
EXECUTIVE SUMMARY

Under the American federal system most law is cast as state statutes and local ordinances; accordingly, most law enforcement is the responsibility of state and local agencies. Federal law and federal law enforcement come into play only where there is rationale for it, consistent with the Constitution. Within this framework, a clear role has been identified for federal support of state and local agencies. A major area of such support is technology-related with activities taking the following forms:

- Sponsoring research and development (R&D),
- Testing and evaluating technology and developing performance standards for technology and its use,
- Funding and otherwise assisting with acquisition of or access to technology,
- Providing training in the use of technology and developing technology used in training,
- Providing technology assistance by applying federal technology and expertise to specific problems, and
- Providing information on technology and its use in law enforcement.

This report provides findings of a study of technology in use or needed by law enforcement agencies at the state and local level, for the purpose of informing federal policymakers as they consider technology-related support for these agencies. In addition, it seeks to

characterize the obstacles that exist to technology adoption by law enforcement agencies and characterize the perceived impact of federal assistance programs intended to facilitate the process. The study findings are based on a nationwide Law Enforcement Technology Survey (LETS) and a similar Forensics Technology Survey (FTS) conducted in late spring and early summer 2000, interviews conducted throughout the year, focus groups conducted in autumn 2000, and review of an extensive, largely non-academic literature.

LESSONS FROM THE SURVEYS

Technological Lessons: Where Are We Now?

One of the main goals of the RAND Law Enforcement Technology Survey was to identify what technologies were and were not available to law enforcement organizations around the country and to gauge their future technology needs. It was to obtain an answer to the question “Where are U.S. law enforcement departments *now*?” with respect to technology. Depending on how one frames this question, a macro-level answer could simply be a more comprehensive knowledge of the range of technologies that are and are not available to local police departments. The RAND surveys can provide such an answer. When asked about their current technology capacity, respondents identified a number of technologies that were not currently available and were not “unnecessary” (LETS, 22, 25–29). This resulted in a list of potentially needed technologies from the perspective of U.S. local law enforcement. The listing of the technologies, along with the percentage of local police departments lacking them, is included in Table 1. The table is sorted in order of decreasing non-availability, down to a cutoff of 25 percent.¹

When examining such a summary listing of unavailable technologies, it is important to place the survey responses in an appropriate context. Although the values included above are the percentages of law enforcement that indicated these technologies were both unavailable

¹It should be borne in mind that because the surveys did not cover every current or potential law enforcement technology, this represents a limited slice of the technologies which are and are not available to local police departments.

Table 1
Technologies Not Available to Local Police

Technology	Not Available	Technology	Not Available
Detection and analysis of cyberattacks	79%	Computers in patrol cars	58%
Blister/nerve agent protective clothing	79%	Electronic listening	57%
Video conferencing equipment	75%	Night vision devices	57%
Kinetic energy projectiles	75%	Vehicles—special purpose	45%
Chemical agent detection	71%	Crowd or riot control	44%
Long-range video monitoring	69%	Computer-based training	41%
Stun devices/projectiles	68%	Conference call equipment	36%
Radioactive agent detection	66%	Computer assisted dispatching (CAD)	35%
Explosives detection	64%	Integrated data bases	34%
Polygraph equipment	64%	Protective gloves, helmets, and shields	34%
Fleeing vehicle interdiction equipment	63%	Audio-visual equipment to obtain evidence	30%
Concealed weapon detection devices	62%	Training equipment	28%
Bomb containment/disablement equipment	60%		

SOURCE: LETS, 22, 25–29. Numbers are statistically adjusted percent of local departments reporting technology is not available.

and not unnecessary, it is likely that there is a significant barrier for a survey respondent (especially for a survey of this kind) to designate a technology as unnecessary.² For example, it is the case that more than two-thirds of local police departments lack “necessary” radioactive agent detection equipment (Table 1). However, the degree

²There is a legitimate personal and organizational interest not to refuse any resources that might improve the performance of the respondent’s organization even marginally. As a result, while it is unlikely that a circumspect observer would assert that each of the 57 percent of local departments that lack night vision capability truly “need” it, there is also a clear and reasonable rationale why many survey respondents indicated that they did.

of necessity of this technology might be appropriately calibrated by considering the net increase in public safety that might accrue from providing each of these departments a Geiger counter compared to providing training equipment to the 28 percent of respondents who lacked it (or upgrading the training equipment of the many respondents who indicated that theirs was insufficient). All technology acquisition decisions, whether they are made at a local or national level, are a calculus of trade-offs and it is important to remain cognizant that there are serious consequences of losing sight of that fact.

