ review.

Background on the Project

In April 1995, the Law Enforcement Support Agency (LESA), a jointly funded entity serving the Pierce County Sheriff’s Department (PCSD) and the Tacoma Police Department (TPD), began a study to replace an existing case management system. This project was a workshop held on four days over a four-week period. During these workshop sessions, the project team examined the case management processes of PCSD and TPD with the view to design a new case management system. As a result, the team realized they needed to expand their study to ultimately define a new paradigm for activity and task management within the contributing agencies. LESA spent the next year organizing support for an inter-agency group to formulate a strategic plan for the new system. A “ground up” reengineering study group was formed with PCSD, TPD, and the Puyallup Police Department (PPD) assigning personnel full-time to the effort.

The new study, conducted between July 1996 and December 1997, yielded a strategic plan for the Law Enforcement Activity and Data System (LEADS) 2000 and a request for proposal (RFP) to begin the acquisition process. This RFP resulted in an award and contract with MEGG Associates, Inc., of Salt Lake City, Utah, to provide their NetRMS and CRISNet Cruiser applications as the core information management system built in the first phase of LEADS 2000.

The primary participants in the LEADS 2000 project—LESA, PCSD, TPD, and PPD—view themselves as a consortium that shares resources, both financial and personnel, to the benefit of the group. This unique concept, which spans political and law enforcement agency boundaries, has fostered a cooperative approach to technology acquisition not often found in city and county governments today.

Law Enforcement Support Agency (LESA)

LESA is a governmental entity formed by interlocal agreement provided for under Washington law and jointly funded by Pierce County and the City of Tacoma. Its purpose is to provide communication, information, and records management services to the PCSD and the TPD. LESA is designed to eliminate redundancy, improve access and
communication, and gain economies of scale. LESA also provides law enforcement support to several other cities and towns in the region. It is the lead agency in a consortium to provide electronic information systems for the purpose of reducing officer time currently spent performing routine, time consuming, administrative tasks, focusing on law enforcement tasks by changing the way business is conducted in the departments.1

Key personnel within LESA who continue to contribute to this project include Robert Van Gieson, LESA Director; Robert Kaelin, LESA Assistant Director; Lloyd Eggers, LEADS 2000 Project Manager; Arnold Blaker, LESA Assistant Director, Communications; Dorian Stockman, Project Assistant; Tina Huber, LESA Assistant Director, Records; and Steve Davis, Consultant, MTG Management Consultants.

Pierce County Sheriff’s Department

Pierce County is southernmost of the four counties generally referred to as the central Puget Sound region, which includes King County, Snohomish, and Kitsap counties. It has a total landmass of 1,675 square miles and ranks 23rd in size among Washington’s 39 counties. In terms of population, Pierce County ranks second in the state. Pierce County’s population is 673,400, with 301,196 or 45 percent in unincorporated areas and 373,104 or 55 percent in incorporated areas.

The Pierce County Sheriff is appointed by the County Executive. The Sheriff’s Department (PCSD) has a staff of 297 sworn officers, 259 corrections officers, 109 civilian personnel, and approximately 90 volunteers. The Department operates out of 11 facilities located throughout the county and is organized into three bureaus, Operations, Corrections, and Administrative and Technical Services.2

Key personnel within PCSD who continue to contribute to this project include Sheriff Mark French; Captain Tom Miner, Training Services, Leads 2000 Agency Project Manager; and Kathy Bogue, Systems Analyst.

Tacoma Police Department

The city of Tacoma, situated in Pierce County on Puget Sound, has a total population of 186,500. Tacoma’s projections for growth over the next five years range between 4.6 and 6.7 percent. Tacoma’s vision is that it will be recognized as a livable and progressive international city, regarded for the richness of its multi-cultural population and its natural setting.

The Tacoma Police Department (TPD) is a full-service law enforcement agency with 370 sworn members and 43 civilian personnel.

Community oriented policing is a philosophy of the police and community working together, using problem solving strategies to address crime problems in neighborhoods. Community oriented policing in Tacoma emphasizes crime prevention and problem solving through partnerships with city neighborhoods. The TPD practices community policing through full participation and involvement of all police employees during their

1 Law Enforcement Information Management System Specification Number G-061-97, p.17.
2 Ibid, p. 22.
interactions with citizens and in all matters concerning crime prevention and law enforcement strategies.

The TPD is configured into four geographical areas called sectors. Each sector contains four districts. Sector and district boundaries are based on calls for service, taking into account neighborhood integrity. ³

Key personnel within TPD who continue to contribute to this project include Chief of Police James Hairston; Sergeant Dennis Kieffer, Patrol Operations; Captain Ray Roberts, Patrol; and Jeff Huntsman, Systems Analyst.

**Puyallup Police Department**

Located east of Tacoma along the Puyallup River, the city encompasses approximately 12 square miles and has a population of 30,000. The Puyallup Police Department (PPD) has 50 commissioned and 18 civilian personnel. This includes police officers, corrections staff, and clerical and technical staff.

Areas of the city are divided into community policing neighborhood “beats,” and officers are permanently assigned to these beats. The PPD is committed to providing 1.6 commissioned police officers per 1,000 population and to giving all citizens equal police exposure and services. Police officers maintain a 3.5-minute emergency response time and a 5-minute non-priority response time. All calls for service requesting an officer receive an officer based on priority. ⁴

Key personnel within PPD who continue to contribute to this project include Loc Reader, Chief of Police; and Cheryl Scott, Administrative Assistant to the Chief of Police and LEADS 2000 Agency Project Manager.

**Summary of the Technology Solution**

The LEADS 2000 project provides a technological replacement and upgrade strategy for a variety of disparate systems located within Pierce County. These range from mainframe programs to applications running on standalone personal computers. The project includes both hardware and software acquisitions. The strategic plan encompasses four phases of implementation beginning with acquisition of the core IMS, pilot of the new IMS, and limited implementation of the IMS within TPD and PCSD.

Where the previous system contained a number of separate applications accessed through “dumb” terminal connection to VAX servers, LEADS 2000 operates on Intel-based workstations and laptops using a Windows operating system. The workstations connect to local area networks (LANs) within each agency and then out to a wide-area network (WAN) having up to 100MB throughput capacity.

³ Ibid., p. 23.
⁴ Ibid., p. 24.
**Legacy Environment**

The LESA legacy applications operate on a 2-node VAX cluster and several Micro-VAXes. The VAX systems run the VAX/VMS operating system, which uses several programming languages, including a fourth generation language and database management system called Userbase.

The LEADS 2000 project will migrate from the VAX system to new Intel multi-processor servers and the Windows NT operating system.

LEADS 2000 also integrates or replaces the following legacy information systems LESA has developed or currently maintains.

<table>
<thead>
<tr>
<th>System</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP/S</td>
<td>Pawnbroker and Tracking System</td>
</tr>
<tr>
<td>CAD Closed</td>
<td>Extract database from CAD for use by other LESA systems</td>
</tr>
<tr>
<td>Caselog</td>
<td>Case tracking system being replaced by LECATS</td>
</tr>
<tr>
<td>CHRI</td>
<td>Criminal History Records Information System</td>
</tr>
<tr>
<td>CIIS</td>
<td>Criminal Information Inquiry System</td>
</tr>
<tr>
<td>CIMS</td>
<td>Criminal Investigation Management System</td>
</tr>
<tr>
<td>CLEAR</td>
<td>Consolidated Law Enforcement Automated Reporting System</td>
</tr>
<tr>
<td>CMS</td>
<td>Case Management System (being replaced by LECATS)</td>
</tr>
<tr>
<td>GANG</td>
<td>Gang Tracking System</td>
</tr>
<tr>
<td>LECATS</td>
<td>Law Enforcement Case Assignment and Tracking System</td>
</tr>
<tr>
<td>MSU</td>
<td>Marine Services Unit personnel tracking</td>
</tr>
<tr>
<td>Phone Number System</td>
<td>Telephone Number Database System</td>
</tr>
<tr>
<td>PROACT/MO</td>
<td>Organizes criminal activity by MO or incident characteristics</td>
</tr>
<tr>
<td>RMS</td>
<td>Puyallup Police Department Records Management System</td>
</tr>
<tr>
<td>SORS</td>
<td>Sex Offender Registration System</td>
</tr>
<tr>
<td>State Interface</td>
<td>LESA Interface with WSP ACCESS System</td>
</tr>
<tr>
<td>TPDGANG</td>
<td>Gang Tracking System</td>
</tr>
<tr>
<td>Vehicle Hot Sheet</td>
<td>Stolen Vehicle Hot Sheet</td>
</tr>
<tr>
<td>Warrants</td>
<td>Warrant Tracking System</td>
</tr>
<tr>
<td>WARRANT</td>
<td>Automated Warrant System</td>
</tr>
</tbody>
</table>

**Acquisition Project**

Interviews conducted with project personnel indicated the reasons for acquiring the new technology centered on the need to move from the legacy systems to new hardware platforms and software applications. Part of this was due to a Year 2000 concern within

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5 Ibid., p. 17.

