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Author(s): Tom McEwen ; Randall Guynes ; Julie Wartell ; Steve Pendleton

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Institute for Law and Justice
1018 Duke Street
Alexandria, Virginia
Phone: 703-684-5300
Fax: 703-739-5533
E-Mail: ilj@ilj.org

Information Technology Acquisition

Final Report

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FINAL REPORT

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Report Contributors

Tom McEwen
Randall Guynes
Julie Wartell
Steve Pendleton

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Table of Contents

<u>Chapter 1: Introduction and Project Overview</u>	1
Information Technology Acquisition Project	1
Overview of the Technologies	2
Other Existing and New Technologies	3
Methodology	5
State of IT Acquisition in Law Enforcement.....	16
Report Organization.....	20
<u>Chapter 2: Strategic Planning</u>	21
Supporting Agency Goals	21
Characteristics of IT Strategic Plans.....	25
Techniques of Strategic Planning	26
<u>Chapter 3: Phase 1—Assessment and Decision-Making</u>	31
<u>Basic Considerations.....</u>	<u>31</u>
<u>Assessment and Decision-Making Activities</u>	<u>33</u>
<u>Chapter 4: Phase 2—Procurement</u>	45
Procurement Methods	45
The RFP Process	52
Negotiations and Contracts	60
<u>Chapter 5: Phase 3—Implementation</u>	64
Implementation Methods	64
Implementation Plan	66
Support Structure	66
Preparation of the Organization	67
Agency Satisfaction	67
Risk Analysis and Management.....	68
Training.....	71
Legacy Systems	73
Implementation Scheduling	74
Acceptance Testing.....	75
<u>Chapter 6: Phase 4—Impact Assessment</u>	77
Organizational Change.....	77
Project Versus Program	78
Measures of Success	78
Unintended Consequences.....	81
Quality Improvement	81
<u>Chapter 7: Managing the Technology Process</u>	83
Institutionalizing Change and Acceptance.....	84
Establishing an Organizational Structure and Project Team	85
Using Technology Effectively	87
Recognizing Problems	87

<u>Chapter 8: Conclusions and Policy Implications</u>	89
Strategic Planning	89
Four-Phase Acquisition Model	90
Acquisition in Practice	92

Chapter 1: Introduction and Project Overview

Information Technology Acquisition Project

The Information Technology (IT) Acquisition project, supported by a grant from the National Institute of Justice (NIJ), was conducted by the Institute for Law and Justice (ILJ) and several private sector partners from January 1998 to March 2001. The overall purpose of the project was to help law enforcement practitioners and policymakers navigate the many considerations involved in acquiring up-to-date information technology, communication technology, and other technologies.

The *acquisition* of technologies for policing was viewed as much more than purchasing; rather, it was defined as a four-phase process that involves assessment and decision-making, procurement, implementation, and impact assessment. Moreover, the study team consistently emphasized that IT acquisition strategies cannot be separated from policing strategies; they must fit with an agency's tactical and strategic plans. The experiences of both technical staff and management were seen as crucial throughout each phase, and the products of the research were designed with both technical and management personnel in mind. These concepts were reflected in the project's objectives, which were to

- Develop guidelines to help policing agencies take a more systematic approach to IT acquisition
- Describe the changing landscape of information technology in law enforcement
- Identify organizational constraints and needs (e.g., organizational capacity, financial considerations) that have an impact on IT acquisition
- Identify factors that are critical to the success of the IT acquisition process
- Discern patterns in the four-phase IT acquisition model
- Compile a list of resources (e.g., organizations, research material, vendors) available to assist policing agencies with IT acquisition
- Develop recommendations for improving the IT acquisition process

- Raise the law enforcement community's awareness of IT acquisition issues
- Assess the impact of funding and IT administration on the successful implementation of information technologies for policing

Major tasks aimed at achieving these objectives included conducting case studies in 14 policing agencies, developing an RFP handbook, conducting a national survey of policing agencies on their IT acquisition practices, and creating a decision-making model for acquiring crime mapping technologies.

The rest of this chapter provides an overview of the technologies selected for in-depth study; discusses the project's relevance for acquiring other current and emerging technologies; gives an overview of the research methods used; explains how the study products were disseminated and put to immediate application in various training projects; and offers comments and conclusions on the current state of the art in IT acquisition for policing.

Overview of the Technologies

Before the project was funded, NIJ recognized that this study could not examine in depth every conceivable type of technology available to law enforcement. Rather, NIJ wanted to focus on the information technologies that had become essential to police departments' ability to function efficiently and that were important to small as well as large departments. These technologies include management information systems, computer-aided dispatch (CAD), case management systems, and Internet access by citizens. NIJ also anticipated that by examining the acquisition *process* in great detail, the study results should prove valuable regardless of the technology in which an agency was interested.

At the outset of the project, ILJ, NIJ, and the project's advisory panel reviewed the initial list of technologies to be examined and made some refinements. First, it was clear that computer-aided dispatch (CAD) and records management systems (RMS) could and should be examined together. Second, the researchers recognized that many of today's RMS packages for law enforcement agencies include a case management system for investigations. They agreed that case management systems—an independent purchase in the recent past—are now often linked with the RMS and should be examined as part of this CAD/RMS group of technologies.

Third, the project planners agreed that crime analysis and computer mapping systems also deserved close examination, given their increasing support for community policing efforts and the high level of agency interest in these systems. Fourth, there was strong interest in exploring how the four-phase IT acquisition process applied to laptop and wireless technologies. Finally, ILJ originally proposed including DNA technologies in the study but later recommended against doing so, since the impetus for establishing these systems was still very much at the federal level. DNA systems had not entered into the mainstream of operational systems; consequently, there was not much the researchers could learn from local agencies. In addition, the acquisition process for DNA systems was straightforward because agencies were simply using federal funding for direct purchase of the necessary equipment.

Ultimately, the researchers agreed to devote the bulk of the project's resources to examining the following groups of technologies:

- Computer-aided dispatch (CAD)/records management systems (RMS), including case management systems for investigations
- Crime analysis and computer mapping systems
- Laptops and wireless technologies
- Internet/intranet technologies

An additional change was made in the framework for the study. In its research solicitation, NIJ described IT acquisition as a three-phase model (assessment and decision-making, implementation, and impact assessment) but agreed with the researchers that the *procurement* process was so complex and so critical to successful acquisition that it should be treated as a separate phase.

Other Existing and New Technologies

A revolution in computer technology and telecommunications has occurred over the last 20 years with an unprecedented combination of increased capabilities and decreased costs. The questions faced by law enforcement today center on how to harness the enormous capabilities that have become available. The approach to this project was designed to ensure that the results would be applicable to other existing technologies that could not be included in the research and to new technologies on the horizon.

Existing Technologies

Among existing technologies, the potential of wireless communication systems for policing is just beginning to be realized. In many departments, laptops double as mobile digital terminals (MDTs) for inquiry access to incident databases, motor vehicle databases, warrant files, in-house police department records, and national databases such as the National Crime Information Center (NCIC). Dramatic efficiency and effectiveness improvement through increased speed and increased hits for warrant arrests have been reported through the application of these systems. On the other hand, several factors have challenged departments' desire to make wider use of these technologies. Some of these relate to the laptops themselves (initial expense, cost of maintenance, obsolescence). Other challenges are related to the transmission of data. Although wireless transmission capabilities and bandwidth continue to grow, the ability to transfer massive amounts of data is still relatively limited with current technology. This not only makes it impractical to transmit certain types of data but also keeps the process slow, frustrating officers in the field.

The tremendous potential of Internet and intranet technologies for policing must also be considered. When the proposal for this project was written, an estimated 300 policing agencies had Internet web pages that provided the public with information about their agencies and about crime in their communities, including photographs of wanted persons, crime maps, drug "hot spot" locations, announcements of special police programs, and other information. Although the number of agencies with these capabilities is now well into the thousands, many other Internet and intranet applications for policing are just beginning to be explored. Besides regional intranet systems in which agencies are sharing crime and investigative data across jurisdictions, Internet applications such as on-line reporting and interactive crime mapping are becoming increasingly popular.

DNA databases are another emerging information technology for law enforcement agencies. NIJ funding support through such programs as the DNA Identification Program and DNA Laboratory Improvement Program gave impetus to development within federal, state, and local agencies. There will be increasing interest in examining these databases as an information technology available to police for investigative assistance. Local, regional, and state databases are increasingly used to identify suspects from cold cases and to link serial crimes.

Any project on information technology for law enforcement agencies must consider the changes that are occurring nationally within the NCIC system. NCIC 2000 includes increased capacity, updated technology, image processing functions (e.g., mug shot, signature, identifying marks), automated single-finger fingerprint matching, access to new databases (e.g., convicted persons on supervised release), access to external databases (e.g., the Canadian Police Information Center and the Federal Bureau of Prisons “SENTRY” database), and other enhancements. NCIC 2000 is having a significant impact on information technologies at the state and local level.

New Technologies

The ILJ research team defined *new technologies* as technologies that do not currently exist in the marketplace but will undoubtedly become available in the future. When a new information technology emerges, several issues arise. How does an agency obtain reliable information about it? When should consideration be given to a financial investment in the technology? What impact will the technology have on the operational strategy of the agency? Will additional personnel and space be required, and if so, how can these costs be estimated? Expert systems, similar to the GIS decision-making model developed for this project, could be developed to help agencies answer such questions.

For example, NIJ awarded a grant to the Charlotte-Mecklenburg Police Department for the development of the Future Alert and Contact Network (FALCON) to predict community problems. Another award supported the Monroe County, Florida, Sheriff’s Office in the development of an intelligence gathering system. Other projects involved developing regional crime databases, neural network systems, a global inquiry system, and virtual reality training.

Methodology

The research design for the IT Acquisition Project involved multiple methods aimed at gaining an in-depth understanding of the processes law enforcement agencies apply to acquire information technology, key factors that contribute to successful IT acquisitions, and the challenges and obstacles that agencies must face. The researchers began by engaging an expert advisory panel, convening focus groups, and identifying resources available to assist policing agencies with IT acquisition. These initial steps resulted in refinements to the four-phase information

technology (IT) acquisition model, which served as a framework for conducting the research and for explaining the findings.

With this model in mind, the researchers proceeded with the major project tasks: (1) conducting case studies at 14 sites throughout the country, (2) developing a handbook to help agencies work through request for proposal (RFP) and other procurement processes, (3) completing a national survey of policing agencies about their IT acquisition experiences, (4) creating a decision-making model for acquiring crime mapping technologies, (5) widely disseminating the study findings and interim products (e.g., case studies, RFP handbook) on the web and through other means, and (6) preparing this final report on the project.

Research Team and Advisory Panel

This project was an ambitious undertaking that required experience and capabilities in police information technologies, acquisition practices of local and state agencies, modeling, measurement of efficiency of technologies, and other topics. Project staff from ILJ were Dr. Tom McEwen (ILJ director of research and the project director), Dr. Randall Guynes, and Julie Wartell. In addition to expertise in IT acquisition and computer modeling, the ILJ team contributed a broad-based knowledge of the role of IT in supporting community policing. For example, related ILJ projects for NIJ include a national study of organizational transformation to community policing and studies of CAD support for community policing. In addition, for the COPS Office, ILJ project staff have studied call management practices that support community policing and have conducted a series of training workshops for COPS MORE grantees; and Dr. McEwen and Dr. Guynes were directly involved in revamping all the information management and communications systems in the Metropolitan Police Department (Washington, D.C.) to support that agency's community policing objectives.

The ILJ project staff combined their expertise with the capabilities of several private sector partners to conduct the study, and the project benefited greatly from the involvement of an expert advisory panel. At the beginning of the project, ILJ teamed with the Center for Digital Government, part of Government Technology (GT), a national firm specializing in information technology application, procurement, and policy in the public sector. The firm's criminal justice and other IT conferences draw over 40,000 participants annually, and its award-winning national monthly publication reaches more than 100,000 practitioners and policymakers throughout the

country. Later in the project, Steve Pendleton, president of Information Analytics, Inc. (IA), and Raymond Dussault, formerly with GT and later with IA, served as principal investigators, assisting with the case studies and with development of the RFP handbook.

Members of the project advisory panel were selected in consultation with NIJ and included representatives from local law enforcement agencies, key associations representing policing and IT development, and relevant NIJ and DOJ agencies. Panel members were Chief of Police Arturo Venegas, Sacramento, California; Sheriff Patrick Sullivan, Arapaho County, Colorado; David Roberts, SEARCH, Inc; Bill Deck, National Law Enforcement and Corrections Technology Center, North Charleston, South Carolina; Ken Goodwin, National Sheriffs' Association; Ellen Scrivner, COPS Office; Phyllis McDonald, NIJ; and Trent DePersia, NIJ. The advisory panel was convened at the beginning of the project to discuss the project's aims and its proposed tasks, consider the selection of information technologies to be explored, make recommendations for focus groups and potential sites for case studies, and offer ideas for disseminating interim products and final results.

Focus Groups

Two focus groups were held in the last quarter of 1998, one in Sacramento, California, and one in Arlington, Virginia. Each group involved 10 to 15 participants, including sworn and civilian personnel from law enforcement agencies that had recently completed or were currently going through an acquisition of one or more of the technologies being studied. The purpose of the focus groups was to bring operational personnel together with the project team to discuss issues of interest in the project. Several practitioners discussed specific applications within their agencies. These included acquisition of CAD/RMS in the Spokane, Washington, Police Department; wireless and laptop technologies in El Dorado County, California; strategic planning in Scottsdale, Arizona; the CALGANG intranet project in California; Identification AFIS in Dallas; the ALERT vehicle and CAD/RMS in Alexandria, Virginia; ICAM in Chicago; and intranet applications in the Jacksonville, Florida, Sheriff's Office.

Other topics discussed in the focus groups included the role of strategic planning in information technology, the four-phase model forming the basis of this research project, and potential sites for the project.

Internet Research and IT Acquisition Web Page

Throughout the project, the ILJ team conducted a comprehensive scanning study to take full advantage of Internet and e-mail capabilities. The objectives of the scanning were to (1) identify distribution channels for findings from the study and (2) confirm the state of the art of IT acquisition and infusion in law enforcement.

With respect to the first objective, ILJ expanded its own web page to provide a separate IT Acquisition Project location. This location was used to publish interim products (e.g., the 14 case studies) and is directly accessible through ILJ's home page (www.ilj.org).

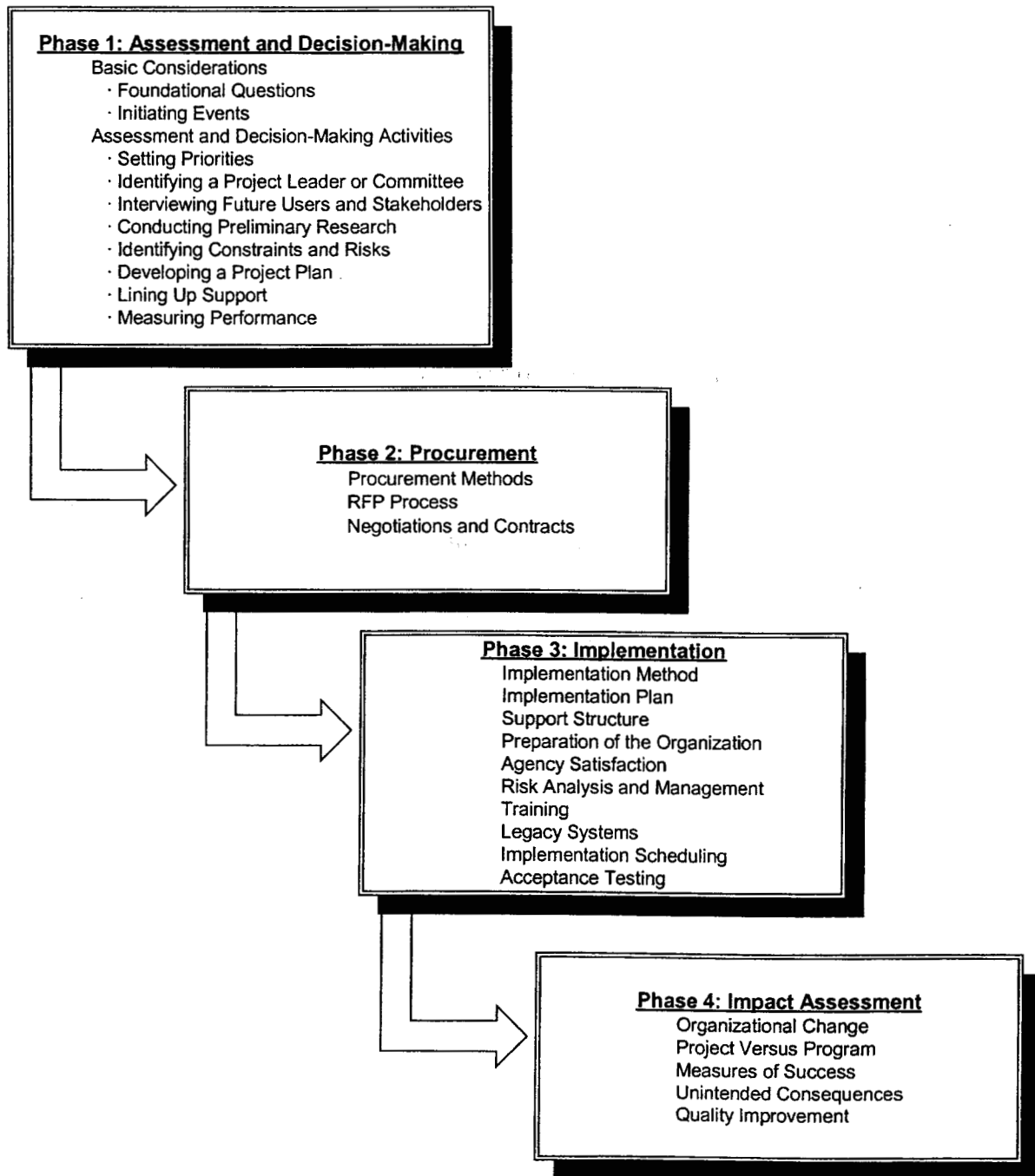
One result of work on the second objective—to keep abreast of the state of the art in IT acquisition—was the development of a law enforcement software database. This database, along with other products from the IT Acquisition Project, was distributed at a series of five regional IT training conferences sponsored by the COPS Office. The software database has helped law enforcement agencies find out what is available in the various markets. ILJ continues to update the database and distribute it on request.

Four-Phase Technology Acquisition Model

As noted earlier, NIJ originally suggested a three-phase IT acquisition process as a framework for the study but agreed that an additional phase—procurement—should be added to emphasize the importance of procurement as a key to successful implementation. In other words, there was agreement that if the procurement was not handled correctly, the technology was almost certain to fail. The expanded IT acquisition model, then, had four phases: (1) assessment and decision-making, (2) procurement, (3) implementation, and (4) impact assessment.