In addition to identifying technologies that are unavailable to state and local police organizations, the RAND surveys also asked for information on the age and quality of currently available technologies. By identifying their current technologies as either obsolete or “old but serviceable,” survey respondents also provided a list of technologies that may be candidates for replacement in the near-to-medium term. These responses are included in Table 2 in decreasing order of the fraction of departments characterizing them as “Obsolete” or “Old but Serviceable,” down to a cutoff of 25 percent (LETS, 22, 25–29).

From the perspective of the policymaker, several things stand out from such a numerical summary of the survey results. Most striking is the fact that 18 percent—almost one in five local police departments—indicated that their administrative or accounting systems were obsolete; without such input from departments it would be difficult to see that such an “unglamorous” technology might indeed be a high priority for local police forces. Other entries on this table are less surprising. The appearance of computers and cellular telephones is not unexpected given the short product cycles and rapid obsolescence of those products. The appearance of ballistic-resistant armor (stab-resistant armor is not broadly available) on the list also holds a relevant lesson from the perspective of law enforcement technology policymaking. While bulletproof vests do “age” and become worn over time, studies have shown that the protective properties of the armor do not break down.³ As a result, the notion of an “obsolete” bulletproof vest is a complex one likely based more on the

³See “Old Armor Tests As Good As New,” <http://www.nlectc.org/>.

Table 2
Technologies in Need of Replacement by Local Police

Technology	Obsolete	Old but Serviceable	Either Obsolete or Old
Radio equipment	10%	46%	56%
Training equipment	10%	35%	44%
Administrative/accounting systems	18%	26%	44%
Computers in workspaces	7%	34%	41%
Audio-visual equipment to obtain evidence	12%	28%	40%
Crowd or riot control	12%	25%	37%
Protective gloves, helmets, and shields	9%	25%	34%
Ballistic- and stab-resistant armor	8%	25%	33%
Computer-based training	9%	20%	29%
Integrated data bases	8%	22%	29%
Conference call equipment	3%	24%	27%
Vehicles—special purpose	4%	21%	25%
Cellular telephones	2%	24%	25%

SOURCE: LETS, 22, 25–29. Numbers are statistically adjusted percent of local departments reporting as indicated.

obvious importance of the technology (and its performance) to officers rather than the technology itself.

Conceptual Lessons: Where Do We Need to Go and How Do We Get There?

These survey results are striking. There are large numbers of technologies that are unavailable to local police departments and many officers believe that the technology they have is aging and becoming obsolete. In an era when crime is becoming more and more technologically intensive, there are clearly serious technology needs in the law enforcement community. It is obvious that an important part of “where we need to go” as a nation in this area is to better outfit our law enforcement organizations with the technology they need to fight crime.

It is important, however, that consideration of these results does not stop at this level. Hasty examination of lists of “unavailable” or “aging” technologies can lead to the conclusion that the solution to the problem is to “just buy them what they need”; the assumption is made that laying out the situation “as it is now” implies only one course for how to get “where we need to go.” This simplifies discussion too far because, in reality, there are many ways to approach these problems that should be considered to ensure resources are not wasted and the nation gains the greatest benefit for its investments. Reading these results as a “shopping list,” for example, eliminates discussion of the important trade-offs that must be made among technologies, among what functionalities are truly “needed” by law enforcement at all levels, and the priority level of individual improvements. For example, a third of departments report that their workspace computers are “old but serviceable”; while making good computer technology available is important, the costs and benefits of upgrading all computers to “state of the art” must be weighed against the unavailable technologies above and also against other uses such as providing training to better use technologies that are already available, or performing R&D to generate the potential that superior technologies will be available in the future.

Barriers to Technology Adoption

To address these many complex considerations in a coherent way, it is relevant to consider a general framework of the many obstacles that can get in the way of an organization, in this case a law enforcement organization, adopting new technology. These barriers impact whether organizations initially choose to adopt a new technology and, after they have chosen to do so, how effectively they put the technology to use.