6 Law Enforcement Activity and Data System 2000, Exhibit II.
the legacy system. Another reason given was to create a system wherein the computer does what the user needs it to do. The reason stated in the RFP was “to provide an integrated law enforcement information system that meets the business requirements of the member organizations through the implementation of new technologies.”

The primary vendor in LEADS 2000 is MEGG Associates, Inc. MEGG is providing their NetRMS product as the core information management system for Leads 2000 Phase 1. This application came on-line, in a pilot format, in January 1999. MEGG is currently customizing their CRISNet Cruiser application for deployment as the LEADS 2000 field reporting application. MEGG’s price for the Phase 1 applications is $630,000.

CRISNet Cruiser is a desktop or notebook client application for case report data collection. The client software connects to CRISNet Server modules by way of local area network (LAN), wide area network (WAN), wireless, or dial-up connections.

NetRMS is a server-based intranet and Internet-enabled application that runs on Microsoft BackOffice. Clients connect to NetRMS with Microsoft Internet Explorer using LAN, WAN, wireless, or dial-up connections.

The new system provides many advantages over the legacy environment. It provides LESA the ability to integrate the many separate applications currently in use within PCSD, TPD and PPD. The NetRMS product provides a web-based client that facilitates a centralized deployment and upgrading of all clients accessing LEADS 2000.

NetRMS is accessed via the Microsoft Internet Explorer browser. Because NetRMS is a true intranet application, no other program code needs to reside on the desktop or laptop computer to be able to access the resources in the system. Only a network connection is required. NetRMS also provides LESA developers with the MEGG Active Paper application resident on each client. Active Paper is a copyrighted and patent pending technology written by MEGG Associates for use with their products to allow them to efficiently wrap web pages and documents into the format they want for MEGG applications. This application incorporates Microsoft’s Active Server Pages, an application environment that lets CRISNet and LESA staff developers combine hypertext markup language (HTML) with inline scripting. The scripts reference components running on the local server, or any other server, to access CRISNet databases, documents, applications, or process information. This allows LESA to customize NetRMS to their needs. Bob Kaelin refers to Active Paper as “literally the client/server glue” within the NetRMS environment. Mark Stiegemeier, CEO, MEGG Associates, says the NetRMS product was designed to allow the customer to extend the environment but do it in such a way that it preserves the maintainability of the vendor application.

LESA began planning for system replacements in 1990. The initial activity centered on replacing the legacy Computer Aided Dispatch (CAD) system. This was a separate acquisition process that started with an RFP release in 1993 and contract award in 1994.

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7 Law Enforcement Information Management System Specification Number G-061-97, p. 5.
8 http://www.crisnet.com/products
9 Ibid.
10 http://www.microsoft.com/industry/government/developers/whitepapers/crisnet2.stm#ASP
11 Ibid.
The LEADS 2000 acquisition project began with a case management study in 1994. The case management planning workshops took place in March and April, 1995.


Nature of the Problem

In its role as the provider of communication, records management, and information services to the PCSD and TPD, LESA began reviewing their technology needs as early as 1987. At that time, LESA hired R.W. Beck Consulting to perform an analysis of LESA’s ability to support technology.

Out of these early studies grew an understanding of the need to address changes required by rapid advances in computer hardware and software technologies that resulted in the degradation of legacy systems. LESA realized they were facing a Year 2000 problem in the early 1990’s and began moves to address the problem. A basic concern of the legacy applications was the lack of integration and the existence of information islands that inhibited users’ ability to obtain data in an efficient manner.

The LEADS 2000 strategic plan, published in September 1997, best describes the legacy system problems as follows:

Many of the critical information systems were developed in the 1980s and are not year 2000-compliant. These systems were designed to address specific functional needs and lack many of the benefits of more integrated systems, and therefore modifying them to meet changing business needs is increasingly difficult. Additionally the legacy systems do not meet new state and federal standards developed for NCIC 2000.

- The current business processes and practices are not satisfying the need for timely and convenient access to accurate and current information. Current information processes are characterized by the following:

- The initial capture of almost all information is paper-based, making sharing and location of information time-consuming and difficult.

- Reports are often manually transported between locations using valuable law enforcement officer (LEO) and other law enforcement staff time on low-value activities.
Entry of information from paper forms into automated systems usually takes place well after the incident itself, impacting the ability to broadly share and access information in a timely fashion.

Some information is never entered into any automated system, forcing the continued reliance on access to paper files for a comprehensive view.

External systems are often queried for information, and that information is reentered into local systems.

The same information is often entered into multiple automated systems, creating additional workload and causing different systems to provide different results.

There is no way to determine what the full contents of an existing single case file should be (e.g. how many supplemental reports should there be and from whom). Therefore, incomplete information may be provided and result in inaccurate conclusions and rework.

Case files are entirely paper-based, relying on manual access and photocopying to create sharable information. Providing needed copies takes staff time, causes delays in delivering needed information, and increases risk of interested parties having multiple versions of the case file.

Investigative work relies heavily on law enforcement staff knowing what paper and automated systems to access and how to access them. This requires significant time simply accessing the data, thereby leaving less time to focus on analyzing and drawing conclusions based on the data.\(^\text{12}\)

The LESA staff is comprised of forward-thinking individuals who understood that in order to fulfill their vision, they would have to completely reengineer the legacy information systems. Bob Kaelin, Assistant Director of LESA, said that LEADS 2000 started has an idea formulated by line level personnel to replace an outdated case management system. Kaelin’s analogy for the beginning is that a “healthy seed planted in the right place always grows.” In this fashion, LEADS 2000 germinated from the ground up rather than being formulated at the executive level.

This germ of a concept led to an initial four-day business process reengineering exercise. The first day was spent discussing the business process. The next two days were spent modeling the existing case management system. The final day was spent discussing vision and redesign issues. At the end of this exercise, it was apparent to the group that what they wanted to accomplish was far beyond the scope of a new case management system. Instead, they found that what was needed was an entirely new information and activity management system.

With this concept in hand, the group approached command staff in the participating agencies with a request to form a reengineering study group, which would be responsible

\(^{12}\) Law Enforcement Activity and Data System 2000, pp 5-6.
for producing a strategic plan for (1) acquiring technology to support the concept, and (2) implementing the systems following acquisition.

Assessment and Decision Making Phase

**LESA Reengineering Study**

The LESA assessment and decision phase is unique in that it began with an exhaustive 18-month reengineering study that resulted in a comprehensive strategic plan. Part of the impetus for conducting the study was LESA’s successful application for a COPS MORE 95 grant.

Arnold Blaker, currently the LESA Assistant Director for Communications, described COPS MORE 95 as providing the ability for law enforcement agencies to make the leap from legacy data systems to new technology in the same fashion that the 1970s LEAA funding allowed the first moves from paper-based systems to automation.