The research team's understanding of the details involved in each phase was refined throughout the course of the project, but the four phases remained essentially the same. The phases are illustrated in Exhibit 1-1 and are discussed briefly below. The phases are also described in detail in Chapters 3 through 6 and are referred to throughout the report.

Exhibit 1-1: Four-Phase Information Technology (IT) Acquisition Model



In the *assessment and decision-making phase*, an agency decides *why* to purchase a new technology and *what* to buy. It also considers project planning, project management, and performance measurement. In the agencies studied, the decisions made in this phase created repercussions that affected the remainder of the technology acquisition effort. Moreover, when a project began to lose direction, remembering the answers to the *why* questions helped put the agency project team back on track.

The *procurement phase* involves lining up support for the project, selecting a procurement method, and negotiating a contract. Choices made in this phase lay the foundation for project success or failure. This research found that support through the chain of command is vital when a project team is developing the agency's system requirements. This report also explores the benefits and drawbacks of a variety of commonly used procurement methods: request for proposal (RFP), sole source, request for information (RFI), request for quotation (RFQ), strategic partnering, piggyback contracts, and pre-negotiated contracts.

The *implementation phase* presents such challenges as deciding whom to train and how to train them, creating interfaces with legacy systems, and encouraging the acceptance of new technologies by officers in the field. Again, each phase builds upon the previous one, and proper work done in the assessment/decision-making and procurement phases increases the likelihood of success in the implementation phase. This research found that agencies typically choose one of four implementation methods: *in-house management* by an individual or team; a *turnkey solution*, where the vendor develops and installs the IT with only limited agency support and oversight; hiring of a *systems integrator* who implements the products of several vendors to provide an integrated package of technologies; or the hiring of a *professional implementation manager* from outside the department (this individual is sometimes retained earlier in the process). Regardless of the method, an in-house person or team is needed to oversee the implementation.

The final phase of the acquisition process is the *impact assessment phase*. Although extremely important, this phase is often not planned for or executed rigorously. In this phase, the agency examines how the organization has changed, what the consequences (both intended and unintended) of the technology have been, and how the project fits into the agency's overall technology plan or program. The case study research for this project examined various aspects of project impact: how the departments dealt with successes and difficulties after installing the

technology; the types of post-implementation planning done, including vendor support, training, and system maintenance; whether the system functioned as promised by the vendor; how receptive agency personnel were to the new technology and related process changes; how the process affected personnel; whether the project met its budget; and what the benefits of acquiring the technology were.

Case Studies

An important component of this study was the development of case studies in 14 jurisdictions. These case studies emphasized the need to understand an agency's strategic and tactical plans in relation to its decisions about which information technologies to acquire and the specific features of those technologies. ILJ, NIJ, and the study advisors developed the following criteria for selecting the case study sites:

- Representation from each of the technologies of interest (CAD/RMS, crime analysis/mapping, laptops and wireless, and Internet/intranet)
- Examples of multi-agency agreements for IT acquisition
- Representation from small, medium-sized, and large agencies and from diverse regions of the country
- Sufficient progress in implementing and assessing the technology of interest

Although this study was not an assessment of agencies' use of COPS MORE funds, it is important to note that at most study sites, COPS MORE grants provided significant support for the IT acquisitions.

Each case study was conducted by a principal investigator (Ms. Wartell, Mr. Pendleton, or Mr. Dussault) who had a strong background in the technology of primary interest at that site. Preparing each case study involved two to three days on-site at the policing agency. Methods included interviews with key agency personnel involved in planning, purchasing, and implementation; interviews with vendors; interviews with users of the technologies involved; observations; and document reviews (e.g., requests for proposals and other procurement documents and processes, system documentation, internal reports and assessments).

Drafts of the case studies were reviewed by site personnel for accuracy. Each case study report followed a similar format, explaining what occurred in terms of the four-phase IT acquisition model. The final case studies were published on the ILJ website and submitted for NIJ review. The list below shows the study sites and the technology of particular interest at each one.

Throughout this report, examples are drawn from the 14 case studies to illustrate various aspects of the IT acquisition process.

Exhibit 1-2: IT Acquisition Case Study Sites

CAD/RMS

- Altamonte Springs (Florida) Police Department
- El Dorado (California) Sheriff's Department (RMS only)
- Golden (Colorado) Police Department
- North Miami Beach (Florida) Police Department
- Pierce County/Tacoma (Washington) Law Enforcement Support Agency (Core MIS)

Crime Analysis/Mapping

- Baltimore County (Maryland) Police Department
- Charlotte-Mecklenburg (North Carolina) Police Department
- Malden (Massachusetts) Police Department
- Overland Park (Kansas) Police Department
- Seattle (Washington) Police Department

Internet/Intranet

- California Department of Justice (CAL/GANG)
- Kansas Criminal Justice Coordinating Council
- Jacksonville (Florida) Sheriff's Department

Laptops/Wireless Mobile Data Communication

- Monroe County (Florida) Sheriff's Department

The researchers obtained information from local departments on how the information technology was supporting existing plans and strategies (for example, community policing). Similarly, for agencies at the state level, they asked about the strategic goals for agency operations. Such information was deemed crucial to understanding how these technologies succeed or fail.

RFP Handbook

Another major project component involved developing the publication *Managing the Risks: A Guide for Improving Procurement Practices in Acquiring Technologies for Policing*. That handbook is available at the ILJ website (www.ilj.org/infotech/casestudies/rfpbook.pdf).

The handbook includes several sections that were based on and contain text from a publication by Michael Asner, *The Request For Proposal Handbook, Second Edition*, 1999. The material was included with permission of Michael Asner Consulting, the copyright holder. In addition, “An RFP Template” (in Chapter 3 of the handbook) originally appeared in *The RFP Report*, May 1998, and is also included with permission of Michael Asner Consulting, the copyright holder.

One of the main purposes of the handbook is to help law enforcement IT purchasers understand how to use an RFP to communicate effectively with vendors and begin the process of developing shared expectations for an IT project. The document discusses how to use the RFP process to reduce risk, how to draft the RFP document, how to prevent vendor complaints and protests, and when and how to choose consultants. It also provides examples from RFPs previously used by justice agencies to procure IT systems.

A final draft of the handbook was submitted to NIJ in early 2000 and was distributed at five training conferences sponsored by the COPS Office to assist COPS MORE grantees.

Briefly, the handbook covers the following topics:

- **Chapter 1: Introduction** provides an overview of the procurement process, including the specific challenges that face law enforcement and the various avenues available for acquiring new technologies. It also includes some tips on managing a successful procurement process.
- **Chapter 2: The RFP Process** deals with a number of common questions—What is an RFP? When is it used?—and provides an overview of the RFP process. It then leads the reader through each step in the process from start (someone has an idea for a new application) to finish (debriefing the vendors). It pays particular attention to the evaluation process and illustrates commonly used approaches.
- **Chapter 3: The RFP Document** contains tables of contents from representative RFPs. It explains the purpose and content of each section of these RFPs. The examples used are relatively simple in order to illustrate various features.
- **Chapter 4: Using and Choosing Consultants** helps the reader understand the value of a consultant; what a consultant can and cannot accomplish; and how to find, evaluate, hire, and manage consultants.
- **Chapter 5: Summary** provides tips on working with vendors, learning from other agencies’ experiences, and conducting a critique of an agency’s procurement process.

Survey on Police IT Acquisition Experiences

The 14 case studies were valuable for developing a survey of policing agencies. Phase 1 of the IT Acquisition Project survey was conducted and analyzed during the first half of 2000. Phone calls were made to 408 police departments—all departments with jurisdiction populations greater than 250,000 and a sample of departments with jurisdiction populations between 50,000 and 250,000. Of the 324 departments that completed surveys, 240 had acquired an IT system (of a type that was being studied in this project) in the last three years. Besides asking about the type of acquisition, other questions related to strategic planning and websites.

Phase 2 of the IT Acquisition Project survey was started during the second half of 2000. ILJ staff called the 240 agencies that reported during the Phase 1 survey that they had made a recent acquisition. For each type of technology that an agency had acquired, 33 questions were asked regarding who was involved in the acquisition process, the acquisition process itself, funding issues, and other issues (such as status and success of the project). The results of the survey support and expand on the findings from the case studies done earlier in the project. Highlights of the survey results are discussed at the end of this chapter under “State of IT Acquisition in Law Enforcement.”

GIS Acquisition Decision-Making Model

The products from this study may be beneficial on several different levels. The first is the *conceptual* level, in which the general approach—epitomized by the four phases of IT acquisition—is transferable to other technologies. In other words, the four-phase model should help state and local agencies think in concrete terms about assessment and decision-making, procurement, implementation, and impact regarding virtually any technology under consideration. Further, an agency might take the decision-making program from this project and make modifications to the program code to fit a new technology. While this level would be the most difficult to achieve, it could have considerable benefits for a new technology in which a significant financial investment may be made.

The computerized decision-making model developed by ILJ under this project was the GIS Acquisition Decision-Making Model. The application was designed to assist law enforcement agencies that want to or are planning to implement crime mapping. It was created using off-the-shelf software and is user-friendly and easily installed. From July to December 2000, ILJ

staff completed and began testing the computerized model. During that period, it was tested with three agencies and made available to 18 additional agencies that requested it. Preliminary feedback showed the application to be successful.

The GIS Acquisition Decision-Making Model has components that enable the user to assess (1) the agency's readiness to begin crime mapping and (2) the types of software that should be acquired to fulfill the agency's needs. The user responds to questions on such topics as objectives, desired capabilities, availability of staff expertise, needs for maintenance and updating, anticipated users (analysts, officers, both), and desired interfaces (e.g., with CAD/RMS). The outcomes provide the agency with a level-of-readiness score (based on current data, software, and expertise) and information on the types (not specific vendors) of GIS/mapping software and add-ons that would be required to fulfill its needs. The GIS Acquisition Decision-Making Model is available at the ILJ website.

Dissemination and Follow-Up: COPS IT Training and Distance Learning

An ongoing objective for this project was to quickly disseminate findings and products to the field. In addition to making various products available through the project website, members of the study team spoke on aspects of this project at various professional meetings (e.g., conferences of the International Association of Crime Analysts, International Association of Chiefs of Police, and Crime Mapping Research Center). In addition, ILJ successfully competed for a cooperative agreement with the COPS Office to provide training in IT acquisition. This training was directed at COPS MORE grantees throughout the country in all five COPS regions.

ILJ engaged the principal investigators and a number of advisory panel members from the IT Acquisition Project (among others) as presenters and trainers; enriched the curricula with many case examples from ILJ research; and provided products of the NIJ study (RFP handbook, list of available software) to training participants. All five conferences were delivered within a five-month period (February 28, 2000, to August 1, 2000). A total of nearly 1,400 participants representing COPS MORE grants attended the sessions, which were held in Austin, Texas; San Diego, California; Northbrook (Chicago area), Illinois; Boston, Massachusetts; and Washington, D.C. Key topics included *Strategic IT Planning for Community Policing*, *Writing RFPs and Other Procurement Options*, *How Technology Drives Organizational Change*, *Information Technology Implementation Challenges*, *Dealing with IT Vendors*, *Project Management Tech-*

niques, and *Getting Technical Assistance*. Examples of technologies covered are CAD, RMS, automated booking, laptops (hardware and software), Internet use, and crime analysis/mapping.

Feedback from training participants was positive. In fact, one of the most common complaints on the evaluation form was that attendees wished they could have attended more sessions. Workshop attendees included all ranks and positions, with a good mixture of operational staff, grant managers, and IT personnel. Agency representatives ranged broadly in IT experience as well as in their agencies' stage in the acquisition process.

In addition to the training conferences, the COPS cooperative agreement supported development of a distance learning project, through which three separate training sessions were delivered live over the Internet using InterWise, an interactive, web-based software application. Twenty-five individuals participated in this training, which also benefited greatly from the information gathered through the NIJ IT Acquisition Project. The three sessions were delivered in August 2000 and covered the following topics:

- ***Strategic Planning for Information Technology.*** Training included planning and implementing technology to support COP; understanding who should participate in the planning process; and developing outcomes based on strategic planning for IT.
- ***Project Planning for Information Technology Acquisition.*** This module offered an understanding of the project planning process; highlights of a police department's experience in IT project planning; and guidance on developing a project plan.
- ***Information Technology Project Management.*** This session covered the importance of and techniques for successful project management; understanding the issues of staffing, organizational ownership, communication, budget, and risk management; and project management tools.

Finally, apart from these NIJ- and COPS-sponsored projects, ILJ offers on-site and Internet-based distance learning classes on various aspects of crime mapping and geographic information systems. The GIS Acquisition Decision-Making Model developed for the NIJ-sponsored IT Acquisition project is one element of this training.

State of IT Acquisition in Law Enforcement

The telephone survey described above resulted in information about 111 acquisitions of information technology by law enforcement agencies. Of those acquisitions, 30 involved map-

ping systems, 31 involved CAD/RMS systems, and 50 involved mobile technologies (MDCs and laptops). The findings provide some insight into the current state of IT acquisition practices among policing agencies.

The acquisition process is lengthy. For mapping systems, the median length of the procurement phase was 5.8 months, and the median length of the implementation phase was 18 months.¹ That duration, almost two years, does not include any time spent in the assessment and decision-making phase or the impact assessment phase. The applicable figures for CAD/RMS systems were 4.5 months for procurement and 14.4 months for implementation (just over a year and a half). Mobile technology acquisitions took the longest: 5.3 months for procurement and 25.2 months for implementation (just over two and a half years).

These median figures show that the procurement stage takes about the same amount of time, ranging between 4.5 months for CAD/RMS systems and 5.8 months for mapping systems. Procurement includes the preparation of a request for proposal or similar purchasing vehicle, issuance of the request, review of proposals, negotiations, and contract signing. Interestingly, the implementation times are longer than might be expected and vary considerably, depending on the technology, from 14.4 months for CAD/RMS systems to 25.2 months for mobile technologies. For survey purposes, implementation time was measured from the time the contract was signed until the technology was completely in place. With laptop purchases, for example, vendors usually had a phased-in schedule calling for the delivery of a portion of the order each month over the course of the contract. Similarly, with records management system, vendors usually implement modules according to a pre-determined schedule. As a result, progress proceeds throughout the course of the procurement phase.

The total acquisition time is noteworthy as it relates to the entire acquisition process and the expectations of a police department. Generally, police managers expect procurement and implementation to take considerably less time than actually occurs. As the survey results show, procurement and implementation of mobile technologies required two and a half years, with some survey respondents indicating as long as four years. The experiences of our study sites for shortening this time are discussed later in this report.

¹ Medians are given here because some outlying number skewed the averages.

IT acquisition costs vary significantly by type of technology. As is reflected in Exhibit 1-3, acquisition costs also vary considerably depending on the technology that was acquired. Mapping systems were acquired for a median cost of \$24,400, while mobile technologies had a median cost of \$322,500. It should be noted that the range of costs was considerable with these technologies. Three departments listed costs of over \$3 million for the CAD/RMS systems. These departments were among the largest in the sample.

The breakdown of costs between hardware and software also differs by type of technology. With mapping systems, the acquisition usually applies to the software that produces the computer maps; that software commonly accounts for almost two-thirds of the total cost. With mobile technologies, hardware costs dominate because the acquisition is, for example, laptops for patrol cards. With CAD/RMS, the cost covers a mixture of hardware and software. For all technologies, the “other” category generally covers the cost of maintenance, training, and related needs.

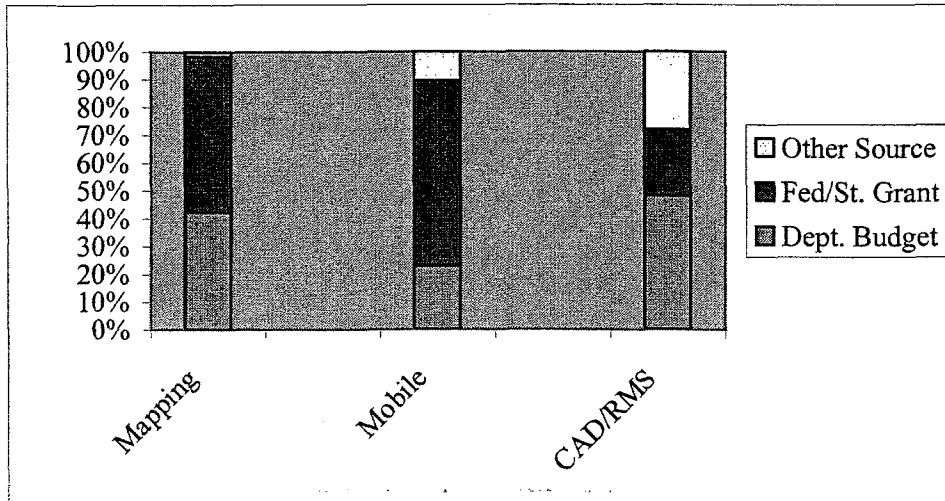
Exhibit 1-3: Acquisition Costs

	<u>Median Cost</u>	<u>Percent Hardware</u>	<u>Percent Software</u>	<u>Percent Other</u>
Mapping Systems	\$24,400	21.2	63.2	15.6
Mobile Technologies	\$322,500	61.8	23.9	14.3
CAD/RMS Systems	\$190,000	34.6	54.6	10.8

IT acquisition funds come from a variety of sources. The different technologies are more heavily funded by some types of sources than by others. See the chart in Exhibit 1-4. Interestingly, acquisition of mobile technologies was heavily dependent on federal grant funding, which contributed about two-thirds of the total costs. Several departments indicated in the surveys that COPS MORE grants had provided the funds for these purchases. Federal grants were less likely to be applied toward the acquisition of CAD/RMS systems. These systems usually were acquired through local funds (about 45 percent of total costs) and “other” sources (about 30 percent). These other sources included asset forfeiture funds and local bonds (e.g., bonds for

construction of a communications center that included provisions for the technology acquisitions).

Exhibit 1-4: Sources of Acquisition Funds



Most IT acquisitions are successful (in the eyes of those involved in the acquisition), but a significant percentage do not succeed. In 83.0 percent of the 111 acquisitions, respondents said the project was deemed to have been a success. In 79.8 percent of acquisitions, the system was said to have met the department's needs. In 72.4 percent, the project's milestones were met; in 72.7 percent, the vendor was said to have been honest about system capabilities and limitations; in 72.2 percent, the vendor was said to have provided knowledgeable assistance; and in 67.7 percent of acquisitions, the vendor was deemed to have met the promises made in the contract.

Additional findings from the survey are presented throughout this report.