When considering the adoption of law enforcement technologies by local police, however, it is first important to point out that generalizing is difficult. There are significant differences among technologies that make it more or less likely that departments even want to adopt them; actual desire for a technology is a critical first “barrier” that must be passed before any more “practical barriers” matter. Rural departments, for example, were much more likely to indicate that they had no need for technologies used in crowd control. It is there-

fore irrelevant to discuss barriers inhibiting their adoption since pursuing undesired or unuseful technology is, by definition, counter-productive.

For technologies that are desired by organizations, however, there are serious barriers to pursuing and utilizing them. For the broad classes of technologies included in the surveys, these barriers have been broken down into four classes:

- **Costs**—including both the procurement cost of a technology and the opportunity cost of that technology compared to other uses of resources. Includes implicit trade-offs and assessments of the benefits of new techniques or equipment.
- **Technology Risk**—the risk that the technology will not perform as expected or fulfill the tasks desired of it.
- **Human Associated Risks**—the risk that the members of the organization will not be able to adapt sufficiently to the new technology so it is not put to effective use or, in the extreme case, not utilized at all.
- **Unanticipated Potential Costs**—the risk that new technology will have unintended consequences. In this context the primary unanticipated costs are in the area of liability risk or the risk of adverse public opinion associated with using a new technology.

In addition to asking survey respondents about the availability of technology, the RAND surveys also addressed these barriers to acquiring it. Of the reasons cited by respondents, cost routinely stood out as the primary obstacle to the adoption of new technologies. Such a result is not unexpected given that, at some price point, any technology becomes attractive for purchase and, until it reaches that level, cost does stand as an obvious initial obstacle to using the technology. If cost is a sufficient obstacle, none of the other barriers to adoption is relevant; if you don't have the opportunity to adopt a technology because the cost is too high, how well you adopt it is not an issue. The fact that many respondents cited cost, however, likely also represents the important and difficult trade-offs that must be made within police departments. Because of the labor intensity of their activities, technology acquisition must always compete with "placing more police on the street" or paying overtime to extend an

investigator's work on a pending case. In addition, because of the variety of ways police departments could allocate their funds, trade-offs among technologies are also likely to be very important. It is not just the cost of the technology that dictates its desirability but the perceived benefits that are associated with purchase. In this light it is not surprising that fewer large urban departments cited cost for some technologies that are particularly suited to solving the problems of an urban police force.

But just as cost is clearly a barrier, other barriers to adoption are important as well. Departments are concerned about the technical risks associated with some technologies as expressed by their indicating that the "reliability/effectiveness" of the technology could be a barrier to acquisition. Smart guns stand out as such a technology where, if police departments are to adopt the technology, steps must be taken to develop it to the point where these concerns are satisfied. The human factors associated with technology adoption, as emphasized in concerns about training, training technology, and other sources of information are also clearly important for both law enforcement agencies and forensic science laboratories. The barrier that finding sufficient trained personnel poses to the effectiveness of forensic science laboratories stands as a troubling but important finding of this study. Currently, most law enforcement organizations' technology adoption efforts are less affected by concerns of unanticipated effects like public opinion. Important exceptions exist to this trend, however, including stand off and direct electrical devices, once again emphasizing the differences that exist among technologies with respect to adoption barriers.

Because of society's interest in law enforcement adopting technologies and utilizing them effectively, crafting policies that reduce barriers to adoption is of clear interest. Approaches to address these barriers have focused on several areas: provision of technical information to reduce the uncertainties associated with new technology; R&D to reduce costs, broaden capabilities, and provide new technical options; directly providing technology or funds to purchase it; and training to address the human factors of technology adoption.

Sources of Technology-Related Support and Information

To assess how these organizations were currently addressing these barriers to adoption, the RAND surveys asked about the sources of technology information and support which they regularly utilized. The most striking result in this line of questioning was the number of local departments that did not receive support from any source—on issues ranging from topics as broad as “technology testing and evaluation” to those as specific as “firearms tests.” On average, two-thirds of departments never received any technology support. Of those that had received technology-related support within the past year, the primary providers of that support were:

- a. In-house departments
- b. Local and state agencies
- c. Manufacturers and vendors.