Within the law enforcement community, inter-agency task forces are inherently fraught with battles for resource allocations and resistance to the recalling of those resources for internal use. One of LESA’s successes was obtaining a team of people released from their day-to-day duties to focus their attention, full-time, on the reengineering study. They accomplished this by doing a good job of selling the process and potential benefits to agency executives. The selling process even included producing a videotape presentation on LEADS 2000 benefits. This selling effort was required since the concept was born at the line level and at first the executives did not see the value.

The LEADS 2000 strategic plan viewed executive ownership in the project as a critical success factor.

Effective business process change, whether or not enabled through technology, requires the unqualified commitment of the organizations whose processes are being examined. This commitment must begin with senior executive staff. It must be clear that the projects identified in the LEADS 2000 plan are an organizational priority. This must be a ‘knowledgeable commitment’ that exhibits a shared understanding that change is necessary, a shared vision regarding what is desired through the change, and a shared commitment of resources and leadership to define and implement the changes. Senior executives within each organization must act as sponsors for plan implementation and must believe in the importance, priority, and benefits of the changes identified.13

From the inception of the reengineering study, the LESA struggled to retain the allocated resources. The whole reengineering concept was hard for agency executives to see as their project, rather than as a LESA project that was tying up their resources. The fact that the study team remained on task for 18 months is a tribute to the team members’ dedication to the LEADS 2000 concept. Now, agency executives agree that the reengineering study was the most valuable aspect of the entire acquisition process.

Ibid., p.12.
Arnold Blaker and Bob Kaelin led the reengineering study. A representative from the LESA Records Management division, a TPD Sergeant, a PCSD Detective, and a PPD Records Management representative formed the study team. LESA wanted a Puyallup representative involved in order to investigate the concept of making LEADS 2000 a regional service.

The team took a non-traditional approach to task modeling and reengineering in that they looked at the participating agencies as businesses rather than public safety departments. In this approach, they considered three major forces that drive modern law enforcement agencies into unfamiliar territory.

1. Customers. LESA viewed each of the participating agencies as customers. In turn, each agency viewed the general public as customers. Customers demand service, and the strategic plan had to explore how to provide efficient and timely service.

2. Competition. The team recognized there would be ongoing internal and external competition for scarce resources.

3. Change. Viable businesses recognize that change is inevitable and that planning for change in an orderly fashion is essential to success.\(^\text{14}\)

Viewing the reengineering through the eyes of a business was also seen as a critical success factor in the final strategic plan.

To be successfully implemented, each project in the plan must maintain a clear focus on satisfying the business needs of participants. Automated and manual systems simply enable changes in process and workflow to better serve the business. If these enabling systems become the sole focal point of LEADS 2000 plan projects, the project and participating organizations may lose sight of the business needs and anticipated benefits. Too much emphasis on the technology solutions for this project (e.g. laptop computers, imaging) could cause the focus on business requirements to be diluted in the rush to introduce new technology.\(^\text{15}\)

The reengineering team reviewed 140 different workflow processes beginning with the receipt of a call for service at the communication center, through the patrol officer response and report taking, to any subsequent investigation, and finally through the court system. The team took an enterprise view to workflow and data modeling, but looked at implementation at the individual agency level. The team interviewed all components of their individual agency’s operations. The first 12 months were spent examining all aspects of each department’s workflow and the paper it generated.

Initially, the team did not seek any external assistance with the study. The team leaders did not choose to seek outside help until the team began struggling to stay on task. In October 1996, LESA released an RFP for consulting assistance. MTG Management

\(^{14}\) LESA Case Management Presentation, 3/22/95 through 4/12/95.

\(^{15}\) Law Enforcement Activity and Data System 2000, p. 13.
Consultants, Seattle, Washington, were chosen in January 1997. Steve Davis was the MTG representative who worked with LESA.

MTG adopted the consortium approach to the process to bring all parties back into focus. MTG took on the role of opening and maintaining lines of communications between the team and executive decision makers. Bob Kaelin viewed the selection of MTG as a turning point in the assessment process. Once MTG became involved, the team began moving forward until it ultimately produced the final strategic plan in September 1997. MTG continues to have an ongoing role in the project through conducting independent risk assessments on a quarterly basis.

**Final Strategic Plan**

The final strategic plan is a comprehensive roadmap of LEADS 2000. The plan is comprised of the following major components:

1. **Introduction.** This section describes the purpose of the plan, the plan’s background, objective and content, and planning approach.

2. **Situation and Scope.** “This section defines the current situation for the law enforcement and law enforcement support agencies in terms of problems and opportunities faced. Additionally, this section defines how the various organizations and information systems are considered within the scope of the planning effort.” 16

3. **Business Framework.** “This section describes the overall business environment desired for the future, the strategic goals that will help achieve this environment, and the actions the organization must take to realize the goals. These statements about the future provide a strategic business framework within which specific change initiatives and plans of action will be developed.” 17

4. **Future Vision.** “This section of the plan defines a business and technology vision for the future. The vision defines how work will be done and technology underlying or supporting business processes. This vision is the work of project team members from the PCSD, TPD, Puyallup Police Department, LESA Records, and LESA Information Technology.” 18

5. **Strategic Initiatives.** “This section describes focus areas, or initiatives, along with typical activities the law enforcement community must undertake to move participating organizations toward the goals and vision for the future.” 19

6. **Migration Strategy.** “This section of the plan presents the business decisions and parameters used to develop the migration strategy; and the migration strategy,

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16 Ibid., p. 5.
17 Ibid., p. 9.
18 Ibid., p. 15.
19 Ibid., p. 38.
which packages activities within the various initiatives into a series of implementation stages.”

7. Tactical Plan. “This section defines the tactical plan of: the major activities required for each stage and an estimate of the amount of time required for each activity or task; the projected number of human resources from agency operations and management personnel to complete the activities and provide timely decision making and oversight; and the estimated schedule and costs for each stage of implementation.”

The Tactical Plan broke the LEADS 2000 Project into 4 stages of implementation. In the RFP, these stages are defined as follows.

Stage I includes:

Acquisition of the core IMS, pilot of the new IMS, and limited implementation of the IMS within TPD and PCSD. The pilot will be conducted in a highly contained environment and be based on the basic IMS with very few enhancements. The limited implementation will follow the pilot and include up to 50 additional users. Specific locations to be part of the pilot and limited implementation are not yet established. Features of the IMS limited implementation in Stage I include:

- Stage I replaces the functionality of the current CLEAR, CHRI, LECATS, and Puyallup systems for pilot and limited implementation users
- The current CLEAR, CHRI, and LECATS systems will continue in operation
- Common data between the legacy RMS (CLEAR, CHRI, LECATS) and the new IMS will be stored in the legacy database
- Automated report-writing capabilities will be piloted; however, the number of report types will depend upon a forms redesign effort occurring prior to and concurrent with stage I. Deployment to patrol vehicles will depend on the availability of funds to acquire and deploy portable units
- Limited activity and “to do” lists will be available. This implementation will probably include standard “to do” lists based on incident type
- The IMS and officer laptop devices will be able to receive data from CAD

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20 Ibid., p. 56.
21 Ibid., p. 64.
The LESA organization structure, as well as LESA Records and LESA IT job descriptions, will be reviewed and adjusted as appropriate based on the new work flows and technical environment.\footnote{Law Enforcement Information Management System Specification Number G-061-97, p. 6.}

Stage II includes:

- The CHRI, CLEAR, and LECATS and WARRANT legacy systems continue in operation for those locations that do not have the new IMS technology. The Puyallup RMS is retired
- The IMS will continue to be deployed in the participating agencies
- IMS and common legacy data will be stored in the new database
- The new IMS will replace the functionality of the WARRANT and PCSD Warrants systems. The PCSD Warrants system will be retired.
- New functionality will be provided to support a local protection order file
- Pushing information to users, providing automatic alerts, and generating activity and to do lists will be substantially completed (approximately 80 percent)
- A public service delivery strategy will be developed, and the public will be able to access limited law enforcement services over the Internet
- The IMS will be capable of automatic case assignment
- The automatic capture and reporting of business activity information will be available, along with an initial implementation of resource allocation information
- Document scanning and digital document storage and retrieval will be acquired and piloted in selected locations. This includes the pilot of the electronic (virtual) folder
- Automated report capture and creation will be completed
- The LESA, TPD, and PCSD organization structures and job descriptions will be reviewed and adjusted as appropriate based on the new work flows and technical environment.\footnote{Ibid., p. 7.}

Stage III includes:

- The AP/S, CIIS, CIMS, GANG, MSU, Phone Number, PROACT/MO, SORS, and TPD GANG systems will be functionally replaced and retired
- The CLEAR, CHRI, LECATS, and WARRANT systems will be retired
• The State Interface system will be replaced and retired
• Document scanning, storage, and retrieval will be fully implemented
• The electronic (virtual) folder will be fully implemented
• Activity and “to do” lists will be completed
• Public access through the Internet will be fully functional
• The resource allocation and management capabilities will be completed
• The DEC VAX environment will be retired, including all applications and OA tools
• The LESA, TPD, and PCSD organization structures and job descriptions will be reviewed and adjusted as appropriate based on the new work flows and technical environment.24

Stage IV includes:

• All desktop and MCDs will be in place
• Printers will be available in field operations
• Advanced peripheral technologies will be available for the laptop and desktop computing environment (e.g., electronic signature pads, portable citation devices)
• Live-Scan will be implemented on the desktop and at the patrol vehicle level
• The last imaging technology components will be deployed
• The LEADS 2000 plan will undergo significant revision and be replaced by a new planning document.25

The LEADS 2000 plan is worthy of being a model for agencies considering the acquisition of new technology. The team that produced the plan made painstaking efforts to enfranchise all levels of each organization in the planning process in order to foster ownership of the project. This also led to a plan uniquely designed to meet the needs of end users throughout the system.

Budget and Funding
The LEADS 2000 plan broke the project cost and implementation into four stages. The plan provided estimated costs for each stage. The LEADS 2000 plan estimated the total project cost would be $14,570,828.

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24 Ibid., p. 7.
25 Ibid., p. 8.
Since the inception of the LEADS 2000 procurement process, LESA has been awarded two COPS MORE grants. In 1995, they received $1.375 million in grant funds. In 1998, they received 2.3 million in grant funds. In the case of the Puyallup Police Department, a 1.5 percent law enforcement tax was included in the city’s sales tax. This money has been earmarked for technology acquisition. The Pierce County Sheriff’s Department and the Tacoma Police Department incorporate LEADS 2000 funding requests in their annual department operating budgets.

The LEADS 2000 project team is investigating additional private funding sources as an ongoing task through the project. To date, private funding sources have not been acquired. The consensus of those interviewed for this report was that continued funding posed the greatest threat to successful project completion.

The COPS MORE grants were written specifically to fund the LEADS 2000 project. The 1995 grant has paid for the majority of the Stage I implementation. It is anticipated that the 1998 grant will pay for 75 percent of Stage II and 50 percent of Stage III.

Bob Kaelin stated that another benefit of the strategic plan is that it has yielded cost savings over the original estimates. He estimates that the Stage I cost of approximately $1.5 million provided a system that would have cost over $3 million without the structure provided by the plan.

In 1998, the Pierce County Sheriff’s Department allocated $400,000 in federal block grant funds to the purchase of laptop computers for PCSD personnel. This eliminated this cost from the LEADS 2000 project. There is currently $500,000 of unbudgeted funds coming from Tacoma and Pierce County for the purchase of server hardware.

It is estimated that over these grants and expenditures each of the four participating agencies have spent $300,000 to date on the LEADS 2000 project.

Procurement Phase

RFP Development and Response

On October 31, 1997, LESA published an RFP for a Law Enforcement Information Management System. The RFP was developed directly from the strategic plan that had been published in September 1997. Members of the reengineering group and MTG Management Consulting produced the RFP. The RFP was released on November 26, 1997, for competitive bid.

Since the RFP was written directly from the specifications of the LEADS 2000 strategic plan, it accurately reflected the requirements of the reengineering planning. LESA made the strategic plan available to vendors who were preparing proposals. They encouraged vendors to use the plan as a guide to understanding the LEADS 2000 vision and then responding to the RFP with how their products supported that vision.

Prior to the RFP release, LESA sent out a Request for Information (RFI) document to 200 vendors who were listed as offering public safety technology. This mailing resulted in 30 RFI responses. The RFP was mailed to these 30 responding vendors. Five vendors...

The following timetable was listed in the RFP for the procurement process:

- **RFP Issue Date**: November 26, 1997
- **Pre-Proposal Conference Question Deadline**: December 12, 1997
- **Pre-Proposal Conference Date**: December 17, 1997
- **Proposal Due Date**: January 27, 1998
- **Public Proposal Opening Date**: January 27, 1998
- **Notification of Finalists**: February 18, 1998
- **Schedule Site Visits for Finalists**: February 23-27, 1998
- **Confidential Presentations by Finalists**: March 3-4, 1998
- **Finalists Evaluation**: March 5, 1998
- **Site Evaluations**: March 9-13, 1998
- **Evaluation Completion Date**: March 16, 1998
- **Recommendation to Executive Board Date**: March 19, 1998
- **Issue Intent to Award Date**: March 20, 1998
- **Contract Signed Date**: April 15, 1998

There were no reported problems associated with the RFP process. Bob Kaelin attributed the lack of problems or protests to the fact that the evaluation process was well defined in the RFP. This made the process very clear to the responding vendors and did not leave loopholes where a protest could be made.

The Printrak International account manager at the time, John Hodel, was interviewed for his perspective of the RFP process. He stated that the RFP was one of the most complete documents he had ever responded to. He said that LESA presented a clear understanding of what they wanted in the LEADS 2000 system. This presented difficulties for the response; the depth of requirements and the number of required interfaces to external systems made the proposal response very challenging. He felt the process, while difficult, was fair.

Mark Stiegemeier, CEO, MEGG Associates, stated that MEGG had made a point to have exposure to LESA staff prior to release of the RFP. Stiegemeier, at the request of LESA staff, conducted three separate technology briefings in Tacoma. Since the MEGG Associates product plan incorporated web technologies in their NetRMS products, the LESA staff requested the briefings to assist in educating decision makers. LESA used these briefings to build end-user consensus for moving to web-based technology regardless of which vendor won the contract.

Mark Stiegemeier observed that the RFP contained detailed requirements, but also presented the LESA vision in such a way that vendors could show how they would meet that vision. The RFP left room for a vendor to use their experience to provide the best opportunity for an end solution. The RFP clearly stated the LESA did not expect to get all of their vision in one package.

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Ibid., p. 13.
**Evaluation Process**

Once the RFP process ended with the receipt of vendor proposals on January 27, 1998, the evaluation process began.

LESA formed three evaluation teams to review submitted proposals. These teams were organized as follows:

- **Project Management Team**—consisted of the project managers and other management personnel from LESA, PCSD, and TPD. The project management team also determined acceptability and administrative issues.

- **Operational Review Team**—consisted of operations staff from various divisions within LESA, PCSD, and TPD.

- **Technical Review Team**—consisted of Information Services/Technology Staff from LESA, PCSD, TPD, Pierce County, and City of Tacoma.²⁷

The RFP described the evaluation process as follows:

The Proposals will be initially reviewed by the Project Management Team to insure that they are compliant as to format defined in section D. Proposal Format in this RFP. Proposals will also be compared with the Letters of Intent from the Vendors.

Proposals will be evaluated on the administrative, operational and technical sections first, and then, if they qualify, the costs. Proposals that fail to sufficiently comply with the technical, operational, and/or administrative requirements in this RFP shall not be considered for the final evaluation.