Report Organization

The rest of this report is organized as follows:

Chapter 2 addresses strategic planning for IT acquisitions and the relationship of such planning to an agency's overall strategic plan and to the four-phase approach to IT acquisition.

Chapters 3-6 cover each of the four phases of the IT acquisition model—assessment and decision-making (Chapter 3), procurement (Chapter 4), implementation (Chapter 5), and impact assessment (Chapter 6). The chapters include examples from the case study sites to illustrate key concepts and issues.

Chapter 7, “Managing the Technology Process,” addresses the need to institutionalize change and the acceptance of new technologies, methods of structuring the project team, the importance of making sure that the intended users actually use the technology, and pitfalls uncovered in past IT acquisitions.

Chapter 8 presents conclusions and the policy implications of this research.

Chapter 2: Strategic Planning

This report presents a four-phase process that law enforcement agencies can follow in acquiring information technology. Those phases are (1) assessment and decision making, (2) procurement, (3) implementation, and (4) impact assessment. Before that four-phase effort can begin, however, an agency should conduct strategic planning regarding its information technology needs. The relationship between IT strategic planning and IT acquisition is this: the IT strategic plan comes first, setting the stage for future acquisitions and ensuring that the agency upgrades its information technology in a way that supports agency goals, while the four-phase acquisition process comes second, helping the agency successfully execute the acquisition of a specific technology.

Developing a strategic plan for a police department's operational mission is beyond the scope of this paper. However, IT strategic planning is addressed here because the same team that is responsible for executing the four phases of acquiring a specific information technology is likely also to be responsible for IT acquisition planning in general. Furthermore, IT strategic planning is a necessary precondition of the IT acquisition process. As one observer writes,

Managers face two particularly vexing challenges in developing and implementing competitive strategies. The first is to ensure that the strategy is not a reflection of the biases (and possibly ignorance) of the management team—biases that are likely to be rooted in the organization's past successes. The second challenge is to ensure that once a company has outlined a viable strategy, it allocates resources in a way that accurately reflects the strategy. In other words, the strategy must mirror the realities of the company's environment, and the resource allocation process must mirror the strategy.²

Supporting Agency Goals

The IT strategic plan should support the agency's overall strategic plan. For example, if the agency's plan calls for improving its practice of community policing, the IT plan should be

² Clayton M. Christensen, "Making Strategy: Learning by Doing," *Harvard Business Review*, November-December 1997, p. 142.

tooled to account for the types of information exchange that community policing requires. The IT strategic plan may need to project which technologies would best support citizen input, geographical focus, prevention, partnerships, problem solving, and accountability. Community policing changes the way an agency views information, the way it analyzes incidents and community characteristics, and even the way it evaluates itself. Therefore, community policing may well change an agency's information technology needs.

Organizational change should drive technology planning, not the other way around. In developing IT strategic plans, agencies should first consider their overall missions and then consider which types of technologies would support those missions. The accompanying examples of law enforcement strategic plans for IT show how technology planning can be linked to overall agency goals. (See Exhibit 2-1.)

Exhibit 2-1: Strategic Plans Focused on Agency Goals

The following are excerpts from the IT strategic plans of several law enforcement agencies. These excerpts show the agencies' commitment to making IT planning mesh successfully with overall agency strategic planning.

Example 1: General

Our IT goals are to

- (1) Increase the quality, timeliness, and type of information disseminated in the sheriff's office and to related agencies by creating an Integrated Criminal Justice Information System.
- (2) Expand the use of technology to increase the service level of the sheriff's office to the community.
- (3) Provide an efficient and fault-tolerant operating environment for all information systems in the sheriff's office.

Example 2: Specific

Our IT goals are to automate police reports, automate booking systems, implement video teleconferencing, improve information system networking, improve crime mapping and crime analysis, perform data warehousing to facilitate searches across multiple databases, make better use of digital imaging, maximize information system security, improve wireless communications, and carefully train users.

Example 3: Explanatory

Recognizing the need to align information technology with the department's goals and objectives, the department undertook an aggressive examination of its information system infrastructure. Several assumptions guided the planning process. First, the plan was designed for the patrol function. Patrol officers were heavily involved in every step of the design phase. The master plan is based on the needs and demands of patrol officers rather than those of other agency workgroups, such as administrative or support personnel. However, those other workgroups will

derive substantial benefits from implementing the plan. Second, the plan was designed to support the three primary tenets of the community policing philosophy: partnerships, problem-solving, and communication. Third, the plan is based on a team approach to planning. Participation was stressed at every point, and the results are based on employee input and guidance. These three assumptions (patrol orientation, community policing orientation, and employee involvement) greatly affected the direction and scope of the information system plan. The plan hopes to advance the department's problem-solving capabilities, to facilitate and improve internal and external communication among key actors involved in the reduction of crime, and to promote partnerships with district residents and corollary agencies that may prove helpful in solving neighborhood problems.

Several agencies that were studied in this research took pains to link their IT strategic planning efforts to their overall agency strategic plans and goals. One example involves the Seattle, Washington, Police Department, which was working to acquire and implement crime analysis and crime mapping technology. In undertaking that project, the department relied on its Information Technology Functional Plan that had been created in conjunction with the department's strategic plan, which had named acquisition of a crime analysis system as a major project.

Similarly, the Charlotte-Mecklenburg, North Carolina, Police Department (CMPD) followed an IT strategic plan that conformed to the agency-wide strategic plan. "Technology Goals," one of the CMPD strategic plan's five sets of goals, emphasizes the agency's commitment to making information one of the most important problem solving tools. The goal set refers to automated systems, electronic communication, information access capability, and CAD for community policing. In addition, CMPD has a master information system plan, which includes information about strategic planning, agency information resource requirements, resource allocation, and expected outcomes. The master information system plan guides CMPD's IT acquisition process.

Another example of a beneficial IT strategic plan is one developed by the Law Enforcement Support Agency (LESA), a jointly funded entity serving the Pierce County, Washington, Sheriff's Department (PCSD) and the Tacoma Police Department (TPD). LESA is a governmental entity formed by an interagency agreement between 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 aims to eliminate redundancy, improve access and communication, and gain economies of scale. Its assessment and decision phase began with an exhaustive 18-month engi-

neering study that resulted in a comprehensive strategic plan.³ The IT strategic plan for the new system, called LEADS 2000, 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.⁴

The plan laid the groundwork for development of a detailed request for proposal and subsequent acquisition of a new RMS. The assistant director stated that a key benefit of the strategic plan is that it resulted in cost savings over the original estimates. He estimated that the cost of approximately \$1.5 million for the new system would have been over \$3.0 million without the structure provided by the plan.

Besides linking IT to the department’s overall plan, police departments face several other challenges in developing an IT strategic plan. For example, the world of information technology is a rapidly change world. Improvements in hardware and software occur monthly—computer manufacturers announce faster systems, software developers announce new products or updated releases, and network providers announce products for faster communications. Police departments need to keep pace with these developments as they plan their acquisitions and prepare strategic plans. Another challenge is how to deal with the usually long acquisition period for most systems. The IT strategic plan needs to anticipate that a year or more may be needed from the issuance of a request for proposal for a system and the signing of a contract with the successful vendor. Budgets are a related consideration. The annual operating budgets for a police department must anticipate when systems will be brought on board. These budgets may be more

³ Interestingly, part of the impetus for conducting the study was LESA’s successful application for a COPS MORE grant—an example of a supplemental benefit from obtaining a federal grant. The LESA assistant director at that time described the grant as providing the opportunity for 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.

⁴ Law Enforcement Support Agency. 1997. *Law Enforcement Activity and Data System 2000*.

complicated because of the influence of federal grants that usually have milestone dates that must be met for spending the funds.

Finally, the fact that some IT acquisitions such as a records management system are rare purchases enhances the utility of an IT strategic plan. Annual updates of the plan provide an opportunity to assess the current systems and canvass the field for new developments. Annual conferences of professional organizations offer an opportunity to review the latest products from vendors.

All these considerations are important as a police department goes through the development of an IT strategic plan and traverses the acquisition process.

Characteristics of IT Strategic Plans

IT strategic plans aim to *guide* future decisions, not necessarily *make* those decisions. Such plans name a destination but do not specify every step that must be taken to reach it. They also help ensure that steps taken for other projects do not lead the agency away from its goal. Strategic plans might suggest a timeline and considerations for future years, but each year those considerations must be reexamined in the light of current conditions.

In addition, strategic plans, if they are to succeed, must link realistically to current agency budgets and budget projections. Also, because budgets and various other conditions change from year to year, it is best to revise IT strategic plans annually.

IT strategic plans can work within a single law enforcement agency or across many agencies. The Kansas Criminal Justice Information System (CJIS) provides an example of a state-wide strategic planning exercise. Before acquisition of CJIS technology began, a variety of state and local agency personnel participated in an elaborate planning process. The outcome was a 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 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."

The strategic plan sets nine goals for CJIS. Briefly, they are as follows:

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 system's 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.

As the list shows, the Kansas IT strategic plan describes the desired functions and characteristics of future law enforcement IT systems in the state. It does not specify the technologies that might be required for attaining those functions and characteristics.

Techniques of Strategic Planning

Experience as a law enforcement professional does not necessarily prepare one for strategic planning. What has been observed about the business world holds equally true for the law enforcement world:

Strategic planning is not a core managerial competence at most companies. Executives hone their management capabilities by tackling problems over and over again. Changing strategy, however, is not usually a task that managers face repeatedly.⁵

Through its survey of 111 law enforcement technology acquisitions, the present research learned just how little IT strategic planning is practiced by law enforcement. Of the sites acquiring mapping systems, only 13 percent conducted a needs assessment, which is a fundamental

⁵ Christensen, p. 141.

step in strategic planning. Of the sites acquiring mobile technologies, only 36 percent conducted needs assessments, as did only 32 percent of the sites acquiring CAD/RMS systems.

Development of an IT strategic plan presents formidable difficulties for a law enforcement agency, especially if the agency has not prepared such a plan in the past. As previously mentioned, an IT strategic plan should support the overall strategic plan of the agency. If that plan does not exist, the IT strategic plan will be developed in a vacuum. While such a plan may still prove beneficial, it may fall short of meeting the goals and objectives of the agency. It is wrong thinking to approach IT acquisition with a “more technology is better” attitude.

Our site studies also showed that the best approach for an agency is to develop an initial IT strategic plan and then update the plan annually. This approach had several advantages for the study sites that used it. It provides a means to take advantage of the ever-changing improvements in technologies and the introduction of new technologies. For example, vendors are constantly adding new modules into their systems for both new and existing clients. As these modules become available, an agency needs to include them in the strategic plan to plan how they will support the agency’s activities. Another advantage of annual plans is that the acquisition periods for technologies are long, as was discussed in the previous chapter. Adjustments to the plan are needed as the acquisition proceeds. For example, an annual plan might indicate how many laptops have been installed in the last 12 months and describe plans for future installations. Budget considerations are always important with a strategic plan in laying out the financial priorities for the agency. In some cases, an agency’s budget may be reduced for IT purchases from one year to the next and that reduction needs to be reviewed in the IT strategic plan. On the other hand, many respondents to our survey indicated that the COPS MORE grants had a positive effect on their IT acquisition by speeding up the procurement process. Their difficulties with the program centered on how to spend the funds effectively in a relatively short period of time. Their strategic plans offered an opportunity for carefully planning their acquisitions.

Law enforcement agencies take many approaches to strategic planning. One approach is to appoint a steering committee representing various ranks, job specialties, and lengths of service within the department. The committee or a subset of its members then conducts a series of focus group meetings with people inside the department (such as different divisions or bureaus) and outside the department, such as members of neighborhood, business, or ethnic associations and

employees of other government agencies. For example, before acquiring crime mapping and crime analysis technology, the Malden, Massachusetts, Police Department formed an advisory committee consisting of the police chief, Chamber of Commerce president, several Chamber board members, the mayor's top aide, the evaluator of the grant that was funding the acquisition, the crime analysis director, a police captain, one or two patrol officers, commercial sector representatives, and the local media. Also invited to attend the meetings were neighboring jurisdictions' police chiefs, Chamber of Commerce presidents, and patrol and MIS officers. The committee met monthly for about a year until the system was up and running, and it continues to meet as needed for special decisions.

In general, a steering committee would next analyze the findings of its focus group research and other research and then develop a law enforcement IT strategic plan by taking the following steps:⁶

1. Assess the current situation through market analysis, customer analysis, competitive analysis, and internal analysis. Gather information through personal interviews, focus group sessions, mail surveys, and interviews of special-topic committees (such as a laptop committee). In market analysis, study such factors as community demographics, economic patterns, and social characteristics and trends. In customer analysis, try to gain an understanding of what the customers (area residents, police officers) want, what their expectations are, and what concerns they have. In competitive analysis, learn what other law enforcement agencies have done and are doing to reach the same goals your agency has. In internal analysis, examine such issues as employee workload and attitudes, financial resources, management practices, and in-house expertise.
2. Identify the driving forces in the organization's competitive environment (that is, the root causes of the issues that the organization needs to address). Define the issues that the organization's strategy must address. For example, is community policing the agency's main focus? Are youth crimes, drug crimes, or quality-of-life issues the driving forces? As one observer notes, "The business world's graveyards are filled with organizations whose executives implemented elegant answers to the wrong questions."⁷ This is the time to ask, "Are we performing the right tasks?", not "Are we performing our current tasks right?"
3. Assess the current capabilities of the department's information technology. Can the current technology support the findings of the focus groups? Are the skills

⁶ This list is based on ideas contained in Clayton M. Christensen, "Making Strategy: Learning by Doing," *Harvard Business Review*, November-December 1997; Scott Bryant, "Strategic Management: Developing and Realizing a Strategic Vision," *Public Management*, October 1997; Michael Allison and Jude Kaye, *Strategic Planning for Nonprofit Organizations* (New York: John Wiley & Sons, 1997), presented by the Nonprofit Genie online service of CompassPoint Nonprofit Services; and findings of the research on which this paper is based.

⁷ Christenson, p. 142.

and abilities available to develop and use the desired applications? The assessment will determine whether the department needs to move forward with new acquisitions or with enhancements to current technologies.

4. Formulate a strategy that addresses the results from the focus groups, the driving forces, and the assessment of the current technology.
5. Create a plan for the projects that will implement that strategy. In other words, determine how money and staff time will be spent to implement the strategy. This part of the plan does not need to be highly detailed. Rather, it is a guide that will assist various acquisition project teams later.
6. Link the IT strategic plan realistically to the agency's current budget and budget projections.
7. Revise the IT strategic plan every year.

Contents of an IT strategic plan should at a minimum include the following topics:

- Executive Summary
 - As implied by the title, the Executive Summary gives an overview of the IT strategy for the coming years. It should emphasize the immediate IT events that will be occurring and how they will support the agency's overall strategy.
- Agency's Policing Strategy
 - The agency's policing strategy should be clearly delineated in this section. The aim is to highlight those areas in which IT can be especially supportive. Elements of the strategy may be available from the agency's overall policing strategy or from existing documents that detail key agency operations.
- Review of Current IT Environment
 - A critical review of the current IT environment should be included in the IT strategic plan. The review should describe the strengths and weaknesses of current information technologies.
- IT Needs Assessment for Supporting Policing Strategy
 - As previously indicated, the development of an IT strategic plan should involve key personnel in the agency and can, for example, employ focus groups as a way of determining agency needs. This section of the IT strategic plan should provide the results of the needs assessment.
- IT Strategy for the Next 1 Year, 3 Years, and 5 Years
 - The plans for IT should be laid out for the next five years. Because the plan ideally will be revised each year, this section represents an update with necessary changes in the IT strategy.
- Factors for Successful Implementation

- Every IT acquisition is dependent on key factors that must be accomplished for successful implementation. Such factors could be budgetary, needed personnel, procedural changes, or others. Those factors considered most important for success should be discussed in the IT plan.
- Budget Considerations
 - Monetary considerations are always an issue in IT acquisitions. A frank discussion of the costs for IT should be included in the strategic plan. It should include not only the initial cost of acquisition, but also required maintenance costs in coming years.
- Time Schedule for Acquisitions
 - The IT strategic plan should include a time schedule for acquiring and implementing technologies. The time schedule should be realistic regarding the amount of time required for procurement and implementation.

In addition to these minimum requirements, an IT strategic plan should include other topics of importance. It is not too early to discuss the reengineering implications of technologies that may be acquired. In this context, “reengineering” means a review of organizational processes with the aim of changing them to take full advantage of information technologies.

Reengineering usually includes the preparation of an “as is” report that describes a process, such as crime reporting, as it currently exists and a “could be” report that describes a process vision that takes advantage of information technologies to improve efficiency and results in higher-quality outputs. The view is that automation of a poor process still results in a poor process. Changes in process through reengineering are almost always necessary when an information technology is introduced into an agency.

An IT strategic plan should also include a discussion of the training needs associated with the implementation of an information technology. As an example, the survey results and site visits to agencies that had acquired mapping technologies clearly showed that many agencies had overlooked the need for teaching personnel how to create and interpret computer maps. Many agencies believed that mapping was “plug and play” software that automatically created maps.

It is one thing to perform a successful acquisition and implementation (“doing things right”), but it is quite another to make sure, beforehand, that one has elected to address the correct problem (“doing the right thing”). That is where strategic planning proves its value.

Chapter 3: Phase 1 – Assessment and Decision-Making

This chapter addresses assessment and decision-making, the first of the four identified phases of technology acquisition. (The other three are procurement, implementation, and impact assessment.) The foundation for all these phases is, of course, the IT strategic plan that was the topic of the previous chapter. This report now turns its attention to the acquisition “nuts and bolts” that follow the vision laid out in the strategic plan. This chapter presents the authors’ research findings on why an agency decides to purchase a new technology and what it decides to buy. The chapter also gives findings on project planning, project management, and performance measurement.

Basic Considerations

Foundational Questions

In this phase, agencies ask questions whose answers lay the foundation for the success of the entire project. In the agencies studied, the decisions made in this phase created repercussions that affected the remainder of the technology acquisition effort. If a project begins to lose direction, remembering the answers to the foundational questions can put the team back on track.

An agency typically starts by asking itself why it wishes to acquire new technology. The answer to that question helps the project team determine what it should acquire. For example, a department may wish to acquire mobile technologies and an automated report writing system (the *what* issues) so it can free up officer time normally spent driving between calls and the station (the *why* issue). Remembering the *why* may help the department realize that it needs not just laptop computers but also report writing software that feeds into the department’s records management system. What technology is needed is directly related to why it is needed.

The question of how to obtain the technology is addressed in the procurement phase, covered in the next chapter. However, some departments begin considering how to acquire the technology even in this first phase.