In-house departments and local and state agencies were especially important in terms of technology-related training received by local police. Between 46 and 58 percent of local police reported receiving training support from these three sources. Not surprisingly, in-house departments were the primary source of technology-related support for many of the categories listed. State agencies provided support for trace evidence analysis to half of the respondents and to 15–25 percent of respondents for a wide range of other types of support.

Manufacturers or vendors provided support to 10–20 percent of respondents primarily in the areas of technology assistance, firearms tests, and technology testing and evaluation—in addition to support for training. Virtually all of the support for cybercrime investigations was provided either by in-house departments or local and state agencies. The majority of departments (64–83 percent) rely on trade magazines, colleagues, manufacturers, or word-of-mouth for information on law enforcement technology.

About one out of five reported usually obtaining technology information from either Law Enforcement Online (LEO) or the National Law Enforcement and Corrections Technology Centers (NLECTCs). On specific technical topics, federal sources of advice and assistance were generally consulted by 2–6 percent of local departments. The

relatively low apparent utilization of federal sources, both for technology support and information, is troubling from a policy perspective given that many sources utilized by police—including manufacturers, trade magazines, and Internet resources—have no incentive to provide impartial advice and many other sources are not in a position to provide either comprehensive or technically rigorous input. It is possible that these values reflect limited awareness of the programs or the limited capacity of the programs to provide support to many departments based on their current levels of budgetary and staff support.

Views on Federal Technology Assistance

It is clear that federal programs designed to lower these barriers, whether through R&D, provision of technical information, support of training, or other activities are making some progress in making the technology adoption process easier for law enforcement organizations. Considering the views expressed by respondents who had received any of a broad range of federal technology assistance, a majority of departments and crime labs always believed that the aid had been at least “somewhat helpful.” However, many fewer of the respondents (often a small minority) indicated that the programs were either “very helpful” or “essential.” As a result, while the broadly positive views of federal support programs on the part of those departments that have benefited from them are encouraging, the low intensity of these views suggests that there is more that can be done to increase the relevance of the aid and advice and craft it to better serve the needs of local police. In general, respondents were more positive about federal initiatives (like supply of technology or grants of funds to purchase technology) that immediately and directly send federal resources to their organizations for use. It should be noted that the generally more positive view of federal programs by crime laboratory respondents to the survey suggest that these programs are more effectively reaching their intended audience.

The relatively modest percentages of local law enforcement departments that are currently being reached by these programs suggests that they also have the potential to more broadly serve the needs of the nation’s police, provided sufficient organizational and financial resources are available. It would be counterproductive to encourage

more police forces in the country to take advantage of these resources if the increase in demand would overwhelm the system and make it less effective for everyone.

BROADER POLICY CONSIDERATIONS AND ISSUES

When considering federal responses to these issues, it is important to consider policies not just in terms of the short-run but also how their long-term effects can be crafted to generate the most benefit. The programs that were viewed most positively by respondents to these surveys—direct provision of technology and transfer of federal monies to the local level for technology purchases—are uniquely short-run strategies. Although it is understandable why law enforcement practitioners, who are primarily asked to solve problems in the short term, would find the quick effects of these types of programs appealing, they may not be the best way of investing limited federal resources. Provision of money that is designated for technology support eliminates the trade-offs that must be made at the local level among competing potential uses for the resources; when a particular technology is mandated as a condition of support, even trade-offs among technologies may be eliminated.⁴ While providing a technology to a police force today will generate immediate benefit (assuming that the other barriers to adoption of the technology are overcome), the return on the investment will gradually decrease over time as the system is worn out or becomes obsolete. It is possible that other programs, whose returns increase with time rather than decrease, might be better policy targets.

One example of such an increasing returns target is the provision of technical training to help overcome human barriers to technology adoption. Training of individuals has the possibility not just to improve how individuals use today's technology but improve their use of technologies in the future; the potential for trained individuals to spread their knowledge within their organizations provides the chance for increased returns on the investment even in the short

⁴It should be noted that these effects have the potential to generate significant distortion in the way that funds are used at the local level since it is the competition among different potential uses and the trade-offs among alternatives that could lead to more efficient allocation.

term. The RAND survey results and findings from interviews strongly suggest the need for increased training, including training to use technology already available or being procured. This particular topic was brought up with respect to small rural departments all the way up to a large urban department with a billion dollar budget. Respondents spoke of considerable, wasteful redundancy in training curricula. Training technology is developing rapidly on many fronts, including law enforcement. Distance learning and interactive computerized training offer promise for overcoming at least some of the obstacles (e.g., lack of time and money) agencies face in training their personnel. Because of the apparent importance of training in addressing these issues, it is considered in more detail below.