In addition to the criteria listed below in Phases I - III, the Evaluation Teams will be looking for the responses which most reflect the following:

- adherence of the Proposal to the format specified herein; all required information shall be provided as indicated

- demonstrates a clear understanding of the goals and objectives of the project

- completeness of the Proposal

- quality and depth of references

- demonstrated ability, within the past two years, to have successfully completed the installation and acceptance of at least two Information Management systems directly comparable to that being requested by the LESA organization. Vendors not able to provide demonstrated ability should adjust other risk factors with their proposal

²⁷ Ibid., p. 27.
- level of service and responsiveness that the Vendor commits to provide to LESA
- financial stability and resources of the Vendor
- experience and technical expertise of the staff assigned to implement the LESA installation and acceptance process
- proposed system that meets or exceeds the functional requirements
- ability to demonstrate the majority of its application in a live working environment similar to the LESA operation. Vendors not able to provide demonstrated working environment should adjust other risk factors with their proposal
- ability to demonstrate a commitment to the Marketplace and future technology being developed and
- ability to work within the limited time frames provided for the completion of this project.

Points will be scored during each of the Evaluation phases. Scoring during each phase is independent of the preceding phase. Upon completion of each phase, the vendors will start on a level playing field without any basis from the previous phase’s scores.”

All five vendors who submitted proposals were invited to make confidential presentations to the evaluation groups in Tacoma.

Following the confidential presentations, a site visitation team (12 members of the evaluation teams) spent five days traveling across the United States to visit vendor sites and vendor headquarters. The site team went to Indianapolis, Indiana; Ft. Lauderdale, Florida; Boulder, Colorado; and Salt Lake City, Utah. Most of the travel team members don’t recommend trying to compress this type of schedule into five days. Their stories range from airplanes being struck by lightning to flight delays and little sleep.

During the procurement process, all evaluation groups read the submitted proposals and scored them against the RFP requirements. This led to an initial vendor ranking. All evaluation groups attended the confidential presentations and again ranked the vendors. The site visits’ purpose was to confirm or deny what was seen and heard during the confidential presentations. The site visit team presented a report to the entire evaluation group. They concurred on the vendor selection and a presentation was made to the LESA Executive Board. The Executive Board accepted the evaluation group’s recommendation and awarded the bid to MEGG Associates.

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28 Ibid., p. 27.
Rationale for Award

The group chose MEGG Associates because of the company's dedication to Microsoft tool sets, web-based applications, and ease of modification for LESA future development. MEGG also made a convincing presentation on their interest in forming a partnership with LESA to make LEADS 2000 a reality.

The LEADS 2000 Information Management System is a core application made up of the MEGG Associates NetRMS and CRIS Cruiser applications. These applications are being customized by MEGG Associates to meet LESA requirements. In addition, LESA has an internal programming staff that will further customize and maintain the system. One of the primary reasons for choosing MEGG Associates was the application's use of Microsoft's Internet Explorer as an integral client feature. This will allow LESA programmers to develop internal applications and "plug" them into the NetRMS structure. MEGG, in turn, provides LESA developers with access to NetRMS source code so they can determine how modifications made at the local level affect the database and application structure.

One of the decisions made during the LEADS 2000 planning process was to build the new system entirely upon Microsoft operating systems, database engines, and development tools; and Intel based servers and workstations. MEGG Associates' use of Microsoft Backoffice and Microsoft SQLServer in their products was another reason for selection. This decision also allowed LESA to make COTS purchases of hardware and software which, in turn, reduced system costs.

LESA made the Microsoft decision to avoid the use of any proprietary hardware or software products. Experience with their legacy environment and the LEADS 2000 vision of an integrated system using web technology underlined the need for LEADS 2000 to be an "open" system.

Contract Negotiations

MEGG Associates was awarded the bid in April 1998. Bob Kaelin said the contracting process went smoothly and a contract was signed in June 1998. The contract included payment milestones based upon performance rather than delivery. The contract also included liquidated damages linked to the milestones.

Mark Stiegemeier said that from MEGG's point of view, the contracting process was smooth because LESA drove the process with a contracting schedule. He said the contract language was very clear. MEGG participated actively in the contract process. They created over 120 scope of work items that became part of the contract. Stiegemeier said that MEGG wrote to every deliverable in the RFP and, if it was work they were agreeing to perform, created a single page scope definition. Each side then reviewed these definitions and agreed to them. This process produced scope definitions at a fine level of granularity that allowed all parties to understand each side's role and responsibilities. This process has yielded benefits during implementation, since it has made the change order process very efficient.
Working Relationship with Vendor

To date, Kaelin views MEGG as a good partner who has been responsive to LESA needs and concerns. Kaelin has established good communications with the vendor through Mark Richens, the MEGG project manager. MEGG has dedicated internal resources to the LESA project in order to maintain the project schedule. Kaelin describes MEGG as being behind schedule on product deliveries, but not to the extent it is causing LESA concern. LESA has hired Lloyd Eggers as the LESA project manager. Eggers directs the internal project team and is the primary liaison with MEGG.

Pierce Power, of MEGG Associates, said that the company views themselves totally in a partnership relationship with LESA. He said a secondary factor that differentiates the LESA approach is their willingness to enter a long-term relationship with a vendor. Historically, public safety, for political reasons, has been hesitant to enter into a long-term arrangement with any one vendor. There is real benefit and value added to product and services where a long-term approach is taken. Since MEGG is committed to keeping pace with Microsoft technology, the long-term relationship will help LESA benefit from advancements in that technology.

Mark Stiegemeier confirms MEGG dedication to the LESA project. He has allocated significant internal resources to insure success. He sees MEGG’s role in subsequent phases as providing a workflow architecture that will support the LEADS 2000 vision. MEGG will develop and integrate the complex business rules that the vision requires.

Implementation Phase

All of the LESA and agency personnel interviewed said that implementing and maintaining good lines of communication at all agency levels was critical. Many of those interviewed said that the LESA pre-procurement selling effort was so effective that it created problems during the implementation phase in that it caused agency personnel from the executive level to the line level to expect a rapid deployment and immediate access to the new technology.

Project Management

When the implementation began, LESA formed an internal project management team with project managers assigned from each participating agency. This team meets weekly to monitor project progress, address issues, and plan for future implementation. The team uses the Microsoft Project application to create master project plans and manage the project. These project plans were first created during the LEADS 2000 strategic planning and have been modified as needed for project management.

The LEADS 2000 system is housed within LESA offices in the Pierce County City/County Building in Tacoma. As the implementation moves forward, space is allocated as needed for expansion.

LEADS 2000 operates in a multi-processor, Intel-based Microsoft NT server environment. The new system is a standalone system that does not use any of the legacy hardware or software components. Bob Kaelin stated that a critical component to implementing a major system was to have completely separate development and production servers.
Since LESA intends to build their own internal applications, this was a requirement for development and testing before releasing an application into the production environment.

One of the few complaints heard about the new system was that the MEGG documentation was poor. This was attributed to the fact that the NetRMS is so new, documentation production was lagging behind development.

**Training**

Within LESA, training has been conducted in Visual Basic and MEGG Active Paper for LESA developers who will be working with the system. LESA developers will handle all legacy data conversion. Bob Kaelin stated that choosing industry standard tool sets has resulted in lower training costs for LESA staff.

MEGG training is conducted in a train-the-trainer format. There are trainers selected from each agency’s personnel who attend the MEGG training. This generally consists of 24-32 hours of hands-on application training. These trainers then train the end users within their departments.

The move from a VAX based “dumb” terminal system to an Intel/Windows based PC system led to a training issue. LESA had to provide eight hours of basic Windows training for many end-users. The agencies involved made the Windows orientation course a class within their regularly scheduled training programs for existing employees and included it as a requirement for new hires. This avoided the need to disrupt schedules with special training classes.

**Project Support and Schedule**

LESA is first line support for LEADS 2000 end users by manning a 7x24 Help Desk. MEGG provides 7x24 support at the system administration level. This support focuses on single points of contact between MEGG and LESA.