Initiating Events

Each site studied could identify an event that led to the decision to acquire a specific technology. For instance, a federal report identified the criminal justice information process in Kansas as one of the least automated or useful in the nation, providing the impetus for a major statewide modernization and automation project. In Monroe County, Florida, the initiating event for a mobile computing solution was merely the commitment of the department's technology manager to provide officers with the best tools to do their job.

This project's research concluded that decisions to acquire technologies can arise in a variety of ways but can be classified under three general categories:

- Internal influences
 - ***Agency head wants technology.*** The chief or sheriff (or mayor or city manager) may learn about a new technology, decide that the current technology is not fitting the department's needs, or want to be on the cutting edge.
 - ***Employee pushes for technology.*** An employee might learn about a technology through literature, a conference, or a colleague. He or she may then become the driving force behind an acquisition.
 - ***Public relations need to be improved.*** A department might want to boost public relations through the Internet, laptops for officer, e-mail, and other forms of information technology.
 - ***Strategic plan is developed.*** Technology may help an agency accomplish goals that are part of a new strategic plan.
- Opportunity
 - ***Neighboring law enforcement agency acquires technology.*** Neighboring departments may wish to share systems and data for better communication and more effective policing.
 - ***Grant funds become available.*** Granting agencies have supplied billions of dollars for information technology in the last decade. Often the impetus to acquire new technology is simply that funding is available.
 - ***New technology comes on the market.*** Digital cameras, the Internet, and handheld computers can change the way a law enforcement agency works.
 - ***Improved technology comes on the market.*** Better CAD systems, greater bandwidth, and graphical user interfaces are examples of improvements of existing technology that agencies may want to shift to.
 - ***Vendor approaches department with technology.*** A persuasive vendor may convince an agency to purchase new technology.

- Intervening factors
 - *Internal crisis demands technology.* For example, major staffing reductions might lead to a need for new technology.
 - *External crisis demands technology.* New laws or mandates, such as the National Incident Based Reporting System or Megan’s Law, could necessitate a technology purchase, as could rapid growth of a jurisdiction.
 - *Lack of support:* A vendor goes out of business or makes the decision to stop support of a system.
 - *Current technology needs upgrading.* Systems may need upgrading to work well with other, newer systems, to comply with new standards, to add functionality that was not needed before, or to make users’ jobs easier.

Results from the national survey support these categories and types of initiating events. For example, almost 90 percent of the respondents who had acquired mapping systems stated that the acquisition was the result of pushing by the agency head or internal staff for this capability. Similarly, about 88 percent of respondents stated that availability of funds influenced their decision to purchase mobile technologies. Interestingly, because the survey took place in 1999, about 45 percent of respondents with new CAD or RMS systems gave possible Y2K incompatibility (external crisis) as a reason for acquiring a new system.

The type of initiating event may affect the likelihood of project success. For example, if the technology project begins because the agency’s strategic technology plan calls for it, the project has a good chance of success. On the other hand, if the project begins because the agency receives a grant and has to spend it by the deadline, the project may not be as successful. In the latter situation, the technology acquisition project is managing the department, rather than the other way around. In particular, the availability of COPS MORE technology grants starting in 1995 put some agencies in a position of initiating more acquisition projects than they could manage. In some cases, the projects were plagued by difficulties and they failed. In contrast, agencies whose initiating event was a carefully developed strategic technology plan tended to fare better.

Assessment and Decision-Making Activities

This project’s research found that successful IT acquisition depends largely on how widely the effort is embraced by the agency, how much research and planning are done, and

whether the system fits the users' needs. Case studies highlight the importance of identifying a project leader or committee, setting priorities, interviewing future users and stakeholders, identifying constraints and risks, conducting preliminary research, developing a project plan that fits into the larger technology and strategic plans, and measuring performance.

This project's survey on police IT acquisition experiences found significant effects of insufficient planning in the early stages of an acquisition. For example, 79.6 percent of respondents said that budget issues were a constraint to implementation of the technology acquired. That suggests insufficient planning, as the costs of implementation should have been known before the contract was signed. Similarly, 26.6 percent of respondents named legal issues (primarily vendor failure) as a constraint to implementation. Again, in a well-planned acquisition, legal issues and vendor reliability would likely be worked out before contracting. These findings highlight the importance of the assessment and decision-making steps in Phase 1.

Setting Priorities

If an agency has an IT acquisition plan, that plan may call for acquiring new CAD, RMS, GIS, and mobile computer systems in the next three years, for example. Generally, acquiring all those systems simultaneously is neither feasible nor advisable. The funds may not be available to purchase all the systems at once, the best technology may not be available, the agency may not wish to undergo so many changes at one time, or the department may not have enough staff to manage multiple acquisitions. In fact, bringing on even a single major technology successfully is almost always a full-time job. Therefore, an agency usually sets priorities in IT acquisition.

IT acquisition projects may be prioritized according to several criteria:

- What are the current needs of the department? Is there a crisis?
- Is the available funding allocated to a specific technology?
- What are the costs of each system?
- How long will it take to implement each system?
- Do suitable systems exist? Have they been tested?
- What staff will be available to help procure and implement the technology?
- Are we contracting with different vendors for the different systems?

For example, an agency may be more eager for a new CAD system than a new GIS, but it might realize that GIS can be implemented within a couple of months for a few thousand dollars while a new CAD will take a year and \$300,000. Such issues may push the GIS to the top of the priority list, while CAD would be postponed until funding, staffing, and other agency resources are adequate to meet the task.

Also, an agency should determine who will make the final decision on which technology to pursue first. Ideally, prioritization should be determined in the most objective, non-political manner possible.

Identifying a Project Leader or Committee

As soon as the agency decides to acquire a new technology, an individual or a committee should be assigned to lead the process. This research encountered four leadership options:

1. ***An individual is assigned to lead the process.*** He or she performs research, conducts a needs assessment, speaks with vendors, and creates a project plan.
2. ***A committee is established to lead the process.*** The committee may consist of two people or many people, and it may have subcommittees. The committee performs the tasks described above.
3. ***A consultant is hired to lead the process.*** If staff expertise or time is lacking, a consultant may be hired to perform the tasks described above. The consultant may assist the agency with the final decision, but he or she should not be the sole decision-maker.
4. ***The chief executive makes a decision without going through a detailed process.*** Sometimes the chief or sheriff makes an executive decision to acquire a system without thorough research and planning.

Most of the agencies studied selected a single leader or a small group to lead the process. In general, the leader could be a sworn officer, a civilian technical employee, or a manager. Sworn officers often communicate better with the rank and file and bring field experience to the project, but they may have little experience in technical matters or in working with vendors. A civilian technical employee may have the opposite strengths and weaknesses. A manager is likely to possess experience in managing projects and may have influence over subordinates, but he or she may not be technical or be a good communicator with the rank and file. Most departments lack a single person who possesses all the desirable skills and experience; in those cases, teamwork is vital. In agencies that made a conscious effort to select a project team to support the acquisition, assigning various team members different responsibilities, projects were more likely

to be supported enthusiastically throughout the department. (Note: for simplicity, this report will generally refer to the person or small group in charge of the acquisition process as the “project team” or simply “team.”).

Choosing an Individual Leader

When an agency selects an individual to lead an IT acquisition project, often it does not have the luxury of choosing from a pool of highly trained IT professionals. It is more likely to choose one of its own officers with an on-the-job education in IT.

At the Fort Lauderdale, Florida, Police Department (FLPD), Sergeant Michael Gregory was assigned to the Administrative Support Division, which was responsible for a wide variety of issues, from crime analysis to payroll. Sgt. Gregory helped the division captain oversee the nine departments within the division, including Information Systems. At the time Sgt. Gregory joined the division, the civilian system and database administrator—officially responsible for the IS department—was on a leave of absence. During the civilian’s time away, Sgt. Gregory was assigned to supervise the IS department. That was his first experience with information technology.

When the IS manager notified the FLPD that he would not return, Sgt. Gregory’s duties shifted from maintaining the status quo to starting new projects and implementing new technologies. He has succeeded through careful attention to the details of acquiring new technologies.

This process—and most times the success—was typical of agencies studied. In at least one case, the selected project leader was someone whose computer experience had come mainly from playing a lot of computer games. For the most part, small agencies (typically up to 50 officers) and mid-size agencies (50 to 100 officers) did not feel they had sufficient funding to hire a professional, civilian IT manager, so they tended to assign sworn officers to IT positions.

Interviewing Future Users and Stakeholders

The more complete IT plans encountered in this research identified the agencies’ goals regarding information technology for three to five years. In addition, those plans described the agencies’ technological strengths and weaknesses. Using the technology plan as a starting point, the project team should assess the agency’s specific needs that relate to the technology that will

be acquired. The assessment might include talking to the primary users, identifying stakeholders (those who will affect or be affected by the new system), identifying constraints, assessing risks, and conducting preliminary research of market options.

In the assessment, the team should consider both primary and secondary users. For example, records clerks and patrol officers may be the primary users of an RMS, while investigators and crime analysts may be secondary users. If these secondary users do not provide their input into the acquisition, data entry and basic queries and reports may work well, but analysis capabilities may be limited, forcing analysts to use a separate system for their purposes. Likewise, detectives may find that the system does not capture the data they want for their follow-up investigations.

In some cases, system users come from several law enforcement agencies. For example, in Washington state the Pierce County Sheriff's Department and the Tacoma Police Department, through their jointly funded Law Enforcement Support Agency, recently teamed up with the Puyallup Police Department to acquire a case management system known as the Law Enforcement Activity and Data System (LEADS) 2000. Representatives from all the departments collaborated in developing the technology plan that resulted in that acquisition.

One way to gather user input is to convene a committee that represents key groups in the department. Alternatively, the project team can conduct surveys or focus group meetings, attempting to include people of many ranks and positions.

Though not users, others inside and outside the agency (stakeholders) should be identified, kept informed, and asked for input. One important class of stakeholder is the technical support staff. Whether they are in the law enforcement agency or in a city or county information services unit, they will likely be the "help desk," system administrators, or staff assigned to create modifications and upgrades. Other stakeholders might be regional or state agencies that have systems with which the new system will need to interface, as well as other city or county agencies with which the law enforcement agency might share data or a network. Private companies, too, may be a resource for training or technical assistance.

Conducting Preliminary Research

Before making any substantive decisions, the project team should conduct some preliminary research. Doing so prepares the team to write the project plan, communicate with vendors, move forward with the acquisition, and possibly reduce any risks that were identified in the assessment process.

The team should consider reviewing the availability of various technological options, consulting with similar law enforcement agencies that have recently acquired the same technology, and investigating such resources as technical assistance providers, publications, and websites. Preliminary research does not focus on specific systems; rather, it is a general look at what the current technology is and who is using it.

The team may want to ask such questions as these:

- Is the technology 10 years old? Is it one year old and implemented in several sites? Is it on the cutting edge, making the project team's agency serve as the test site?
- How many vendors provide the particular technology—one, two, 50?
- Roughly how expensive is the technology?
- Would adding certain options increase the cost by 10 percent or 100 percent?
- What resources (such as governmental, nonprofit, and for-profit organizations) can assist in the planning, procurement, implementation, and assessment of information technology?

Using the acquisition of mobile technology as an example, preliminary research might help the project team learn the differences between ruggedized and standard laptops, find out about touch screen technologies, and explore voice recognition software options. Preliminary research does not attempt to decide which vendor can provide the technology; it simply explores options and helps the team decide whether the agency is interested in those technologies at all.

Identifying Constraints and Risks

A vital part of the assessment and decision-making phase is to identify constraints or obstacles, which may be technical, legal, financial, or organizational. It is important to become aware of potential problems or requirements early, as it may be unduly difficult or expensive to change the system later. Technical constraints for hardware acquisitions include network issues,

bandwidth limitations, replacement schedules, multi-vendor support agreements, connectivity, security, data migration, city or county standards, and interface with other systems. Software considerations include licensing, certifications for NIBRS compatibility, upgrades, and recurring maintenance costs. Legal constraints might reside in municipal, county, state, and federal laws. Budget and funding constraints are usually clear, although grant-related constraints may be less so. Organizational constraints may include department policies, struggles over which person or unit should house and control the technology, and general staff opposition to the project. (See box titled “Staff Objections to IT Acquisition.”)

Staff Objections to IT Acquisition

At the El Dorado County, California, Sheriff’s Office, the sheriff at the time of this case study was convinced that mobile technologies and an automated report writing system would be beneficial to the department. The project team—whose members had been the primary impetus behind the project—consisted of two younger deputies and an administrative manager in the department. The majority of the deputies in the department at that time, especially those in leadership positions, were strongly opposed to the proposed change. Midway through the implementation of the new technologies, a new sheriff was elected. He had campaigned on a platform of “old style” policing and had joked that there was no computer on his desk and never would be.

With his arrival, the “old guard” began refusing to use the automated report writing system. It was easy for them to resist because of the low rank and seniority of the project team, which now appeared to lack management support. The resistance was so strong that the half-million-dollar project was at risk of failure. When shown the advantages of the new system and the disadvantages of failure, however, the new sheriff made it clear that he was behind the team and the automation project. The word was put out that anyone who refused to learn the system would probably need to look elsewhere for employment. This strong statement of support saved a project that has since turned out to be successful.

To overcome organizational constraints, the project team does not necessarily need high rank, but it does need the unequivocal backing of management. If, from the beginning, communications regarding the project originate from or are visibly supported by management, there is less chance of resistance from agency members.

IT acquisition also presents risks. The project team may want to consider these questions during Phase I:

- How might the new system adversely affect the organization's budget, morale, and staffing?
- What is the department's current level of computer knowledge? For example, will the implementation of mobile computers, in an agency where the majority of officers do not know how to use computers, cause more problems than benefits in the short term?
- Is the budget being used for a new, high-end computer system when patrol vehicles are in severe need of replacement?

Performing a risk assessment better prepares the project team for problems that arise. A risk assessment should examine potential risks, means for preventing them, and steps for mitigating each risk if it occurs.

Developing a Project Plan

The team's next step is to create a project plan. This plan includes the project's objectives, a needs assessment, procurement options, the conceptual design or list of functions, implementation guidelines and timeline, testing and acceptance procedures, and a training plan. Many of the elements may be estimates that cannot be solidified until a statement of work is in place with the vendor. For instance, the timeline may estimate one year (the agency's preference), but the procurement process might take longer than expected, or the vendor might be short-staffed. The timeline would then need to be revised.

The key to a successful project plan is specific, measurable, written objectives. The objective for a new mobile computer and field reporting system might be "to reduce the amount of time it takes for a patrol officer to complete the crime report process." The objective for a GIS might be "to identify spatial patterns of crime and disorder incidents." If the objective is "to implement mobile technologies to make us better at writing reports," success is not readily measurable, and the objective is unlikely to be a useful guide during the acquisition process. If an objective is too vague (such as "to deploy mobile computers in the field"), even 20-year-old technology would satisfy it, but that technology would not be what the project team had in mind.

After clarifying the project's objectives, the team should assess the agency's needs by collecting information from and about current and potential users. That process can include both formal and informal components, such as surveys, focus or discussion groups, technology user

meetings, presentations, or brown-bag lunch meetings. Casual conversations, too, can provide valuable insight into the agency's needs and expectations for the new project.

In addition, a good needs assessment would collect information about existing hardware, software, data, and applications related to the new technology. A technology inventory would examine the hardware and software currently in use by the department; what they are used for; whether they are compatible with dissimilar systems; where and how current data are stored; how systems are networked; what the current software licensing agreements are; how maintenance and support are currently handled; and who is responsible for the different systems or components.

If a legacy system exists, the project plan should lay out steps that will be taken to migrate the existing data to the new system. An inventory of the data in the legacy system should be made, including the quantity and quality of the data. Decisions will need to be made on whether internal staff will be responsible for moving the data or whether the migration will be included in the vendor's contract.

A good project plan might also list the following:

- Likely procurement option (request for proposal, request for information, sole source, etc.)
- Conceptual design statement or statement of expected functionality
- Estimated timeline
- Implementation guidelines
- Proposed testing and acceptance procedures
- Training plan

The project plan is an early-stage document and may need to be modified once the vendor and scope are confirmed.

Lining Up Support

Support through the chain of command is vital when the project team is developing the agency's plan. Sometimes, when a team asks department veterans for input on building a report writing or records management system, the team may face resistance. It is important to overcome that resistance if the acquisition is to be successful in the end. Clarifying that the acquisi-

tion is a project for the whole agency and is supported at the top can prepare the agency to cooperate with the project team and later to embrace the new technology.

Developing support pays off. In almost all the agencies studied, after implementation and training, new technologies were more than accepted—they were in demand. For example, when new mobile technologies were deployed, it became a sign of status to be one of the first to receive a computer and learn how to use it, even among those who had resisted the acquisition.

The California Department of Justice (CalDOJ) was saddled with archaic, little-used software for managing the vast volumes of information collected on violent street gangs throughout the state. The system, called GREAT, was useful for collecting data but not for accessing it. GREAT used a network of dedicated monitors located only in the major urban gang units, despite the spread of street gangs into rural communities. Even in the urban street gang units, few detectives could remember the complex commands necessary to retrieve the data they had provided to CalDOJ. Consequently, street gang units relied on their handwritten field interview (FI) cards and case files for information to support investigations. That approach meant gang information was not available to gang units outside a given jurisdiction and was difficult to analyze even within a jurisdiction.

CalDOJ decided to replace the system. The new system, named CAL/GANG, provided an easily accessed, user-friendly interface and numerous investigative tools that had never been available anywhere before. It contained a database built on GREAT's information and was growing rapidly. By all accounts the system was a technological success. Still, many street gang detectives continued to rely on their handwritten FI cards for information and investigation support. Some provided those cards to civilian staff for input into CAL/GANG but did not rely on the system themselves.

Although the system was easy to use and provided new tools, many officers resisted it. Some felt the state was imposing its will on local jurisdictions, while others doubted the system's security. A greater effort to get local command staff to support the system visibly and to build organizational ownership in the various jurisdictions might have eased the system's acceptance.

Measuring Performance

Although it is a vital step, measuring performance is often overlooked. Most agencies in this study avoided performance measurement until their projects were finished and reports were due to the funding agency. In this setting, performance measurement is used to show “before” and “after” change in order to prove the benefit of a new technology. To measure change, a baseline is needed, but agencies often fail to take an initial measurement to establish that baseline.

To establish a baseline, the project team can assess the technology for its efficiency, its effectiveness, and its enabling quality. In this context, efficiency means getting a task done with the least expenditure of resources. Efficiency is often the primary performance measure⁸ and can be the simplest to examine. It can be measured through direct observation of the time required to accomplish a task or through surveys asking about the amount of time or number of staff required for a task or the number of activities accomplished. For example, efficiency measurements include the time to complete a crime report, the time to finish the arrest process, the time to respond to a call for service, or the number of staffers needed to manage a process.