Like training, R&D can also address the technology adoption barriers of organizations, but it is a much more long-term strategy. It is only through research that new technological possibilities are discovered and current technologies are adapted and applied to the needs of law enforcement. Because of the unique characteristics of the law enforcement technology market, private firms may ignore roles in this area not taken by the public sector. The importance of research as an enabling approach to these problems—exemplified by the important advances in body armor and other technologies which outfit today's officers—point out that, even though local forces may not see immediate benefits and, as a result, may not be as supportive of these programs, they are important nonetheless. Research and development can also take as a goal not only developing new technologies but improving those which are already available; selecting a target of providing rapid, cost-effective DNA analysis capabilities could go a long way toward removing the backlogs and staff shortages that currently prevent forensic laboratories from making their full potential contribution to law enforcement. Research and development therefore likely represents a unique role for government to support work that not only lowers adoption barriers for current technologies but attempts to apply novel technologies to other needs of law enforcement as well.

Differing Needs for Technology-Related Support

In addition to considering the national level implications of technology assistance programs, policy in this area must address the differ-

ing needs of different police departments. We found significant divergence in the technology-related needs of law enforcement departments based on the size of the community and population they serve. Some of these reported differences might be simply due to the fact that larger departments have greater (and more complex) technology needs than other departments. Although these departments represent a small fraction of the total number of local police and county sheriffs' departments in the United States, they also serve a much larger fraction of the total population. Further, larger departments are more likely than smaller organizations to have officers who specialize in technology-related issues (including training and grant writing). So in this sense, one might expect that the larger departments would be receiving greater federal support than the smaller agencies. At the same time, in the areas of funding for technology acquisition, training, and access to federal technology the differences by size of department are striking. These differences suggest that perhaps alternative approaches may be required in order to ensure the necessary level access to federal support in these key areas for both large and small departments.

Small Departments

A majority of both rural and urban departments serving populations less than 25,000 indicated that acquiring technology to more effectively train personnel was a high priority. In addition, two-thirds of small urban departments also rated technology to improve command and control of operations as being a high priority. Both types of departments tended to rate standards by which equipment could be judged or certified to be a lower priority than their other technology-related needs.

Moderate-Sized Departments

Local police in urban settings serving medium-sized populations also placed a high priority on technology to improve command and control of operations. In addition, urban departments serving populations in the range of 25,000–75,000 considered information to help them make better technology-related plans and important decisions.

Large Departments and State Agencies

Urban departments serving populations of 75,000–225,000 listed as high priority a variety of technology-related needs including technology to improve command and control of operations, interoperability, and to more effectively train personnel—as well as better training on technology presently available to their department. These departments ranked standards by which to judge equipment as a relatively low priority.

Priority Needs for Technology-Related Support

The results of these survey studies also showed that some areas can be identified as particularly high technology priorities for law enforcement. As shown in Tables 3 and 4, a majority of departments gave a high priority rating to technology to more effectively train personnel and for command and control operations.

Training

How important of a limiting factor training requirements are in terms of future acquisition varied across different types of policing technologies. Approximately 10 percent of departments considered training requirements to limit acquisition or use of night vision/electro-optic devices, vehicle stopping/tracking devices, and digital imaging devices.⁵ One in five local departments consider training requirements to be a factor limiting acquisition or use of digital suspect composites.

⁵For the LETS survey to local police, percentages have been statistically adjusted to represent the entire population. See Appendix A for a description of the adjustment methodology. For the LETS survey to state police and the FTS survey to crime labs, results are reported as unadjusted percentages.