LEADS 2000 implementation is still underway. Stage I is being completed and Stage II is being started; the overlapping stages are part of the implementation plan. The project schedules for system implementation now extend into 2001.

**Impact Phase**

Robert Van Gieson, Director of LESA, and Tom Miner, PCSD Captain and LEADS 2000 agency project manager, both stated that one of the initial adverse impacts was the transition from the legacy system to NetRMS. The effort required to get data into the new system was greater than anticipated. Initially, police incident reports were being double entered into the legacy system and into NetRMS. This was necessary because the majority of end users still only had to access the legacy systems for their case information, but data had to be entered into NetRMS to begin testing and make the transition to the new system.

A hardware problem caused an existing production server to crash within a month of NetRMS coming online. NetRMS was initially installed on existing server hardware that
was about a year old. This server was equipped with an “off-name” brand disk that failed. This failure resulted in the loss of four out of seven disks in a RAID 5 configuration. As fate would have it, this loss occurred at the same time as LESA was implementing a backup solution, but it was not formally up and running. Bob Kaelin said that, in hindsight, everything that could go wrong did in this specific instance. One of the factors that ameliorated the situation was the skill of the internal LESA support team. After an attempt to perform an orderly recovery failed, the decision was made to reenter the lost data rather than continuing to attempt data recovery. Bob Kaelin said they determined the cost benefit to reenter was greater than to rebuild.

This loss of data set back the implementation effort. It caused a data entry backlog that LESA is still attempting to reduce and frustration at the end user level in getting data needed to do their jobs. However, the project team is undaunted in its efforts to push forward with the implementation.

The team recognized and identified during the strategic planning phase that communication, change management, and risk management were critical factors for success, but they did not realize the effort it would take to incorporate these concepts into the implementation.

As one team member put it, “Everyone assumed that the product purchased would automatically work.” This assumption led to dissatisfaction with the implementation pace and caused LESA staff to implement additional communication tools to keep all levels of all organizations apprised of developments and/or setbacks. These tools included a LEADS 2000 newsletter and increased communication between the agency project managers and their internal staff. MTG Management Associates conducts ongoing risk analysis and provides a quarterly risk assessment report to the LESA Executive Board.

**Staffing**

One difference between the strategic planning phase and the implementation phase is that the agency project managers are not dedicated full time to the project. They must perform their project management duties as an adjunct to their normal duty assignments. Some believe this reduces their ability to effectively communicate project issues within their agencies.

The LEADS 2000 project is requiring LESA and participating agencies to add new staff positions. LESA will be hiring additional developers as contract employees and new hires. The Sheriff's Department anticipates creating two new technical positions to provide internal application support.

**Benefits for End Users**

All of those interviewed are in agreement that agency personnel are very receptive to the new technology. This eagerness to use it contributes to the need to keep them informed of when it will be available.

Loc Reader, Chief of Police in Puyallup, told the story that the first day laptop computers were available in a PPD patrol car and connected to the Washington state crime
computer, an officer ran a license plate on a vehicle and it came back stolen. That underscored the new technologies’ value for his staff.

The LEADS 2000 project is still in its infancy, so this case study can not address specific statistics on how it will reduce crime or save resources. According to Robert Van Gieson, the grant written for the COPS MORE 95 funding estimated that LEADS 2000 would result in the redeployment of 43.3 law enforcement officers to community oriented policing tasks. LEADS 2000 is designed to give LESA the tools to provide quantifiable measurements of how the system is positively impacting agency operations and allowing more efficient use of resources.

**Costs**

At this stage of the LEADS 2000 implementation, costs are lower than originally estimated. Many of these cost savings are attributed to the planning process, but other factors have also helped reduce costs. LESA’s technical staff is capable of fully supporting the system; and the participating agencies contributed more in internal resources both for equipment and personnel than was originally anticipated. Robert Van Gieson commented that city and county funding sources began opening up when people saw the applications and wanted more.

**Organizational Changes**

The LEADS 2000 strategic plan anticipated the project would result in organizational changes both in LESA and in the participating agencies. The plan called for the review of each organization to determine whether changes are suggested to support the revised business processes and work flows. This is an ongoing process that will identify the specific changes needed and implement them. The actual changes will occur concurrently with, or preceding, implementation of the new business and automated processes scheduled within a specific stage. 29

**Summary**

LEADS 2000 began as a grassroots movement to use technology to help people do a better job. It grew into an aggressive technology acquisition project that put the participating organizations on the cutting edge of information and activity management systems. It is a tribute to the agency executives that they empowered line-level users and mid-level managers to act on their vision.

LESA used the reengineering team’s strategic plan to produce the RFP that ultimately resulted in the contract with MEGG Associates. LESA is fortunate to have found a technology vendor willing to share their vision and flexible enough to respond to LESA requirements.

LEADS 2000 is an aggressive technology reengineering project. Since the strategic plan set forth a detailed vision prior to the procurement process beginning, the question arises as to whether the solution with fulfill the vision. Among those interviewed, the general

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29 Law Enforcement Activity and Data System 2000, p. 42.
consensus was that the solution will provide them with 80 percent or more of the system they envisioned in the strategic plan.

At the conclusion of each interview conducted with LEAD 2000 project team members, each was asked to provide a list of “do’s and don’ts” that they would like to share with other agencies. The following is a compilation of their lists.

1. Insure there is executive support for the project.

2. Insure that there are adequate internal resources to complete the tasks for choosing the technology, training, and risk management.

3. Conduct a thorough workflow and reengineering analysis before proceeding with procurement.

4. Go outside for expertise to assist in the planning and procurement.

5. Select a flexible product that allows for ease of maintenance at both the server and the client level.

6. Select a vendor willing to respond to requested changes.

7. Insure there are internal resources available to respond to requested changes.

8. Incorporate the end users in the initial planning and design. Know what the end user wants from the new technology and win their support for the new systems.

9. Establish good internal project management teams. Give these people the authority to make decisions.

10. If choosing an existing product, make every effort to see the product in a production environment prior to selection.

11. Expect technology projects to take more time than originally stated.

12. Prepare for phased planned implementation.

13. Through the planning process, know what you want going into the procurement, but don’t expect to get it all. Be realistic.

14. Be collaborative in the decision making process. Don’t rush into a decision.

15. Be open to compromise both internally during the planning process and externally during the procurement process.

16. Empower line level personnel to participate in the planning process and decision process.

17. Understand that this is a long-term commitment both in time and resources.

18. Don’t believe everything a vendor tells you. See it for yourself.
19. Don’t be in a hurry. Do it right the first time.

20. Don’t think that technology will create less work. It creates different work. Technology doesn’t necessarily save time. It may redirect time.

21. Don’t put limits on what you can accomplish.

22. Don’t plan by your bankbook. Once the vision is in place, it is easier to find the funding.

23. Establish lines of communication at all agency levels. Keep these open and active throughout the project.

24. Don’t over promise; under promise and then over deliver.

While the LEADS 2000 project is only 25 percent completed, the plan is in place to guide the project team to a successful conclusion. It can be safely said that LESA did all the right things in laying the groundwork for success. The depth of analysis conducted during the reengineering effort is extraordinary. The departments’ commitment of resources dedicated to the planning phase is highly unusual. The strategic plan produced by the reengineering team can serve as a model for any public safety agency on the right way to approach the acquisition of new technology. The researcher encourages readers who are considering system acquisitions to contact LESA and obtain a copy of the plan.
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Technology Acquisition Project  
Case Study  

Seattle, Washington, Police Department

This case study focuses on crime analysis and mapping technology acquisitions. It is one of 18 case studies prepared for the “Technology Acquisition Project” administered by the Institute for Law and Justice in partnership with Government Technology, Inc., and funded by the National Institute of Justice (NIJ), U. S. Department of Justice. The author of this case study is Julie Wartell, Senior Research and Technology Associate, Institute for Law and Justice. The report has been reviewed by the participating site but should be considered a draft pending final NIJ review.