Effectiveness, on the other hand, means getting the job done better (not necessarily more efficiently). Effectiveness measures are usually more difficult to measure. They could be the rate of successful prosecutions per arrest, public perceptions of fear and safety (measured through surveys), or specific crime rates (if the technology is meant to reduce a particular crime). Other examples include improving the quality of the crime reports to give investigators better information to find and arrest a suspect, or identifying crime patterns to help officers solve problems more quickly.

The third performance standard, a technology’s enabling quality, refers to the technology’s quality of enabling people to do something they could not do before. Examples of the enabling qualities of technology include the ability of automated vehicle locators to identify the location of an officer in need of assistance and the ability of GIS to identify and spatially analyze crime patterns. Other enabling qualities of technology are seen in the plans of the Overland Park, Kansas, Police Department, which during the present research was pursuing two new technologies. The first is a computer-aided emergency telephone notification system designed to

⁸ Agencies that acquired technology or civilians through COPS MORE are required to provide the efficiency measure of the number of hours sworn officers are redeployed to the field.

contact a large number of citizens with a recorded message—for example, a crime prevention message, crime pattern alert, or survey. The second is a type of search engine used to search for words, strings of words, or phrases in multiple types of reports, documents, and databases for purposes of crime analysis and investigation.

With enabling measurements, the baseline is usually zero, since the task has not been possible before. Examples include computerized searching of fingerprints and photos and the use of DNA for identification. The “after” measurements may have to be estimates. For example, before automated fingerprint identification systems were available, no one actually searched thousands of fingerprint cards for the chance of a random match. An enabling measurement would have to estimate how many staff hours it would have taken (in theory) to search paper cards versus how quickly a fingerprint search can be done with the computerized system.

Performance measurement provides an agency with a way to assess its new technology. If the technology was funded by a grant, the granting agency may ask for this assessment in a final report or as a requirement for future funding. In addition, performance measurement helps convince policymakers to support future technology acquisitions, assists in managing department resources, and promotes the new system’s use within the rank and file.

Chapter 4: Phase 2 – Procurement

In the procurement phase, agencies select a procurement method, develop the requirements for that procurement method, select the vendor with the best value for the procurement, and negotiate a contract. Choices made in this phase lay the foundation for project success or failure. In fact, our case studies indicated that many of the failures during implementation actually were failures during procurement. For example, if an RMS does not contain a particular module upon implementation, it may be simply because that module was not requested by the agency. An equally serious problem may be that the vendor's system does not operate as originally envisioned because the technical specifications were not sufficiently detailed.

This chapter contains three sections. The first describes several common procurement vehicles, of which the request for proposal (RFP) is the most prevalent. The second section describes the RFP process in more detail, and the final section discusses the important topic of negotiations with vendors.

Procurement Methods

Agencies use a variety of procurement methods. This section describes the most common ones:

- Request for proposal (RFP)
- Sole source
- Request for information
- Request for quotation
- Strategic partnering
- Piggyback contracts
- Pre-negotiated contracts

Request for Proposal

Among the agencies studied, the most common procurement method was to issue a formal RFP document. Generally considered the safest procurement method, the RFP follows a specific structure and requires that all requests, queries, and responses be done in writing, providing a detailed paper trail and minimizing the chance of miscommunication between the procuring agency and the vendors. The RFP also provides a built-in scope of work, lays the foundation for a contract, and sets out a specific project plan and goals.

Preparing an RFP involves significant administrative costs and staff labor, and the process takes a relatively long time because of its detailed requirements, structured schedule, and need to allow vendors time to respond properly. Also, because responding to the RFP requires a large investment of time and money on the part of potential vendors, small jobs often receive limited response to their RFPs.

Despite those disadvantages, RFPs are favored, as they require the project team to define the agency's technological and operational needs. That process makes it more likely that the IT ultimately selected will do what the agency wants. Further, developing a formal statement of goals and requirements reduces the opportunity for misunderstandings and corner cutting. The RFP approach was used in nearly every large-scale project examined in this research. A detailed treatment of the RFP approach is found in the handbook *Managing the Risks: A Guide for Improving the RFP and Procurement Practices in Justice Technology Acquisitions*.

The experiences of the Law Enforcement Support Agency (LESA), a jointly funded entity serving the Pierce County, Washington, Sheriff's Department (PCSD) and the Tacoma Police Department, illustrate the value of developing an RFP. The RFP was written directly from the specifications of the LEADS 2000 strategic plan (see Chapter 2) and accurately reflected the requirements of the reengineering planning that had been developed for the plan. LESA made the strategic plan available to vendors who were preparing proposals, and vendors were encouraged to use the plan as a guide to understand the LEADS 2000 vision. One vendor commented that the RFP was one of the most complete documents to which he had ever responded, providing a clear understanding of what

the client wanted in the LEADS 2000 system. Another felt that the RFP presented the vision in such a way that vendors could show how they could meet it.

The RFP is by far the most common choice for procuring complex IT systems. The procurement techniques described below should not be used without strong reasons, and they should never be used merely to avoid the hard work of the RFP process.

Sole Source

This method awards a contract to a vendor without formal competition. Some agencies use this option when they believe their project is too small to garner the attention of larger vendors or that one vendor's technology is unique. In a sole source procurement, the project team should still carefully research potential solutions; gather information from other law enforcement agencies, magazine articles, and research papers; and make site visits to agencies where similar systems are installed.

Sole-Source Acquisition

When the El Dorado County, California, Sheriff's Department decided to automate its records management and report writing processes, its procurement team believed the department would receive limited interest from vendors because of the agency's small budget and remote location. The agency has about 100 deputies and lies in a rural, mountainous region of the state, over an hour from the closest airport.

The team chose to skip the formal RFP process. Instead, it conducted in-depth research on costs and options and then chose a vendor that it thought best suited the department's needs. As the project director stated, "The only company that fit our criteria was the company we went with.... 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."

The sole source process required the team to network with other law enforcement agencies, conduct research on the Internet, attend conferences, and visit vendors. While not the correct choice for all agencies or situations, the process resulted in a successful acquisition.

An agency might use sole source when only one product seems to fit its needs. For example, an agency trying to develop close information-sharing ties with a neighboring department might want to obtain the same system as that department.

Request for Information

A request for information (RFI), unlike the sole source approach, is a formal written process. The RFI is most often used as a means of gathering information from vendors and obtaining general cost estimates for the desired system. It also notifies the vendor community that the department will be seeking a new system. An RFI typically includes the following information:⁹

- Background information about the project and general system requirements
- Request for areas of interest from the vendor including hardware, software, or services
- Request for information on long-term maintenance terms of acquired systems
- Request for basic descriptions of products offered by the vendor

The RFI is therefore a preliminary means of gathering information from vendors before the formal acquisition process. Some agencies use the RFI to reduce the number of potential bidders, sending an RFP only to vendors that responded to the RFI.

After the agency receives responses to its RFI, it usually seeks product demonstrations and makes site visits. Greater detail about project deliverables is added during contract negotiations. The RFI process is faster than the RFP process, but it tends to lack a detailed assessment of needs and articulation of requirements.

The Golden, Colorado, Police Department chose to issue an RFI during the acquisition of its CAD and RMS systems. Interestingly, the department also hired a consultant who had assisted other police departments in acquisitions of information technologies. The consultant developed the RFI and recommended a list of prospective vendors. Eleven of the 19 vendors receiving the RFI responded back to the department. After re-

⁹ See also Drescher and Zaworski (2000) and Chu (2001).

viewing the submissions, the department selected four vendors to receive a more discriminating RFP developed by the consultant.

Request for Quotation

In a request for quotation (RFQ), all the requirements are specific and mandatory; therefore, the contract can be awarded on the basis of least cost. This research did not review any projects that used an RFQ solely. RFQs are typically used only in simple projects.

Strategic Partnering

In this process, the agency selects a private-sector partner that will work alongside the agency to develop a solution and that will share the investment, risks, and rewards. Agencies sometimes choose strategic partnering when an IT solution is not commercially available or when a vendor wants to enter the law enforcement market or develop a new product. However, because strategic partnering is used when a product does not yet exist, it is a risky approach, and delivery schedules can slip by months, sometimes years.

A related approach is for an agency to agree to serve as a beta site (test site) for a vendor's already developed product. For a significant cost break, the agency agrees to purchase a product that was just developed and is being fine-tuned.

Piggyback Contract

In some states, the procurement rules allow a governmental entity to bypass the competitive bid requirement by "piggybacking" on an existing contract in another jurisdiction that did complete a competitive process.

The site visit to Altamonte Springs, Florida, provided an example of this approach. The Altamonte Springs Police Department faced a major problem when its CAD computer experienced a catastrophic failure. When the failure occurred, the department discovered that the vendor contracted to support the system had moved and had not left a forwarding number. The failure of the CAD and the lack of support resulted in the unavailability of the system for several days. This frustrating chain of events led to a decision to replace both the CAD and RMS systems immediately. Due to the failure of the CAD system, the procurement process had to be abbreviated. A member of the depart-

ment visited several sites and selected a vendor that fit the department's needs. Fortunately, that vendor had a contract in Bradford County, located in northern Florida, which could be used by the Altamonte Springs Police Department for its purchase. In short, the department turned a bad situation into good. It replaced a failing CAD system, implemented a better RMS system, and added a new mobile data system.

Pre-negotiated Contract

Under this increasingly popular option, an agency looks to vendors that have already been approved by its city, county, or state government. This method relies on a previous competition to maintain the fairness of the process. In Washington, D.C., for example, the city has developed what is known as a "DC Procurement Schedule" listing companies that have qualified in various areas of expertise, such as Information Technology. The qualification procedure is extensive. A company that wants to be on the list must apply to the city and demonstrate it has personnel and expertise in a given area. For companies providing services, the hourly rates of personnel categories must be approved by the city prior to getting on the schedule. A city agency needing IT support can hold a limited competition with companies on the schedule. This procedure streamlines the procurement process and can save months in an acquisition.

Available Solutions

The marketplace sets further parameters on the IT acquisition. Through careful research, the team can learn the current state of the technology, its potential cost, and the reputation of particular vendors. Today's project team benefits from the maturing of the law enforcement technology market. Competition among vendors is fierce, and law enforcement has built up a knowledge base that provides a solid start for any project team that is beginning research.

A project team can learn much by consulting with similar agencies. However, it may have to reach out beyond its immediate geographic area, or it might not find anyone with a deeper knowledge than it already possesses. The team can start by asking its contacts in nearby agencies whether those agencies have managed similar projects, then ask for names of any other agencies that have acquired similar technologies. It may also be useful to investigate the reputation of vendors by speaking to agencies that have pur-

chased from them. For example, to learn about one prospective vendor, the IT manager at the North Miami Beach, Florida, Police Department called other agencies that had purchased from the vendor, including sites that were not listed in the vendor's proposals. The key question he asked each site was, "If you had to do it all over again, would you buy another system from your vendor?"

A project team can also leverage its networking ability by attending as many law enforcement conferences as possible, especially those related to technology. Finally, the team should regularly look for articles on agencies that have acquired similar technologies. In addition, the team can consult the websites of the International Association of Chiefs of Police (www.theiacp.org) and SEARCH, Inc. (www.search.org). Those sites provide searchable databases on technologies acquired by hundreds of law enforcement agencies in recent years.

The selection of a procurement vehicle also depends in part on the internal capabilities of an agency. The case studies showed that internal capabilities had a particular effect on the acquisition of hardware and software for mapping applications. For example, in general, four options are available for a police department that wants to develop its computer mapping capability. If the department has good technical expertise, then it might be possible to purchase mapping software either from ESRI, Inc., or MapInfo, Inc., which are the two dominant mapping software developers in the country. A second option is to contract directly with a software company such as ESRI or MapInfo for tailored development of computer mapping for the department. Another option is to contract with a company that has a system already developed, such as a crime analysis system, which includes computer mapping. A final option is a variation in which the department contracts with a third-party company that has expertise with mapping software and can tailor a system to the department.

These options for computer mapping vary in cost and personnel commitment by the department. In terms of direct expenditures, the purchase of the mapping software is probably the least costly, but it requires the heaviest commitment of department personnel to get a mapping system operational. A direct contract with one of the mapping soft-

ware companies is probably the most expensive because of the cost of programmers from these companies for developing a tailored system.

The case study in Malden, Massachusetts, offers a good example of these alternatives. The Malden Police Department used a competitive bid process that the city required for purchases over \$1,000. Three proposals were obtained: one from a mapping software developer, one from a company with a crime analysis system, and one from a local third-party vendor with expertise in developing mapping systems. They selected the local company because it had a reasonable price and was willing to work closely with the police department during development.

The approach to purchases of systems other than computer mapping differed considerably in our case studies. An RFP was the most prevalent procurement vehicle for CAD and RMS systems. The most obvious reason for issuing an RFP is that the amount of the procurement is large enough to require strict adherence to local procurement methods, of which an RFP is the most commonly required. As discussed in this chapter, there are also other reasons for developing an RFP for major IT procurements.

The RFP Process

If, as in most cases, the RFP process is chosen, the agency next needs to write the actual, detailed RFP document. To do so, the agency first determines the specific needs it is trying to meet through the new IT. Second, it determines which companies might be able to meet those needs.¹⁰

Agency Baseline and Needs

In the assessment and decision-making phase, the project team took several steps (such as setting priorities and interviewing users and stakeholders) to determine the agency's needs. Now, to build the RFP, the team begins by making a more detailed assessment of the agency's current information management process and ways to improve

¹⁰ The discussion of RFPs in this chapter is summarized from *The RFP Handbook* that is a separate report of this project. Several sections of the handbook are based on and contain text from *The Request for Proposal Handbook, Second Edition, 1999*, by Michael Asner Consulting.

it. In the case of an RMS project, for example, the team should ask such questions as these:

- How do we currently file our records?
- How are they reviewed? By whom?
- How many times must a single record be handled before it is approved and filed properly?
- How long does that process take?
- Why would we want to change the process?
- How can a new technology improve the process?
- In what specific ways will a new technology benefit the agency?

To answer those questions, the team should consult those who will use the new technology, such as patrol officers, sergeants, command staff, agency civilians, and others who may become stakeholders in it. They should be asked what they feel is needed and how a new technology could improve their current process.

The raw information from the needs assessment is not something to be placed directly into the RFP. The findings may be more dreams than needs. For example, most agencies in this study with mobile technologies and report writing software dream of the day when officers can complete reports and conduct criminal history searches purely by voice command. However, voice recognition technology has not evolved to the point where it works well in complex, noisy environments. Although many users may want such a function, requiring it as a deliverable in an RFP is not feasible. In other cases, the barrier between the dream and reality may be related more to the project's budget or deployment timetable.

Steps in the RFP Process

The most common general steps in the RFP process are as follows:

1. Develop the user requirements.
2. Write the RFP document.
3. Release the RFP to vendors.
4. Hold a vendors' meeting to field questions on the RFP.
5. Accept the proposals.

6. Evaluate the proposals.
7. Select a vendor and sign a final contract.

The RFP document also states the criteria by which vendors will be judged, the format in which proposals should be submitted, any maintenance and warranty expectations, a proposed implementation schedule, and training requirements.

The early research provides most of the information necessary to draft the RFP, as well as a list of vendors to which the agency might send the RFP. For smaller agencies and projects, it may help to personally contact desirable vendors and encourage them to submit proposals. Many departments also announce the RFP on websites and professional publications to reach the widest possible vendor audience.

RFP Timeframes

The following timetable is based on the previously mentioned RFP issued by LESA and is typical of the steps and milestones for a procurement process, starting with the issuance of an RFP:

<u>Activity</u>	<u>Cumulative Time</u>
Issuance of RFP	Start
Pre-proposal Conference Question Deadline	2 weeks
Pre-proposal Conference	3 weeks
Proposal Due Date	9 weeks
Notification of Finalists	12 weeks
Site Visits for Finalists	13 weeks
Presentations by Finalists	14 weeks
Best and Final Offers from Finalists	18 weeks
Evaluation of Finalists	19 weeks
Recommendation to Executive Board	21 weeks
Contract Signed	25 weeks

Any duration of more than six months is typically caused by such problems as poorly defined goals and user requirements or withdrawal or business failure by the selected vendor. Proposal evaluation, too, can delay the process. Proposals can easily run into the hundreds of pages, and larger projects are likely to draw several proposals. If members of the evaluation team are unwilling or unable to spend the necessary time on review, delays may result. However, if the RFP process is properly managed and fol-

lowed, it should result in a timely procurement of the most cost-effective solution for almost any project.

The experiences from the case studies indicate that most agencies underestimate both how long it will take to prepare an RFP and how long it will take vendors to provide a good response. Often the type of technology affects the details of the timeline. If, for example, an agency is attempting to procure a CAD and RMS, the RFP process will be complex and time consuming, and the vendor responses will be equally complex and detailed. On the other hand, if an agency is purchasing a few dozen mobile data computers, the RFP should be relatively simple and succinct, resulting in a shorter procurement timetable.

Equally important in the procurement process is allowing ample time for vendors to respond to an RFP. The appropriate time frame varies according to the degree of complexity of the project and the technical details specified in the RFP. For a simple procurement, 14 to 30 days may be sufficient; however, for complex projects 30 to 45 days is reasonable following the vendors' conference. Allotting ample time for responses also encourages vendors to develop proposals that are relevant and comprehensive. The less time provided for a response the more likely that the proposals will be filled with irrelevant and vague language.

ILJ's discussions with vendors also indicate that some vendors with good solutions pass on projects entirely if the response time is too short. Vendors typically receive more RFPs than they can respond to. Normally, they review each RFP and evaluate their chances of success. Some vendors have a rule of thumb that they will submit a bid only if they have had prior contact with a police department and are convinced they have a chance to win the project. These decisions are taken seriously because vendors can spend as much as \$50,000 or more during the procurement process for the initial submission, oral presentations, and proposal re-submissions. Their aim is to do a good job of showing they can meet the needs of the agency.

Vendors also develop internal rating schemes, formal and informal, for determining whether to respond to an RFP. One vendor told the project team that his company rates RFPs by answering the following questions:

- Is this a legitimate opportunity?
- Do we have an opportunity to make the oral presentation?
- Is there time to respond in a comprehensive manner?
- Do we have the personnel available to prepare a comprehensive response?
- What is the risk in doing the job?

The first question addresses whether another company already has an advantage in the RFP because it has a prior record with the agency or has been marketing the agency. Having the opportunity to make an oral presentation is important to vendors because it provides a face-to-face discussion about what the agency's problems are and how the vendor's product might address those problems. The time to respond to an RFP is an important factor because the staff of vendors is always busy and there may not be sufficient time for an adequate proposal. Finally, the vendor wants to make an assessment about the risks involved in doing the project.