Table 3
Local Law Enforcement Agency Ratings of Technology-Related Needs

Technology-Related Need	Percent Reporting Need as High Priority
Technology to more effectively or efficiently train personnel	59%
Technology for command and control of own agency's operations	55%
Technology for improving accountability within own agency	46%
Information to make better technology-related plans and decisions	45%
Technology for interoperability with other agencies	45%
Training to use technology available or being acquired by own agency	43%
Standards for judging or certifying equipment or other technology	26%

SOURCE: LETS, 9. Numbers are statistically adjusted percent of agencies responding as indicated.

Table 4
State Law Enforcement Agency Ratings of Technology-Related Needs

Technology-Related Need	Percent Reporting Need as High Priority
Technology for command and control of own agency's operations	86%
Information to make better technology-related plans and decisions	79%
Technology for improving account ability within own agency	73%
Technology for interoperability with other agencies	64%
Technology to more effectively or efficiently train personnel	60%
Training to use technology available or being acquired by own agency	57%
Standards for judging or certifying equipment or other technology	54%

SOURCE: LETS, 9. Numbers are percent of agencies responding as indicated. Unweighted n=15.

The importance of training requirements as limiting future acquisition decisions showed no clear trends by size of population served by local police. The exception was in terms of use of tire deflation spikes: rural departments were less likely to view training as being important—possibly as a function of lesser need for these devices. Whereas, large urban (more than 225,000) departments were more likely to view training as being important—again, perhaps reflecting greater usage of these devices by these departments. State police departments showed a similar pattern in terms of the relative importance placed on training requirements in acquisition decisions vis-à-vis different policing technologies.

Command and Control

Municipal/city police departments tended to rate as a higher priority technology for command and control of operations, for improving accountability within an agency, and computer hardware than did county police/sheriffs' departments—although none of these differences were statistically significant.

A Special Need: Forensic Labs

Because of initial findings from interviews and literature examination, a concerted effort was made to focus on forensic science capabilities. To this end the team conducted a survey to examine needs and current use. Major findings from the RAND Forensic Survey include:

- Most forensic laboratories have backlogs, due principally to lack of trained technical staff or lack of automated technology that could increase staff productivity;
- When demand for forensic analysis exceeds supply—as is frequently the case—laboratory tests necessary for criminal *prosecution* are generally more likely to be performed than those needed for thorough criminal *investigation*. In particular, tests of evidence to identify controlled substances or to determine blood alcohol levels are almost always conducted because they are needed for prosecution, while tests of blood or semen evidence in murder or rape cases *where no suspect has been identified* are

often not conducted because laboratories cannot afford to do them.

Laboratories prioritized their current needs as shown in Table 5. Additional staffing and training were emphasized in comments from many laboratory directors.

In examining this situation the RAND research team noted that research and development focused on dramatically lowering the acquisition costs of a standard laboratory suite with a specified throughput capability is a unique approach to the resource problem at the local and state level. Research and development efforts aimed at redeveloping existing systems to achieve reliability or cost goals (in contrast to performance or new scientific goals) have been successfully undertaken by other federal agencies, notably the Department of Defense.

Underrecognized Needs

As is the case for most R&D activities and “behind the scenes” product development, the final customers who purchase the resulting products are often unaware of what went into them. Consequently, it is not surprising that only about 20 percent of the departments responding to the RAND Law Enforcement Technology Survey were aware of having received any federal support in the area of R&D or

Table 5
Priorities of Forensic Labs Surveyed

Current Needs	Low/Not a Priority	Medium Priority	High Priority
Additional professional staffing	4%	17%	79%
Continuing education/training on new technologies or developments	0%	33%	67%
Additional laboratory space	17%	17%	67%
Training on technology available or being acquired	3%	41%	56%
Computerized system for tracking evidence	36%	27%	37%
System for overall laboratory management	41%	28%	31%

SOURCE: FTS, 15. Numbers are percent of laboratories responding as indicated.

commercialization. Since most local departments do not perform R&D or generally request technology commercialization aid, there is little reason for them to be aware of these programs. The focus of many burdened departments and laboratories is necessarily short term on the immediate priorities of today; as a result, the long-term focus of R&D must seem distant from their current needs.

Although local departments may not rate the importance of federal R&D, standards development, or commercialization as highly as direct funding, this should not be interpreted as “evidence against” the support of these activities. There is a real need for federal sponsorship in these areas because the law enforcement market is neither big enough nor lucrative enough to attract sufficient private sector R&D investment.