Background on the Project and Study Site

This case study focused on the acquisition and implementation of crime analysis and crime mapping technology within the Seattle Police Department (SPD). Although SPD Crime Analysis has been using various types of information technology for about ten years, in the last 18 months, technology acquisition increased immensely and capabilities have been greatly enhanced.

In the SPD’s Information Technology Functional Plan (created in September 1997 in conjunction with the Department’s Strategic Plan) a crime analysis system is included as a major project. The key people involved in crime analysis and mapping are Ron Rasmussen, Crime Analysis Unit Detective Sergeant, and five Detective Analysts.

SPD serves a population of 536,000 and covers 143 square miles. There are approximately 1,250 sworn and 670 civilian personnel. In 1997, there were 64,000 Index crimes and 67,000 calls for service. SPD has six bureaus in addition to the Chief’s Office. Both Crime Analysis and Information Technology are units in the Community and Information Services Bureau. Crime Analysis is largely a decentralized function. Personnel include a Detective Sergeant Supervisor, four Detective Analysts who serve the area precincts, and a centralized Detective Analyst who handles accountability requests and various citywide issues. The analysts do a combination of tactical, strategic, and administrative analysis for patrol officers, detectives, supervisors, and command staff. Crime Analysis is also supported by light duty officers and volunteers.

Summary of the Technology Solution

The SPD’s rapid growth in crime analysis and mapping technology has been largely funded by grants, including the Youth Violence Handgun Initiative, COPS MORE, and two law enforcement block grants. About $500,000 was dedicated to crime analysis from all of these grants over the last several years. In general, the money was spent on building a crime analysis data warehouse and software such as ArcView, Spatial Analyst, Oracle, and Crystal Reports. Funding also provided for hardware, including servers and workstations to run the databases and software; building a data model of the crime
analysis business processes so the data warehouse could be built appropriately; and training the analysts to use the software purchased.

The initial impetus for a new system was based on a federal grant (received in 1995) that included the implementation of a crime mapping and analysis system to bring together all of the other grant components. A majority of the hardware and original software was purchased with this funding and then supplemented with other grant funds and in-house development. Crime analysts primarily use Environmental Systems Research, Inc. (ESRI) and Microsoft products to accomplish their tasks. They are currently exporting and using CAD data in the above applications, but crime cases and arrests are also entered on an ad hoc basis. Other databases the analysts may use are the Washington State Attorney General's Homicide Incident Tracking System and city licensing. The SPD also relies heavily on the city's Public Utilities Department, which supports GIS efforts citywide.

Assessment and Decision Making Phase

The SPD has been doing some type of crime analysis since the 1980s. Prior to 1989, when they started using Macintosh computers, analysts would type their bulletins. Around 1992, SPD went away from Mac and purchased MS Office for all of the analysts. Since the early 1990s, analysts have pointed to a need for accurate RMS data for analysis and mapping (the vendor, PRC, had not been supportive of the necessary changes), while performing their duties by reading reports and re-entering necessary information. The Department’s IT Unit fulfilled map requests and created drop-down menus in ArcInfo to make maps and canned reports for the federal Weed and Seed project. Until 1998, Crime Analysis performed a range of functions from wanted person bulletins to basic reports to administrative tasks for the Captains. Being decentralized, each analyst served as a clearinghouse of information for the precinct.

By 1995, senior managers had decided to make crime analysis a priority. SPD felt crime analysis and mapping technology were important tools, according to the Community and Information Services Bureau Director, the key policy-maker in the department who is driving the development of crime analysis technology. SPD, he said, wants “to understand crime problems, crime trends, and patterns that assist us in meeting our goal of exceptional and timely responsiveness to community needs as well as individual and team effectiveness in solving crime and crime-related problems.”

The SPD applied for and received a Youth Handgun Violence grant from the COPS Office, U.S. Department of Justice. Of the $1 million dollar grant, about one-third was designated for a crime mapping and analysis system. In addition, the grant funded a half-time civilian crime analyst position, overtime and travel for staff, consultant services from the city Engineering Department and network enhancements (related to crime analysis). To increase crime analysis capabilities, SPD went at the challenge from several angles. The primary application was going to be a Geographic Information System (GIS). With the GIS as a base, SPD had the option of purchasing off-the-shelf extensions or creating their own. They decided to do a combination of both. But the GIS and related systems could not run without data.

Analysts are unable to use the existing RMS data in other systems. In 1997, SPD decided to create a data warehouse to address their problems. By February 1998, the data warehousing project was re-evaluated and current personnel decided to start again
from scratch. The goal of the data warehouse is to hit on the RMS, feed an application server, and then feed the web server. It will have data back to 1996 and will be used for querying and analysis.

In addition to the GIS-based system, Crime Analysis began to look for additional investigative and analytical resources. In February, they were made aware of the Department of Energy/Pacific Northwest Lab’s Starlight Project. This futuristic, analytical application allows the user to look at a wide variety of data 3-dimensionally. The program was still under development but showed immense promise for SPD as a local law enforcement user.

SPD’s plan for the immediate future was to do crime mapping through the Intranet. The long-term plan is to implement an interactive crime mapping web site on the Internet for the public as well.

The good relationship between SPD’s Crime Analysis and IT units has expedited decision-making and approval in technology acquisition. Both units serve under the Director of the Community and Information Services Bureau, and this has also been beneficial. The city maintains standards for hardware and software purchases, but the police have gotten special exceptions, such as with their under-development Intranet (a city ordinance states that city IT maintains the only web server, for security reasons).

**Procurement Phase**

The software evaluation process and vendor selection involved an advisory committee and a Sergeant who traveled to several agencies. They considered ESRI’s ArcInfo and MapInfo’s MapInfo. The committee preferred MapInfo because it was more intuitive and user-friendly, and SPD’s long-term goal was to put mapping in the hands of officers. By May 1996, SPD had selected MapInfo, not knowing that city IT was going to approve only an ESRI product. Between that and pressure from ESRI, the SPD began the purchase process for ArcView (ESRI’s desktop GIS) in late 1996. By late 1997, six workstations were up and running. In June 1998, the Spatial Analyst extension for ArcView was purchased. At the same time, ten seats of the workstation version of Omega Group’s CrimeView, a user-friendly crime analysis extension to ArcView, were purchased for $28,000. The software and training were planned for the end of May 1999.

In early 1998, SPD IT discovered grant funds intended for crime analysis that had not been used. They ended up spending it on contractual support (a local consultant from the city list), server upgrades, fiber optics, and the web interface. The web application (called InWeb) will be using NT 4.0 IIS, ArcView IMS, and CrimeView IMS. ArcView IMS was included in the cost of the package for CrimeView IMS; SPD spent $25,000 to cover development costs with two other agencies. The web version of CrimeView is scheduled to be installed during the fall of 1999.

The data warehouse project (to access RMS data) officially started about the same time and is being funded by a variety of sources, including the Youth Violence Handgun Initiative, COPS MORE, law enforcement block grants, and the SPD budget. The data warehouse consists of two DEC Alpha Server 3000’s running in parallel with a DEC raid array 450 housing fourteen 4.5 GB drives. In January 1999, the network lines to each precinct were upgraded from T1 lines to fiber optic to eliminate bandwidth problems, and
100MB lines will be installed from the FDDI hub to each analyst’s workstation. To populate the database, PRC was required to upgrade the RMS to Oracle v7.1. At the time of the case study, the project was in its final stages of implementation. The data warehouse will have three years of data and will be updated daily from the present Oracle database.

Two positions that were filled in early 1998 affected the procurement of SPD crime analysis technology. The city hired a Chief Technology Officer and the Police Department brought in a new Information Technology Manager. The city informed SPD that everyone was going to be moving from NT to Novell. SPD resisted and won because they had just purchased six DEC Alpha Servers that cannot run with Novell. Crime Analysis has since purchased two more servers. The new SPD IT Manager came in with a new perspective and is considered very "distributed and client server oriented." This eased the process for the growth of crime analysis hardware and software acquisitions. SPD IT signs off on all hardware and software requests but has yet to refuse any from Crime Analysis (although there has been some give and take). They attribute this not to luck but to excellent communication and coordination.