One of the vendors also commented on the quality of RFPs issued by agencies. As he stated it,

The other concern we all share is the way RFPs are written. It seems to those of us that respond that they are cut and pasted with specs from several companies. While each respondent may be able to perform a required task, or provide a product, there is no room for explanation. We are required to hit 'comply' or 'not comply.' The best is to 'comply with modification.' Let each respondent explain what the vendor's product can and cannot do. I understand that it takes quite a bit of comprehensive review on the other end but it is the fair way to evaluate a response.

It is sometimes frustrating to police administrators to balance organizational needs with a realistic timetable. They may want the system "now" in order to support current operations. Those involved in the procurement timetable must give realistic estimates on how long it will take for procurement. On the other hand, an agency cannot afford to "overplan" an acquisition by taking too long for a needs assessment and development of the technical specifications in an RFP. The risk is that the eventual system may not fit the needs of the organization by the time of implementation. Another risk is that the agency may lose federal grant support if the process exceeds grant deadlines.

Developing the Technical Specifications

The goal of an RFP is to describe the IT problems that the department faces and to provide enough technical specifications for vendors to respond with appropriate solutions. The job of the developers of an RFP is to describe the problems that need to be addressed and the requirements of the new system, while the job of the vendors is to describe their solutions. The challenge in developing an RFP is the production of clear, unified, cohesive statements of requirements. These requirements should come directly from the goals for the new technology and should be based on user requirements.

A review of the RFPs issued by the agencies in the case studies resulted in the identification of two general types of requirements: process-oriented requirements and goal-oriented requirements. Process-oriented requirements are very specific requirements that are needed by a department. For example, a process-oriented requirement might read as follows: "The RMS shall maintain a file of all vehicles that have been towed, including make, model, body style, VIN, and vehicle color." A goal-oriented requirement for the same function might read, "The RMS shall include a module for tracking towed vehicles." In both, the aim is to maintain information on towed vehicles. In the first statement, the requirement gives exact specifications on the information to be maintained, while in the second, the vendor is asked to describe a solution.

In practice, most RFPs will contain both process- and goal-oriented requirements. The majority of requirements from the RFPs in the case studies contained goal-oriented requirements. Process-oriented requirements appeared when the department had unique requirements that needed to be addressed.

A composite of the RFPs from the RMS case studies provides the following picture of the contents of the requirements sections:

- Narrative describing the operational process that the system will support
- Description of existing technology systems
- Copies of forms and reports currently in existence to capture and report information
- Statement of transaction volumes for the current and future systems
- Description of the problems to be solved by the new system

- Description of enhancements desired in the new system
- Statement of expected benefits and priorities
- Description of any existing or anticipated interfaces to other information and communications system

The requirement on interfaces proved to be one of the most difficult and expensive for agencies to address. As an example, an agency usually wants its RMS to interface with other systems, such as its CAD system, AFIS, and others. The objective is to have a unified, single-entry system with consistent information. If the CAD system already exists, the specifications need to provide information about that vendor and the particular version of the software. In some instances, bidders may need to contact the CAD vendor directly for more technical information. If the technical requirements fail to provide specifics about an interface, prospective bidders have no choice but to estimate a high cost to cover all contingencies.

After the specifications have been completed, most agencies have a review process by the full acquisition team, the chief officer of the issuing agency, the purchasing department, and the legal department. These reviews may lead to changes in the RFP. The purchasing department usually is responsible for combining the requirements with terms and conditions and other administrative information to produce a cohesive, comprehensive RFP document. The RFP can then be announced and released. In most jurisdictions, the release is accomplished by sending notices to appropriate vendors registered with the jurisdiction, by placing advertisements in newspapers, through e-mail, by facsimile, or by announcing the procurement on a web site. The important point at this stage of the process is that the RFP get into the hands of as many qualified vendors as possible. A wide distribution usually results in a higher number of qualified responses.

Those responsible for acquisition in the case studies commented on the importance of holding a vendors' conference. The conference is usually held two to three weeks after the issuance of the RFP. It may or may not be mandatory, depending on the requirements and practices of the jurisdictions. Its purpose from the agency's viewpoint is to ensure that the vendors have a thorough understanding of the technical requirements detailed in the RFP. It also serves as an opportunity to introduce the project team and

agency staff to prospective vendors. Sometimes the vendors may point out discrepancies in the RFP that can only be corrected through amendments. There should be no hesitancy to issue those amendments even though it may lengthen the procurement process.

Several other key steps should be taken to ensure success during the RFP process. One is that only certain designated people, usually just one person, should communicate with vendors. These designations should be made clear in the RFP, and no deviations should be made. Vendors should be told not to call others in the police department, and any calls should be transferred to someone who has been designated in the RFP. With this approach, the police department can avoid giving out inconsistent information to vendors. Another rule imposed by many jurisdictions is to require all inquiries in writing. Responses to these questions can then be provided to all potential bidders to the RFP. This approach also ensures that all potential bidders are given exactly the same information at the same time.

Evaluation of Proposals

Agencies in the case studies varied considerably on procedures for evaluating proposals. With some agencies, the evaluation process was informal, with key personnel simply discussing each proposal and agreeing on the successful vendor either by consensus or votes. Other agencies had very structured evaluation processes that involved formal scoring and write-ups on the strengths and weaknesses of each proposal. Those agencies usually had specific categories and maximum points in the RFP on which the proposals would be judged. Typical criteria were as follows:

<u>Category</u>	<u>Points</u>
Software Functionality	30
System Architecture and Hardware Functionality	15
Qualifications and References	15
Implementation Plan	15
Warranty and Service Program	5
Price Proposal	<u>20</u>
Total Score	100

As part of the evaluation process, most agencies found it beneficial to allow the vendors to go through an oral interview or presentation process. The purpose is to allow the selection team to ask questions of bidders and clarify any ambiguities in their propos-

als. Most vendors welcome the opportunity to meet with the selection committee and discuss their solution to the agency's problems. They may also have questions of the agency that need to be addressed. An additional approach is to visit agencies that have software installed by the vendors. It is beneficial to see a system in actual operation and to talk with others who have been through the procurement and implementation process.

Negotiations and Contracts

Once a vendor has been selected, the next step, typically, is to negotiate a contract. Usually, the RFP is incorporated into the contract as an addendum and is the first place the parties look when trying to resolve conflicts. In negotiations, the goal is to define exactly what the agency will receive—in specific products as well as levels of support and training—in return for the money it spends. This is a give-and-take procedure in which the agency tries to get as much as it can for its budget.

In many procurements, a team is assembled to conduct the negotiations with vendors. The team may, for example, include (1) someone designated with authority to negotiate the contract, (2) advisers with knowledge of technical issues, (3) the designated project manager for implementation, and (4) attorneys experienced with IT contracts who can provide the necessary contract language.

The main areas of consideration during negotiations are as follows:¹¹

- Price
- Project milestones, time frames, and deadlines
- Contract deliverables (software and hardware)
- Payment schedule
- System performance
- System testing and acceptance
- Training
- Documentation
- System warranty and maintenance

¹¹ Drescher and Zaworski (2000).

- Conversion of legacy systems
- Provisions for change orders and enhancements
- Penalties

All these areas need to be addressed during negotiations in order to have successful implementation. Even price is negotiable, as most vendors find ways to change their price to get the project. The negotiation team can also seek to lower the price by reducing scope or reducing uncertainty (e.g., by providing information that was not available at the time the RFP was issued).

Negotiations should be conducted in a firm and fair manner. The agency's aim is to obtain the best possible system for a given budget, while the vendor's aim is to provide a system at a reasonable and fair price. Negotiations are a two-way street, with each side giving and taking as needed to meet the aims of the procurement. As an example, the software warranty should be negotiated to determine the support and maintenance after implementation and to specify the period for which that support will be provided. Those negotiations should, in turn, depend on the system acceptance period because the warranty should not start until system acceptance.

Sometimes a vendor will propose one or more subcontracts to assist with the project. Such an approach is especially prevalent in large procurements where the prime contractor does not have the complete expertise for the implementation. In these instances, the negotiation team must satisfy itself that the prime contractor is responsible for the entire project. The department's project manager should not have to deal directly with a subcontractor when implementation problems occur.

Another important area for negotiations is the penalty clause for failures on the part of the vendor. The two most common failures are not meeting the pre-defined schedule and not providing the capabilities promised in the vendor's proposal. The agency must determine how important it is to meet the implementation deadlines and determine the penalties for failure, based on importance. Some delays may be unavoidable and may, in fact, be the fault of the agency, and in these instances, the vendor should not be penalized. The greater failure is when the system does not operate as promised or

does not include modules specified in the RFP. In these instances, the vendor clearly has the responsibility and should be penalized for failure to deliver.

The following describes another problem that could have been alleviated during negotiations regarding the ownership of software:¹²

A large law enforcement agency completely funded the development of an interface that fed information from a CAD system to its records system. A message switch was built to handle the transactions with a well-defined Application Programming Interface (API). When the time came to integrate a third product into the records system, the software firm pointed out that they owned the interface, not the agency that paid for it. Consequently, the only option for the agency was to pay for the right to access the API, despite the fact they funded 100% of the original development, and in fact were the only users.

This project's survey on police IT acquisition experiences found evidence that policing agencies are failing to include important provisions in their IT contracts. For example, only 64 percent of respondents said their contracts specified a payment plan, 60 percent specified delivery schedules, 46 percent required acceptance testing, and 18 percent had penalty clauses.

Negotiations with vendors require special skills that not every police department has on board. In one sense, the vendor has the advantage because of its knowledge of the product and because it negotiates regularly with police departments. That experience will show during the negotiations. On the one hand, a contract cannot be so constrained that the vendor has no chance to earn a reasonable profit. On the other hand, a police department must guard against a weak contract with no protections for the department. Procurement of a system is a business arrangement, not a personal arrangement. Several police departments have hired consultants to assist in the procurement phase, especially with negotiations. Assuming that a qualified consultant is obtained, the department may literally save thousands of dollars during the negotiations.

The following are common mistakes made during negotiations:¹³

¹² Chu (2001).

¹³ Drescher and Zaworski (2000).

- **“Scope creep.”** This occurs when the requirements are not clearly defined and the vendor is asked to make software modifications that it did not anticipate. The vendor may want more money for the change, while the agency believes the requirement is part of the base price.
- **Change orders.** While some change orders may be inevitable, the overuse of these orders can greatly inflate the price of the system. These usually occur because the agency did not completely specify its requirements in the RFP.
- **Over-promising of capabilities.** There have been many examples of vendors who have promised systems far beyond the capability of the technology at the time. These vendors may have wanted the contract and overbid their capability. It is the agency’s obligation to evaluate vendor proposals and their ability to deliver. In this regard, it is important to make site visits and check references to determine that a reliable vendor will be selected.
- **Failure to allocate or estimate the funds necessary for on-going maintenance and support.** All systems require support, the costs of which must be considered as part of the contract or made available within a reasonable period after system acceptance.

While most of the burden is placed on the vendor when contracts are written, it is important to note that the procuring agency also has responsibilities in fulfilling a contract. For example, the agency should provide promised facilities for use by the vendor’s staff, make payments in a timely manner, provide detailed information on existing systems, and appoint a knowledgeable, accessible contact person to field questions from the vendor’s team. The agency also must ensure that the physical location for housing the system is in order. This obligation may require that the agency arrange for changes in the construction and electrical wiring in an area. The vendor should not be penalized for failure of the agency to achieve these changes in a timely manner.

Chapter 5:

Phase 3 – Implementation

All the effort in the procurement stage will have been wasted if the police department fails to implement the acquired information system correctly. Implementation encompasses the installation of the technology, acceptance testing of the new system, preparation of the organization to take advantage of the system, movement of records from legacy systems into the new system, and training of personnel in how to use the new system. Implementation may take a few weeks for small systems or years for large records management systems. Proper work done in the assessment and decision-making phase and the procurement phase increases the likelihood of success in the implementation phase.

Implementation Methods

For the implementation of an information system of any size, the agency needs an in-house project team to ensure success. The team should include representatives from the key sections of the agency that will be affected by the new system. For example, the project team for a new computer-aided dispatch system should include representatives from the communications center and field operations. Implementation of a records management system may need a larger project team composed of representatives from field operations, records section, crime analysis, investigations, information technology, communications center, and others. Regardless of its composition, the project team is responsible for the successful implementation of the system, which means that it is installed according to specifications and in a timely manner.

The project team needs an implementation or project manager to head up the entire effort. That person should have good organizational skills and a background in the subject matter of the system. In many instances, the project manager will have been involved in the decision-making and procurement stages of the acquisition.

The findings from the site visits for projects showed three common arrangements for the implementation of systems, as described below:

Turnkey Solution	In a turnkey solution, the vendor develops and installs the IT with only limited support and oversight from the agency. The goal is that the agency can “turn on” the system and it will be ready to go.
Systems Integrator	A systems integrator, usually a company, implements the products of several vendors to provide an integrated package of technologies.
Professional Implementation Management	An agency may hire a professional implementation manager from outside the department. In some cases, this consultant may be brought in even earlier in the process.

Turnkey Solution

With a turnkey solution, the vendor manages the implementation and agency staff require no training to learn how to use the new product. The vendor merely installs the product, shows the agency the equivalent of an “on/off” switch, and leaves. In reality, turnkey solutions are unusual in law enforcement IT acquisitions. Because the new technologies dramatically change the way work is completed, some training is always necessary.

Systems Integrator

Some large technology vendors offer their services as systems integrators. Such services are used most often by larger agencies seeking a comprehensive package of new technologies that they expect to work together seamlessly. Using a systems integrator can be an expensive option, but it is one way to update a whole range of agency technology quickly. The desire to contract with a systems integrator is usually spelled out in the RFP; the integrator’s job is then to assemble the full package of appropriate software and hardware.

An advantage of this approach is that the integrator is responsible for the actions of all the vendors and for facilitating communication between them and the contracting agency. By contrast, when an agency acts as its own integrator, the agency takes on full responsibility for communication and coordination.

Professional Implementation Management

Another method is to hire a professional implementation manager on a consulting basis. Though fees for such experts are high compared to law enforcement staff salaries, the consultant need only be paid for the duration of the implementation.

Implementation Plan

One way to avoid many problems is to develop an implementation plan at the start of this phase. The plan should lay out the purpose of the new system, roles and responsibilities of key personnel for a successful implementation, training needs, the timetable for implementation, and key tasks to be performed.

Any new information system will have an impact on some procedures within an agency. The implementation plan should identify those procedures and describe what activities are needed to address the procedures that will need to be changed. As an example, implementation of a field reporting system on laptops in patrol units changes the supervisory review and approval process. The process must be “re-engineered” to obtain the desired increase in efficiency through the field reporting system.

Even with a project team and implementation plan in place, several obstacles exist for a successful implementation. The remainder of this chapter describe the main implementation obstacles observed during this project’s site visits.

Support Structure

It is important to develop a structure to help agency staff with problems that arise during implementation. Such support can be supplied by other agency staff, by the vendor, or both. The support structure may be as simple as assigning an individual from the IT division to field questions and solve problems, or it may be as elaborate as arranging for a help desk to be staffed by a vendor or in-house technical staff, possibly around the clock.

Another support structure should address maintenance. Even new hardware needs some care. Agency staff should be told whether the agency itself or the vendor is responsible for maintenance. That responsibility could mean anything from actually performing

maintenance to arranging for a replacement laptop while repairs are made. By publicizing maintenance procedures, implementers can reduce employee frustrations and complaints about the new technology.

Preparation of the Organization

Introducing new IT into a law enforcement agency may constitute a significant change for some employees and the overall agency culture. Resistance to change may be expressed through lack of interest in training, through gossip, or even through sabotage of the new technology.

The effort to ease change should begin early. Even before the RFP is written, command staff can visibly support the project, and the project team can publicize its support and maintenance structure to reduce fears and thereby decrease resistance.

It may also help to establish an agency-wide sense of project ownership. The project team may be able to do so by making the case for how the new technology will help the agency reach its goals.

Agency Satisfaction

There has always been a certain level of skepticism between law enforcement and the vendor community. Some agencies feel vendors are out to take what they can get, so agencies must protect themselves. However, in many cases, those same agencies are supportive of the particular vendors they are working with. The vendor community, on the other hand, sometimes feels law enforcement agencies set vague goals and demand more technology than they are willing to pay for. This research encountered some cases in which agencies' assumptions or oversights led to confusion that caused problems with vendors.

For example, the Scottsdale, Arizona, Police Department was working with a vendor to develop an automated report writing system. A major goal was to eliminate redundant effort in typing data into reports. Within the department, a new report could begin at a number of starting points. An officer might write a traffic ticket, a criminal incident report, or another type of reports. The department's goal was that if a report of

any kind was entered into the system, repeated fields would automatically be populated with data, no matter where in the process the officer started the report. However, when the agency drafted its RFP and later negotiated a contract with the vendor, the agency merely stated that data should populate other fields automatically.

Upon delivery of the software, the agency found that the automatic population of data occurred only if reports were written in a specific order. If there were any deviations from that order, the various fields in the report, like the name field, would have to be filled out in each subsequent type of report for that incident. When confronted, the vendor pointed out that the software, when used “properly,” met the letter of the contract. The vendor offered to expand the software’s capabilities (to provide for automatic data population from any point in the system) for a substantial additional fee.

To this day, the department feels that the vendor took advantage of the agency’s inexperience with the contracting process. Regardless of whether that is so, the situation shows how miscommunication leads to distrust between vendors and the law enforcement community.

In this case, the problem could have been avoided had the agency been more specific in its contract language. Likewise, a vendor more attuned to meeting the agency’s needs might have recognized the potential for misunderstanding and helped the agency better define its goal.

A final source to mine, one that is often overlooked, is the agency’s own experience. In an agency where an older technology is being replaced with a newer system, the experiences from the first procurement can inform the latest endeavor. However, in many instances that institutional knowledge is unavailable. Often the project team members are no longer available or the details of the experience are forgotten. Agencies should consider memorializing staff experiences in writing to provide future projects with an internal base of experience on complex technology acquisitions.

Risk Analysis and Management

The implementation of any information system comes with a certain amount of risk, no matter how much planning has preceded it. Agencies must face these risks and

include risk analysis and management as part of their implementation strategy. Risk has two components: uncertainty and loss. In this context, *uncertainty* means that an event may or may not happen, and *loss* means there are unwanted consequences if the event does occur. For example, if hardware is to be ordered for an information system, there is a possibility that the hardware will not arrive on time (uncertainty), and the result would be a delay in implementation (loss).

The project team should systematically identify risks and establish procedures to manage potential problems. Those procedures may range from avoiding the problems to developing contingency plans in case problems occur. One way to proceed is to list potential risks in several categories, such as the following:

- ***Financial resources.*** Even at the implementation stage there may be risks associated with the budget for the information system. In addition to hardware costs, funds may be needed for system maintenance, training (overtime), support personnel, and others.
- ***Vendor performance.*** The vendor's implementation efforts have risks associated with schedule and performance. More risks are likely if the vendor must interface with other systems or develop software modules.
- ***Agency performance.*** The agency has responsibilities in an implementation that must be completed in parallel with the vendor. These efforts may include vendor management, training, file conversion, and acceptance testing. This category is for the risks associated with these implementation efforts.
- ***System performance.*** As the system is implemented, its performance must be closely monitored through the testing plan. This category is for risks associated with the effective performance of the system.

The present research found that both the El Dorado, California, Sheriff's Department and the Scottsdale, Arizona, Police Department identified a risk inherent in mobile technologies and developed a way to manage that risk if it materialized. (See box.)

Risk Management

Both the El Dorado, California, Sheriff's Department and the Scottsdale, Arizona, Police Department undertook to acquire mobile data technologies and automated report writing systems. However, they recognized that once those systems were put in place, the loss of a mobile computer or the crashing of any other part of the system would leave officers unable to perform their jobs.

The agencies could have ignored those risks and scrambled for solutions when problems inevitably arose. Instead, they developed solutions in advance. In El Dorado, the department contracted with its mobile computer provider for immediate replacement of a failed unit while the failed unit was being repaired. Taking a different approach, the Scottsdale department simply purchased more mobile computers than were actually needed and used the extras as backups for failed units.

Risk management seeks to develop proactive decisions and actions to (1) continuously assess what can go wrong, (2) determine what risks are associated with these possible events, and (3) implement strategies to deal with those risks. A common approach to risk management is to develop a table with the following information:

- **Description of Risk Event:** Identification of an event or condition that would prevent the implementation or cause it to fail or be significantly delayed
- **Time to Failure:** Date at which the event is likely to occur, if it does occur
- **Action Priority:** A ranking of the severity of the risk, composed of three factors:
 - **Risk Assessment:** Likelihood of the event occurring, from .1 (unlikely) to 1.0 (certain to occur)
 - **Impact:** Seriousness of the event if it does occur, from 1 (light impact) to 10 (severe/fatal impact)
 - **Severity Score:** Product from multiplying risk assessment and impact scores from 0 (no risk) to 10 (certainty of occurrence and severe impact)
- **Mitigation Strategy:** Plan of action to eliminate the occurrence of the risk and deadline for that plan

- **Personnel or Organizational Responsibility:** The staff or organization responsible for completing the plan of action
- **Contingency:** Steps to be taken if the risk does, in fact, occur

Separate tables along these lines can be developed for the categories of financial resources, vendor performance, agency performance, and system performance.

It is better to assess risks and develop solutions in advance than it is to scramble under pressure when the unexpected happens.

Training

Training is perhaps the most complicated and important issue the implementation team faces in an acquisition project. Even if the technology is designed perfectly, the vendor is conscientious and knowledgeable, and the command staff fully supports the project, poor training can lead to failure.

A good approach is for the implementation team to determine the agency's training needs (based on the technology being acquired and the knowledge level in the agency), develop a training plan, and implement it (by coordinating training locations, trainer support services, and the training schedule). In more complex projects, it may be useful to establish a training committee to perform those tasks.

A simple training cycle can be outlined as follows:

- Assess training needs.
- Prepare a training plan.
- Develop a training curriculum and training materials.
- Deliver the training.
- Evaluate the training through testing and surveys.

Initial attention to the training cycle should take place during the procurement phase, as some training considerations may have to be accounted for in the contract. It may even be useful to begin training before the new technology is implemented so that some employees will be ready to use the technology as soon as it is put in place.

Train the Trainers

One approach to training is to hire the vendor to train some agency staff members to train others. This is perhaps the most cost-effective approach. However, the agency must be willing to commit staff to the training process and allow the trainers time to develop their skills and conduct training sessions. A train-the-trainers approach should be part of the vendor's contract.

Vendor-Led Training

Hiring the vendor to conduct all the training is more expensive but requires less agency staff time. Typically, the vendor provides materials and instructors, and the contracting agency provides the facilities. When contracting for training, the agency should take care to specify the expertise level of trainers who will be sent to its site.

At one agency studied, user training was set to begin after a particularly complex implementation. On an airplane, the agency's project leader happened to meet an employee from the vendor that had provided the new technology. The vendor employee had not been on site previously and did not recognize the project leader or know he was from the department. During the course of conversation, the vendor employee expressed his fear that, having never conducted training before and not being very familiar with the system just put in place, he had no idea how to train the users. In response, the agency project leader contacted the vendor and insisted on a replacement trainer with better qualifications.

Encouraging Participation

A key challenge to overcome is the difficulty of getting users into a classroom. It is often difficult for command officers to release agency staff, especially patrol officers, from their regular duties to attend training. If staff do not receive proper training, at best they may learn only the minimum skills necessary to get by, missing the technology's more sophisticated features. At worst, they may misuse applications or hardware and cause system failures. It is vital that command staff publicly support the training program so all agency staff are brought up to a specified level of competence on the new technology.

Legacy Systems

A key decision is whether the new information system will be a “day one” system or whether it will be populated by existing data in legacy systems. The advantage of a “day one” system is that it can be more quickly placed into operation. There is no need to transfer data from the old system; users can simply start entering data to build a database. Of course, the disadvantage is that access to existing data is lost with this approach. With a new records management system, existing data usually are a necessity for patrol operations. The agency must, for example, have access to crime records for reporting and analysis purposes. Other systems, such as property/evidence systems and even CAD systems, may not require existing data.

The difficulties in moving data from a legacy system into a new system should not be underestimated. The process may be slow and costly. It is advisable to conduct a data quality review to determine how much data should be transferred. The review may show, for example, that some fields are no longer completed or that they contain many blank or invalid codes. For the fields that should be transferred, a computer program may need to be written and tested. The program may be the responsibility of the agency or the vendor, depending on contract specifications. If it is the vendor’s responsibility, then the agency must be sure to provide sufficient information about the old system design to the vendor. In either case, sufficient time must be allowed for program development, testing, and the actual movement of the data.

If it is not deemed essential to bring the old data into the new system, it may nevertheless be necessary to maintain certain data for legal reasons, and the old system may need to be retained merely to house the old data.

The experiences of the California Department of Justice with the development of its GREAT system provide a good lesson on moving legacy system. In this case study, it was found that conversion of the old data into the new system represented a major part of the budget. (See box).

Legacy System Challenge

When the California Department of Justice (CalDOJ) sought to modernize its youth gang database (the GREAT system), the first gang database in the nation, it quickly ran into the legacy systems wall. Developed in the mid-1980s, GREAT was based on “green-screen” technology that required users to remember hundreds of intricate commands to input or access information. The database contained much useful data but had fallen into disuse because of the difficulty of accessing the information.

In 1995, CalDOJ sought a vendor that could modernize GREAT into a more robust system with a user-friendly interface. The department soon realized that the cost of modernization—if the task was even possible—would far exceed the cost of developing a new, state-of-the-art gang database that included link analysis and investigative tools.

That realization led to the development of CAL/GANG, which is now used by youth gang investigators across the state and, under the brand name GANG NET, across the country. The cost of migrating data from GREAT to CAL/GANG represented a significant portion of the project budget.

Implementation Scheduling

When agencies are developing their RFPs, they should already be thinking about the implementation schedule. Scheduling decisions can be incorporated into the RFP and the contract, with payment milestones to encourage the vendor to keep to the schedule. The schedule is determined by the agency’s preferences, external factors, and sometimes the technology itself.

For example, an agency might prefer to roll out the new technology at a calm time in its jurisdiction rather than during a major event. An external factor like the year 2000 (Y2K) computer concern affected the implementation schedule at many agencies. Finally, certain types of technology may best be introduced either all at once or in stages. For example, most mobile technology implementations are phased, allowing the agency and vendor to stagger training, test the new technology in the field, and make necessary adjustments before the next deployment phase. (See box.)

Phased Implementations

One advantage of a phased implementation is the ability to make mid-course corrections. The Fort Lauderdale, Florida, Police Department purchased the Motorola Forte mobile computer. The department found the unit to be sturdy and sufficient for small-scale report writing and inquiries, but too slow and limited in its expandability. After deploying one phase of the units, the department decided that the product's limitations outweighed its advantages. The agency was able to negotiate a change with Motorola to move the rest of the deployment to full-service mobile computers. Without the phased approach to deployment, the department would have been stuck with the limited technology.

The experience of the Monroe County, Florida, Sheriff's Department shows another advantage of phased implementation. Unsure whether it wanted its data communications backbone to run over the department's radio channels or the private Cellular Digital Packet Data (CDPD) network, the department split its mobile deployment in half to try out both communications backbones at once. CDPD was deemed the better approach, and all future units are being deployed with CDPD modems.

Of course, schedule changes are likely to occur, and agencies need to be prepared for them, but a detailed schedule is vital to the success of the project.

Some agencies visited found that a scheduling program, such as Microsoft Project, was beneficial. With such programs, the project manager is able to track the tasks for the project and even establish critical paths that must be met to meet deadlines. Scheduling programs usually provide considerable detail in the level of tasks that can be entered and tracked. In addition, a project manager can enter resource information, such as the time spent by staff and vendors on tasks, as part of the tracking process. In addition, the tasks in the vendor's contract may serve as an excellent starting point for the scheduling program.

Acceptance Testing

A final step in implementation is for the agency to test the new technology. Testing may take from several days to months. It is important to have detailed criteria by which to judge the technology, and every facet of the new system or application should

be tested. Ideally, the agency should conduct some live field testing, as certain problems may not show up in simulated use.

Testing should not be left to the vendor because of the obvious bias that the vendor brings to the system. On the other hand, the vendor can provide useful guidelines on how to go about the acceptance testing, and the vendor should be expected to perform its own testing on the technical functionality of the system. In this regard, the contract should if possible contain language on acceptance criteria, such as the acceptable amount of “down time” of the system. Definitions are important in developing acceptance criteria, and these definitions should be clearly delineated in the contract (e.g., does “down time” include time for performing regular maintenance on the system?).

A general rule of thumb found during the site visits was to have as many users as possible involved in the acceptance testing. Actual data should be used to test the system, and the impact of multiple users at the same time should be measured.

Once the agency is satisfied that the new project is running as planned, the bulk of the acquisition is complete. The project team may breathe easier, but the most careful agencies will continue with one last phase, the impact assessment phase.

Chapter 6: Phase 4 – Impact Assessment

The final phase of the acquisition process is the impact assessment phase. Although extremely important, this phase is often not planned for or executed rigorously. During the impact assessment phase, the agency examines how the organization has changed, the consequences (both intended and unintended) of the technology, and how the project fits into the agency's overall technology plan or program.

The case study research examined various aspects of project impact: how the departments dealt with successes and difficulties after installing the technology; what types of post-implementation planning was done, including vendor support, training, and system maintenance; whether the system functioned as promised by the vendor; how receptive agency personnel were to the new technology and related process changes; how the process affected personnel; whether the project met its budget; and what the payoff of acquiring the technology was.

Organizational Change

Technology acquisition can sometimes cause uncomfortable organizational change. Policies and practices may have to be adapted to meet the new technology. Such change is a key impact of the acquisition, and agencies are wise to anticipate and ease it. For example, with the acquisition of mobile terminals and automated field reporting, the entire records process changes. That change affects a range of employees, such as patrol officers, supervisors, records clerks, investigators, and crime analysts. In addition, the change may affect prosecutors and others who regularly receive incident reports. The use of mobile terminals and automated reporting also leads to changes unrelated to personnel. For example, the need to make copies of reports may decrease, but the need for computers and printers in all units receiving reports may increase.

These are some particular types of organizational changes that may follow a significant technology acquisition:

1. ***Changed responsibilities or authority.*** For example, with automated field reporting, the Uniform Crime Reports code may be determined by the patrol officers instead of records division staff. Similarly, a new CAD system and mobile terminals may allow officers and sergeants in the field—instead of dispatchers—to prioritize calls.

2. ***New or revised policies.*** For example, with an automated fingerprint identification system or DNA testing, policy may have to be revised to call for cold homicides to be reinvestigated. Another new policy might require officers not to use mobile terminals while driving.
3. ***Different organizational norms.*** New technology may erode certain agency traditions. For example, e-mail can circumvent the chain of command, and mobile terminals and user-friendly interfaces allow officers themselves to identify problems on which to work instead of being directed by supervisors and command staff.
4. ***Significant resistance to change.*** Fear of new technology or other change may lead officers not to use a new mapping system, or gang investigators may continue to keep 3 x 5 cards instead of putting their information into a database.

Project Versus Program

A technology acquisition is best regarded as part of a larger program and not as an independent project. Each IT acquisition should make sense with respect to the current and future agency IT scenarios. A new CAD affects not just dispatchers and dispatching but also current or eventual field reporting and integration with RMS and GIS. In addition, the new CAD implementation may affect trainers and trainees (in the academy or in-service training), maintenance and support employees (IT and help desk staff), and building facilities.

Some law enforcement agencies find it useful to evaluate regularly how well a system succeeds in its own objectives and in meeting the agency's overall goals. The strategic plan for the Kansas Criminal Justice Information System states, "Each year an oversight committee, using the appropriate measurement criteria, should be able to evaluate efforts using the long-term goals and yearly objectives."

Measures of Success

The chapter on the assessment and decision-making phase discussed the importance of making a plan for performance measurement. In that initial phase, agencies discern baselines in such matters as efficiency, effectiveness, and enabling quality. Once the IT implementation is complete, agencies can take fresh measures of those qualities to determine what value the technology has added.

Measures of success for information systems offer especially difficult challenges. One immediate problem is that the specifications of measures may be difficult. How does an agency

determine the value of a new information system, such as a new CAD system? Generally speaking, the measurement cannot be done on the basis of changes in crime, arrests, and other traditional measures against which an agency is judged by the public. The systems usually are too far removed from these changes to measure the impact. Presumably, for example, a new CAD system will allow for faster processing of emergency calls, which in turn will result in faster dispatching of patrol units to the scene and increased chances of arrests. The linkages along this chain of events are difficult to assess.

Chapter 3, on decision-making and assessment, introduced the concept of the three E's: efficiency, effectiveness, and enabling quality. This project's site visits and literature review confirm that these three concepts are the most beneficial ways in which to measure the success of information systems.

Efficiency can be measured by looking for a reduction in staff time, staffing levels, or costs. For example, the El Dorado, California, Sheriff's Department used automated field reporting to reduce the amount of time to process an incident report and keep deputies in the field for more of their shift. The Jacksonville, Florida, Sheriff's Department implemented a computerized mug shot system and decreased the amount of time (from days or hours to minutes) that investigators spend looking for suspects and creating photo lineups for witnesses.

Effectiveness can be measured by examining whether the new technology allows the agency to perform the same task better than before. For example, the Baltimore County, Maryland, Police Department used a GIS to map and analyze the crime information that was previously pin-mapped on the wall. Likewise, by reducing the time investigators had to spend searching photos, the Jacksonville Sheriff's Department not only saved the cost of that staff time but also made investigators more effective by enabling them to work on more cases.

A technology's enabling quality can be measured by examining what the new technology enables an agency to do that it could not do before. Enabling technologies may allow agencies to maintain and search thousands of computerized fingerprint records, share data across jurisdictions, or perform spatial analysis. For example, the Kansas intranet-based criminal justice information system enabled small departments to instantly transmit criminal history data, search criminal history files, and communicate with law enforcement personnel. Before the system was implemented, those steps could not be done instantly. The Charlotte-Mecklenburg Police De-

partment's new system enabled the agency to perform spatial analysis of crime and arrest data, link police data to parole information, and examine the relationship between land use, crime, and housing code violations.

Measurements of a technology's enabling capabilities are a more qualitative measure of success. An agency can describe the advantages of a new capability, but generally will not have baseline data against which to develop comparisons. Anecdotal information about how the enabling capability has improved operations are especially useful in many instances.

If surveys or focus groups were conducted before the technology implementation, they can be repeated after the implementation for purposes of comparison. Such queries might ask users how well the technology is working, ask the community about fear of crime or perceptions of police activity, or ask support staff about technical issues.

Performance measurement works best if baselines were taken before the technology was implemented, so that before-and-after comparisons can be made. The purpose of introducing the three E's in the first phase (decision-making and assessment) was to emphasize the need to collect baseline information at that time. For example, knowing the amount of time it took officers to prepare reports manually, prior to the introduction of an automated field reporting system, provides beneficial information for measuring the system's success. The time to prepare a report through a laptop and automated system should be significantly less than manually writing the report. Moreover, the report should contain fewer errors and have more logical consistency between fields.

However, if the "before" measures were not taken, it may still be possible to create a baseline after the fact. If the technology is being implemented in phases, the team can compare officers who are not yet using it to officers who are using it. In other cases, the baseline may simply have to be estimated. For example, the agency can ask officers how long it took to complete a report by hand before computerized reporting was put in place. Alternatively, the agency can examine crime, arrest, or other data for periods before and after the implementation to look for effects of the technology.

Unintended Consequences

Even with a great deal of planning, unintended consequences (positive or negative) may occur. For example, when the Golden, Colorado, Police Department acquired a CAD/RMS, the goal was to provide more functionality in queries and reports. An unintended consequence of the system was that certain tasks actually took dispatchers more time, leaving them frustrated.

Positive unintended consequences are less common but not unknown. The intended consequence of acquiring a field reporting system might be to allow officers to spend more time in the field and with the community. An unintended consequence might be that reports are more legible, the data are better and more comprehensive, and more effective analysis can be performed. Similarly, the primary goal of CAL/GANG was to share gang intelligence across agencies throughout the state. Departments that now have the system can also use it to perform link analysis or bring information into a GIS and perform spatial analysis. That is a positive, though unintended, outcome.

Common unintended consequences of technology acquisition are as follows:

1. ***Need for more staff.*** With more users, there may be a greater need for help desk staff. In addition, an increase in the number or complexity of systems may lead to a demand for more maintenance staff.
2. ***System incompleteness.*** Few projects stay within budget. When money runs out, the final phase or intended functionality may not be completed or may be delayed to a later date. Therefore, the system may not be able to meet the original goal.
3. ***Need for training and documentation.*** An agency may not realize how much training and documentation are needed. Once the technology is implemented, the agency might need to scramble to provide more training and develop user-friendly documentation (user manual).
4. ***Increased functionality.*** Technology is usually acquired with a specific intent, but many departments find new, different uses for the technology or the information it contains.