Analysts currently use CAD data for their regular reports, maps, and analyses. Obtaining accurate incident address data is an issue (e.g., rapes reported from hospitals list the hospital address), but the analysts try to work around this challenge. All non-crime data in the GIS are maintained by Seattle Public Utilities. The list is extremely varied and includes hospitals, libraries, schools, fire hydrants, bridges and ferry routes, tax assessor, building footprints and orthophotos, traffic signals and accidents, and bus stops. Other databases that analysts access are city licenses, the county and state WANS, precinct problem oriented policing (POP) project files, and the Homicide Incident Tracking System (HITS).

HITS, maintained by the Washington State Attorney General’s Office, includes homicides, sexual assaults, DMV, Department of Licenses, Department of Corrections, California Serious Habitual Offenders, California GREAT (gangs), and SMART (parole and probation). This unique and extraordinary database and system is a valuable resource for local departments like SPD. The city and county presently pay monthly fees to the state to connect to their Intranet, but when the state Attorney General’s Office goes live with HITS on a Virtual Private Network, all costs to locals will be eliminated. In addition, HITS is being integrated with MapInfo for mapping capabilities.

Because SPD is a test site for the Starlight Project, they were able to procure the software at a minimal cost; the big spending was for the necessary hardware. With grant funding, they purchased three workstations at $12,500 each. The high cost is due to a dual processor, lots of memory, dual or wide screen displays, and a “monster” graphic card. Each of the four software licenses cost $3,000. The planned delivery date for Starlight was set for the summer of 1999. Each of the analysts will get one day of training.

Crime Analysis hardware and software purchased between 1997 and 1999 include:

- 1 Laptop (shared by all analysts)
- ESRI’s ArcView GIS and Spatial Analyst extension
- Omega Group’s Crime View
- Microsoft Office
Implementation Phase

Training

Crime analysts have had extensive training on conceptual analysis and technical aspects of using the various systems. These classes include Alpha Group’s five-day crime analysis class ($500 per person plus travel); Alpha Group’s criminal profiling class; ESRI’s ArcView training (this was conducted by a city contractor for $350 per person for three and one-half days); and ESRI’s Spatial Analyst training (ESRI came to Seattle and taught 12 people for $10,000). The analysts can also attend various Microsoft Office classes held through the city.

Training at SPD has been a priority, as it should be in implementing new technology. By June 1998, several of the new applications were in place, and the analysts had been through training. The Crime Analysis supervisor noted that “training is worth every single dime.” SPD is currently trying to provide more training in the utility of crime analysis for the remainder of the department and hopes to begin this in the fall of 1999. One request was for “a short course presented by a credible practitioner who speaks in non-geek language demonstrating the possibilities for applying the technology to crime and disorder problems.”

Value in Detecting Crimes

The Crime Analysis supervisor mandated that the analyst role include “detecting crime series.” This occurred almost immediately and led to detectives conducting better investigations and more suspect interviews and clearing more cases. The data is downloaded daily from CAD into Excel and then geocoded in ArcView. The daily files are merged into monthly files. Because the digital data is only from CAD, analysts still read incident reports for target crimes. Some enter them into an Excel spreadsheet while others have a paper filing system. Analysts remain a conduit of information within the precinct between patrol, investigations, and the Captain.

The data warehouse was not quite implemented at the time of the case study, although it could be described conceptually. Precinct analysts will be able to query it (across the SPD network) using Oracle client or via an ODBC SQL connection from ArcView, MS Access, or SQL server 6.5 client.

Marketing, Products, and Staff Support

Part of implementing the enhanced technology was an informal marketing campaign. Analysts create products and show applicability, benefits, and successes to the “customers” and hope word will get around. Crime Analysis products are not standardized across districts but include monthly hot spot maps (using an in-house developed tool based on the code from DOJ’s Spatial Crime Analysis System), top 10 call volume locations/areas, series and pattern identifications, and lists and maps of known suspects. In addition, the centralized analyst does citywide density change maps and analyses for citywide problem solving efforts (such as the one below).
As crime analysis, and in turn, departmental information technology was being enhanced, the IT unit needed to add staff support to implement everything in a timely fashion. SPD's CAD and RMS are in Oracle, as is the new data warehouse. Because of past problems and the need for ongoing maintenance, an Oracle Database Administrator position was added to work solely with the new servers. This position is funded by the Department's budget.

GIS support is received from the Seattle Public Utilities Department (SPU). SPU has 80 people who support 350 ArcView users. They have a help desk and hold weekly seminars and "office hours" where users can spend time with GIS specialists. One of the GIS specialists noted that the SPD has some of the most frequent users and has
encouraged SPU to answer more challenging requests and create more sophisticated tools. One of the main tools SPD uses is “Seattle Tools,” an automatically-loading ArcView extension that adds themes, has a map wizard, and has limited spatial analysis functionality.

Funding for general support comes from the Central Geographic Database Fund, a yearly budget allocation from each city department. Additional time-consuming services and application development cost the SPD $50 per hour. The SPD and SPU agreed that having a large, interdepartmental unit to maintain and update data and provide technical expertise and support was critical to implementing crime mapping quickly and making so much progress in such a short time.

Impact Phase

SPD is using their new tools to assist SeattleWatch, SPD’s accountability model that was implemented in January 1999. One Police Manager noted that one of the largest impacts of the new technology and its applications is an “amazement on the part of commanding officers at the wealth of information, data, and statistical confirmation of the anecdotal information/intelligence provided by the community.” Some believe the new crime analysis capabilities will be even more appreciated by line-level patrol and investigations once the mapping and analysis is directly connected to the department’s RMS. Analysts would like to spend more time with the Academy and in-service training to educate as many as possible about crime analysis products and effectiveness.

Analysts and Officers agree that with the new technology, many products that took several days to create now are “much easier and quicker.” Prior to implementing the new crime mapping technology, for example, one analyst had to input 96 commercial robbery cases into a spreadsheet to look for patterns. Now, in a matter of hours, analysts can identify patterns and hot areas to show patrol and detectives and can more accurately predict times and places. In addition, having a network and email has reduced the time needed to send bulletins to neighboring jurisdictions.

Acceptance and Perceived Benefits

Not all analysts are completely comfortable with or excited about the new “system.” Some feel it has become too computer-reliant and statistically oriented, and one felt some products were not widely used. As is true with any new product, there are some enthusiastic users and some who like to stick to the old ways. One patrol officer said his district analyst saw a need for certain products for patrol and created them. He feels that one benefit is a new ability to compare his beat with surrounding beats and help in other areas if needed. An investigator noted that “maps really help to see patterns in specific
areas of dumped cars, stolen cars, etc.,” pointing out which reports to read and follow up on. One of the newer Captains is regularly using a variety of crime analysis maps and reports to help with resource allocation, identify target areas, and inform the community and other organizations. She also uses the “top 10 call volumes” to learn more about problems in her area, and she uses a link analysis chart to better understand a series of crimes, people, and locations.

**Staffing Needs**

One effect of the new technology and vision of crime analysis is the need for more staff. The new, more complex analyses not only take more time, but also the variety of products has increased the workload greatly. Crime Analysis got one new position in 1999 – a centralized analyst to assist with SeattleWatch, but the Department has asked City Council to fund four additional (civilian) analyst positions by January 2000. In addition to planning ahead for extra staffing, the IT Manager recommends educating senior management and City Council to plan for, factor in, and buy ongoing maintenance support. With new or enhanced technology, she adds, “agencies have three options – hire someone from within, pay a contractor, or have the system fail.” The Seattle Personnel Department, much like other governmental agencies throughout the country, did not realize that good IT people cost a lot.
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