Quality Improvement

Most departments are happy to finish their projects and move on to other concerns. However, one last step that a careful agency might consider relates to continuous quality improvement. An agency may wish to document the acquisition process, the wise decisions and pitfalls, any proof of the project's success, and ideas about what else the department might need

in the short and long term. That step may help in future funding efforts and technology acquisitions. Knowing what worked and what did not can significantly benefit the next project.

Chapter 7: Managing the Technology Process

Managing the technology process is one of the most challenging aspects of a technology acquisition project. Although smaller projects are easier to manage, all projects require a combination of skills and responsibilities, from leadership to technical skills to communication. Especially in larger projects, the project management team must work hard to control the process, instead of letting the technology or acquisition process control them.

Why is good project management so important? The following statistics come from two studies done in the last few years:¹⁴

- 31 percent of all projects are canceled before completion.
- 30 percent experience schedule delays.
- 53 percent cost 189 percent of the original estimated budget.
- Between 9 percent and 16 percent were completed on time and on budget.
- \$81 billion was spent on canceled technology projects in 1995.

Over the past several years, there have been some high-profile examples of unsuccessful projects. For instance, one large state launched an effort in 1991 to develop a computerized system to track parents who owed child support. Six years later, the budget had swelled from \$99 million to \$345 million, and many say the system will never work on a statewide basis.¹⁵ If the technology process is not managed well, it is likely that the project will be delayed, will exceed the budget, or will be canceled altogether. In addition, good project management will lead to widespread understanding and use of the technology.¹⁶

One of the most important aspects of managing the technology process is staffing the team with the right people. In law enforcement, often the officer with the most technical knowl-

¹⁴ Standish Group Report, 1995, www.scs.carleton.ca/~beau/PM/Standish-Report.html. William Cats-Baril and Robert Thompson, "Managing Information Technology in the Public Sector," *Public Administration Review*, November/December 1995, Vol. 55, No. 6.

¹⁵ *Government Technology*, Technology News, December 1997, www.govtech.net/magazine/gt/1997/dec/news/technews.phtml.

¹⁶ Some information in this chapter originally appeared in the project management training materials created for the U.S. Department of Justice COPS MORE training workshops conducted by the Institute for Law and Justice in 1999 and 2000.

edge ends up being the appointed project manager, or the sole “computer guy” falls into the job. Sometimes the person tapped for the task is the commander who has managed administrative duties for years but does not have computer knowledge. That is not to say that those staff members could not acquire the necessary skills and manage the project effectively, but none of them are ideally suited for the job. If an organization wants to be most successful in managing a technology acquisition, the project manager must have a combination of relevant skills and abilities. Once a manager is selected, the team can be created with a variety of people offering differing backgrounds and knowledge. The project team also should be situated high enough in the organizational structure to be effective. If the team is led by an officer who will continually come up against non-supportive command staff, the outcome is not likely to be optimal.

The main goal of a technology acquisition is to successfully implement a new technology, whether it is software, hardware, or a combination of both. Several primary project management activities must be performed to accomplish that task: monitoring the status of the project; adjusting the budget, schedule, and work plan; coordinating all project-related activities; and documenting project status and project plan revisions.

As law enforcement agencies increasingly share data and systems, many technology projects are now crossing jurisdictional and agency boundaries. In addition to the complexity of managing the technology process for one agency, multi-agency projects offer new challenges. Such projects require a number of components if they are to be successful:

- CEOs from all agencies must be supportive.
- Project goals need to be fully understood and shared.
- Parties must cooperate to accomplish the project tasks.
- When conflicts threaten to harm the project, the parties must meet to find a reasonable solution.
- All agencies need to expect and then realize some benefit.

Institutionalizing Change and Acceptance

In implementing new technology, it is essential to institutionalize change and gather acceptance from users. To institutionalize change successfully, the project team should attempt to develop across the organization a feeling of ownership of the technology. The main reason for any IT project is to *add value* to the organization. Organizational value comes from supporting

the most critical business goals and helping the organization deliver on its business strategies. Therefore, an organization should select projects that will create the greatest net benefits for itself. A project can then be justified in light of the organizational goals.

Once the decision has been made to acquire a technology, organizational ownership and acceptance can best be achieved through proper strategic planning, technology planning, and capable project management. In order to succeed, the project must have an executive sponsor. If the chief or sheriff is not behind the project, there is little reason that people below him or her will commit themselves. At the outset, the project team should identify and involve all stakeholders. Employees do not like to be told about a mandatory new technology if they have not had the opportunity to give their input.

Most importantly, a favorable cost/benefit analysis needs to be demonstrated. Depending on the particular technology, the benefits derived may be different for different users. While a new Windows-based, user-friendly CAD may be easier for patrol officers to use when they look at calls for service, it may take longer for dispatchers to use when they input data. To obtain commitment or “buy-in” from both groups, the project team should identify the benefits to communications staff as well as to the department as a whole and the community at large.

Establishing an Organizational Structure and Project Team

The organizational structure plays a vital role in how efficiently and effectively the technology process is managed. Not only is the structure of the project team itself important, but where and what level in the overall structure that team exists can also greatly influence success. The chief or sheriff should show the importance of the new technology by not burying the project team too deep or low in the organizational structure. The first step in acquiring technology should be to create a project team. This team (composed of staff and possibly persons outside the department) will take responsibility for the process.

The project manager, who heads the team, is critical for success. He or she coordinates and facilitates all aspects of the project, takes full responsibility, and is held accountable. This person is responsible for managing project tasks, the overall schedule, and people on the team. Key traits of a successful project manager include enthusiasm for the project, the ability to man-

age change effectively, a tolerant attitude toward conflicting ideas, team building and negotiating skills, a “customer first” orientation, and adherence to priorities of the organization.

Once the manager position is filled, the project team must be staffed. Who the team members are and how they perform are critical to the project’s success. Initially, the manager should identify the various skill sets required for the project. The next step is to evaluate in-house resources and the availability of those resources. Where the skills or resources are lacking, the team can be filled with outside contractors. When outsourcing, the project manager should keep two concerns in mind. First, if the project team is composed of too many contractors, there will be less feeling of organizational ownership among project team members, and it will be more difficult to convince the rest of the organization to accept the project. Second, it is important to create an opportunity for knowledge transfer between the contractor and the agency to develop internal capacities. When the contractor leaves, the department needs to be able to continue to manage the project on its own. As the Altamonte Springs, Florida, Police Department learned, it is not always possible to obtain outside assistance when a system fails. When the department experienced a several-day outage of its CAD system, it attempted to contact the contracted support provider. Unfortunately, that company had moved and left no forwarding number.

In addition, team members should be independent and able to work through problems with limited assistance. Personality is important. Even if the person is technically brilliant, he or she must be able to work with others as part of a team. Staff should have an interest in the project.

To maintain a high-performing team throughout a project, the manager should provide training to increase skills, confidence, and performance. He or she should also define performance expectations, create incentives, and provide challenging opportunities. Although a small team size is advantageous for reducing communication overhead and conflicts, it is important that enough people be involved that no single team member possesses all the knowledge about any part of the project; in other words, people should be cross-trained. As law enforcement has moved toward newer, open computing environments, many agencies are finding that only one person, who retired three years ago, understands the program well enough to extract the old data to put it into the new system. Similarly, many projects take over a year to come to fruition, and

in that time, people are transferred or promoted, or they leave for the private sector. The project manager should be prepared for turnover during the life of the project.

Using Technology Effectively

One important measure of a successful technology project is whether the technology itself is used effectively. It is not unknown for an agency to spend millions of dollars on a new system and then only scratch the surface of its capabilities. Even worse, the agency may stop using the system or never even begin to use it due to lack of training or resources or a change in priorities.

In managing the process, the project manager or team must ensure not only that the system works as planned, but that users are using it. If laptops were acquired for taking reports in the field, but officers are using them only to run queries in their vehicles, the effort and expense of purchasing ruggedized laptops with field reporting capabilities was a waste of valuable resources. Part of the management of the process includes identifying why the technology is not being used for its intended purpose and how to remedy the situation.

During early planning, the project manager should have identified training resources, likely obstacles to implementation, and methods of marketing the new system to users. Often a vendor will sell the organization a system and train a few users solely in how to *use* the system, not how to *apply* it. Such an approach does not help an agency use its new technology effectively. Users need to know what all the buttons are for, but they also need to know how to make the system work to accomplish their goals and those of the department. A train-the-trainer approach is the best way to manage this. The trainers can then show users how to use the system specifically for their needs.

Recognizing Problems

To manage the technology process effectively, the manager and team need to be able to recognize that a project is failing and why. The following are symptoms of a failing project:

- The problem remains poorly defined because not enough time, money, or other resources were allocated to researching the problem.
- Benefits are difficult to measure because the objectives of the implementation project are vague and ambiguous.

- Little or no time was spent in preliminary planning.
- No standards were used for estimating preliminary costs or the duration of the project.
- The project team is not properly staffed. Personnel are assigned on an *as available* basis and cannot dedicate themselves to the project.
- The intended user groups are not represented on the project team.

Projects fail for numerous reasons. The most common ones are these:

1. ***Personnel shortfalls.*** There are too many tasks and not enough people to handle them.
2. ***Unrealistic schedules and budget.*** It is better to overestimate than run out of time or money at the end.
3. ***Development of the wrong functions and properties.*** The system does not do what was intended.
4. ***Development of the wrong user interface.*** Users do not understand the interface.
5. ***Gold plating.*** The system was made fancy (and costly) but no functionality was added.
6. ***Continuing stream of requirements changes.*** The project never gets finished.
7. ***Shortfalls in externally furnished products.*** The system does not work with other systems.
8. ***Shortfalls in externally performed tasks.*** The product is left unfinished.
9. ***Real-time performance shortfalls.*** The system does not work as planned.
10. ***Straining computer-science capabilities.*** The technology is not advanced enough for the proposed functionality.

Each phase in the technology acquisition process is important in itself, but unless the entire process is managed effectively, the project will not be successful. The right people need to be on the project management team. The department needs to make the project a priority. The team should conduct a thorough needs assessment and develop a technology plan (aligned with the department's overall strategic plan). Procurement and implementation should be carefully considered and accomplished. Finally, the technology must be assessed systematically.

Chapter 8: Conclusions and Policy Implications

This project's research included numerous stages: engaging an expert advisory panel, convening focus groups, identifying resources available to assist policing agencies with IT acquisition, conducting case studies at 14 sites throughout the country, developing a handbook to help agencies work through the RFP process, completing a national survey of policing agencies about their IT acquisition experiences, and creating a decision-making model for acquiring crime mapping technologies. Those efforts suggest numerous conclusions and policy implications regarding law enforcement acquisition of information technology.

Clearly, such information technologies as records management systems, computer-aided dispatch, case management systems, and mobile technologies have become essential to police departments' ability to function efficiently. Both small and large departments rely on such systems in serving their communities. However, acquiring those technologies is far from simple. By sponsoring this research and examining the processes used in acquiring several different categories of information technology, NIJ hoped to help policing agencies take a more systematic approach to IT acquisition, regardless of the technologies they might hope to acquire in the near or distant future.

Strategic Planning

IT acquisition strategies cannot be separated from policing strategies. Rather, they must fit with an agency's tactical and strategic plans. However, experience as a law enforcement professional does not necessarily prepare one for strategic planning. Therefore, law enforcement managers may need to develop strategic planning skills within themselves and their staff.

Organizational change should drive technology planning, not the other way around. In developing IT strategic plans, agencies should first consider their overall missions and then consider which types of technologies would support those missions. The IT strategic plan should support the agency's overall strategic plan. For example, if the agency's strategic plan calls for improving its practice of community policing, the IT strategic plan should be tooled to account

for the types of information exchange community policing requires. The IT strategic plan may need to project which technologies would best support citizen input, geographical focus, prevention, partnerships, problem solving, and accountability.

IT strategic plans aim to *guide* future decisions, not necessarily *make* those decisions. They also help ensure that steps taken for other projects do not lead the agency away from its goal. Strategic plans might suggest a timeline and considerations for future years, but over time those considerations must be reexamined in the light of current conditions.

In addition, strategic plans, if they are to succeed, must link realistically to current agency budgets and budget projections. Because budgets and various other conditions change from year to year, it is best to revise IT strategic plans annually.

The IT strategic plan and the four-phase acquisition process work together. The IT strategic plan comes first, setting the stage for future acquisitions and ensuring that the agency upgrades its information technology in a way that supports agency goals, while the four-phase acquisition process comes second, helping the agency successfully execute the acquisition of a specific technology.

When a new information technology emerges, several issues arise. How does an agency obtain reliable information about the new technology? When should consideration be given to a financial investment in the technology? What impact will the technology have on the operational strategy of the agency? Will additional personnel and space be required, and, if so, how can these costs be estimated? Expert systems like the GIS decision-making model developed for this project could be developed to help agencies answer such questions as part of an agency's strategic planning efforts.

Four-Phase Acquisition Model

The four-phase model should help state and local agencies think in concrete terms about assessment and decision-making, procurement, implementation, and impact regarding virtually any technology under consideration. Within each phase, the present research found several key implications.

Phase 1: Assessment and Decision-Making

Converting data from legacy systems (archaic computer systems or paper files) can be expensive. The agency needs to consider whether conversion is worth the cost. Unfortunately, even if it is not deemed essential to bring the old data into the new system, it may nevertheless be necessary to maintain certain data for legal reasons, and the old system may need to be retained merely to house the old data.

Phase 2: Procurement

Among the agencies studied, the most common procurement method was to issue a formal RFP document. That approach presents some challenges: preparing an RFP involves significant administrative costs and staff labor, and the process takes a relatively long time because of its detailed requirements, structured schedule, and need to allow vendors time to respond properly. Also, because responding to an RFP is costly to potential vendors, small jobs often receive limited response to their RFPs.

However, RFPs present significant advantages that were found to outweigh their disadvantages. The RFP process follows a specific structure and requires that all requests, queries, and responses be done in writing, providing a detailed paper trail and minimizing the chance of miscommunication between the procuring agency and the vendors. The RFP also provides a built-in scope of work, lays the foundation for a contract, and sets out a specific project plan and goals. It forces the project team to define the agency's technological and operational needs, increasing the likelihood that the IT ultimately selected will do what the agency wants. The RFP approach was used in nearly every large-scale project examined in this research.

Phase 3: Implementation

A key part of implementation is the effort to convince employees to use the new technology. Some may object to it because they do not wish to learn a new technology, while others might object to the ways it will change their working conditions, their control over their jobs, or even their workload. The effort to ease change should begin early. Even before the RFP is written, command staff should visibly support the project, and the project team, which should include rank and file members, should publicize its support and maintenance structure to reduce fears.

Another key part of implementation is training. The research highlighted the distinction between teaching employees how to *use* the system and teaching them how to *apply* it. Learning how to operate the system provides one level of competence, but learning how to use the system to perform one's job better is another, higher level that makes the technology worthwhile.

Phase 4: Impact Assessment

Performance measurement provides an agency with a way to assess its new technology. If the technology was funded by a grant, the granting agency may ask for this assessment in a final report or as a requirement for future funding. In addition, performance measurement helps convince policymakers to support future technology acquisitions, assists in managing department resources, and promotes the new system's use in the field.

The project team should plan for performance measurement early in the acquisition process—long before implementation. The best performance measurements rely on before-and-after measures. If the project team plans ahead, it can take the “before” measures while it is still possible to do so. Otherwise, it will have no baseline or standard against which to measure any improvements in agency performance that might be attributable to the new technology.

Acquisition in Practice

In reality, some of the acquisition steps and techniques deemed important for successful IT acquisitions are widely practiced, while others are not. For example, through its survey of 111 law enforcement technology acquisitions, the present research learned just how little strategic planning is practiced by law enforcement. Of the sites acquiring mapping systems, only 13 percent conducted a needs assessment, which is a fundamental step in strategic planning. Of the sites acquiring mobile technologies, only 36 percent conducted needs assessments, as did only 32 percent of the sites acquiring CAD/RMS systems.

Similarly, the survey found evidence that policing agencies often fail to include important provisions in their IT contracts. For example, only 64 percent of respondents said their contracts specified a payment plan, only 60 percent specified delivery schedules, only 46 percent required acceptance testing, and only 18 percent had penalty clauses.

The research also uncovered characteristics of IT acquisitions that project planners might need to know about. For example, most IT acquisitions are successful (in the eyes of those in-

involved in the acquisition), but a significant percentage do not succeed. In 83 percent of the 111 acquisitions, respondents said the project was deemed to have been a success. In 80 percent of acquisitions, the system was said to have met the department's needs. In 72 percent, the project's milestones were met, and in the same percentage the vendor was said to have been honest about system capabilities and limitations and was said to have provided knowledgeable assistance. In 68 percent of acquisitions, the vendor was deemed to have met the promises made in the contract. Given the significant costs of IT acquisition (median costs were \$24,400 for mapping systems, \$190,000 for CAD/RMS systems, and \$322,500 for mobile technologies), it may be some cause for concern that 20 percent of acquisitions did not meet the department's needs and that in nearly a third of acquisitions the vendor did not fulfill its contractual obligations.

The research also uncovered a variety of unintended consequences of IT acquisitions (not all of them bad). Some new technologies were found to produce better results but take more time to operate than an agency's previous approach. Common unintended consequences of technology acquisition are a need for more staff, system incompleteness, a need for training and documentation, and increased functionality.

Despite agencies' efforts, some IT acquisition projects fail. The most common reasons for project failure are personnel shortfalls, unrealistic schedules and budget, development of the wrong functions and properties, development of the wrong user interface, "gold plating" (making a system unduly fancy without adding functionality), a continuing stream of requirements changes, shortfalls in externally furnished products, shortfalls in externally performed tasks, real-time performance shortfalls, and requirements that strain computer-science capabilities.

Success or failure in the IT acquisition process does not happen overnight. Project teams should expect to spend at least six months to two years on some IT acquisitions. For mapping systems, the median length of the procurement phase was 5.8 months, and the median length of the implementation phase was 18 months. That duration, almost two years, does not include any time spent in the assessment and decision-making phase or the impact assessment phase. The applicable figures for CAD/RMS systems were 4.5 months for procurement and 14.4 months for implementation (just over a year and a half). Mobile technology acquisitions took the longest: 5.3 months for procurement and 25.2 months for implementation (just over two and a half years).

Given the expense, the time investment, and the pitfalls involved in IT acquisition, law enforcement agencies contemplating such purchases would do well to conduct careful strategic planning followed by all four phases of the acquisition model. It is hoped that this report, combined with this project's 14 case studies of law enforcement IT acquisitions, the handbook *Managing the Risks: A Guide for Improving Procurement Practices in Acquiring Technologies for Policing*, the GIS Acquisition Decision-Making Model software application, the national survey, and the law enforcement software database will help law enforcement agencies succeed in acquiring the right information technologies to support their missions.