Nearly three-fourths of local police departments and 42 percent of forensic laboratories reported that they had neither received nor requested any federal assistance in the technology evaluation or standards area. This apparent lack of utilization of federal standards setting and technology evaluation services is in marked contrast to the support of these activities that was expressed by participants in RAND focus groups. As one of our sources put it, “without federal support for technology standards and commercialization, the law enforcement community is destined to continue to be disappointed by vendors who try to sell them secondhand technology originally designed for other purposes.”

OVERARCHING ISSUES

Throughout our research there were a number of larger issues that came to our attention. While some of these do inform our recommendations above, they are largely beyond the scope of the study or are not explicitly addressed in our survey work. They bear mention, however, if only to help remind policymakers of the larger context, problems, and prospects of employing technology more effectively with our law enforcement departments and agencies. Among the meta issues that were identified through our interactions with the law enforcement community are the following:

Forensic Sciences. Crime laboratories are struggling to keep up with demand for their services. Substantial backlogs are not uncommon.

While most laboratories appear to be able to conduct those tests of evidence needed to support prosecutions, many labs lack the capacity to support investigations equally well. Frequently, evidence is analyzed only after a suspect has been identified.

Interoperability and Data Sharing. There is a great need for improvements in communications interoperability and data sharing among agencies. The technology for this exists and continues to be improved. Frequently what appears to have been lacking is the political will to go the extra mile to coordinate and cooperate with other agencies.

Accountability and Risk Management. Technology has a role to play in increasing accountability of law enforcement officers both to their organization's leadership and to the public. As technology makes it more *possible* for law enforcement to record interviews of witnesses and suspects, to ensure that physical evidence is properly collected and protected, and to avoid unnecessary damage or destruction of persons and property, these safeguards will become more in demand. Failure of law enforcement to keep up with technology in these areas may increase risks of both civil liability and losing criminal cases in court.

Information Security and Privacy. Technology is making possible better surveillance and monitoring, as well as more comprehensive and accessible databases, which raise concerns about information security and privacy.

Availability of Expertise. Certain expertise is in short supply and is prohibitively expensive for all but the best-resourced agencies. An obvious example is expertise in cybercrime investigation and, more generally, digital evidence analysis.

Trends in Crime. Although one cannot predict whether or how long declines in crime rates will continue, it seems reasonable to prepare for increases in electronic crime (e.g., denial of service attacks, criminal transfer of funds by electronic means, possible forgery of digital signatures, etc.), continued public fear of gun violence and certain crimes (such as home-invasion robbery), and possible domestic terrorism (which may involve chemical or biological weapons).

Public-Private Interfaces. Crime mapping and Internet technologies allow law enforcement agencies to make crime maps accessible to citizens and can be used for citizens to report crimes or hot spots. LoJack, GPS-equipped cellular telephones, and other privately purchased or leased security technologies can interface with public agencies, as can private security forces at business sites, on public streets, or in correctional facilities. To what extent should the public side of these interfaces be supported?

RECOMMENDATIONS

As a result of an integrated assessment of each of these sources of information, we present the following recommendations. They constitute what the study team believes is a reasonable, yet forward-looking set of actions for federal technology-related support of state and local law enforcement.

- To avoid wasteful spending and to ensure technology is used to good effect, we recommend that federal initiatives providing technology hardware or software include provisions for training. It appears that all too often, procurements are made under the false assumption that “somebody else” will take care of training.
- To help law enforcement agencies make more effective and less disappointing technology acquisition decisions, we recommend continuing and publicizing federal testing, evaluation, and standards setting for technologies needed by state and local agencies.
- To enhance public safety, we recommend providing data network access to all police and sheriffs’ departments that have unmet needs for it. No American community—large or small—wants its officers to lack information that could have been available to recognize and apprehend dangerous criminals wanted in other jurisdictions.
- To meet the demands of investigation as well as prosecution, we recommend building forensic capability well beyond current levels. This could include providing screening-test technology to first responders, as well as increasing training, recruiting, and retaining forensic scientists. We recommend it include increased federal support of R&D of forensic science techniques and technologies. One possible focus of this R&D might be on lowering

the acquisition cost for a standard, known throughput capability suite of forensic laboratory equipment.

- To correct evident competitive disadvantages of smaller law enforcement agencies, we recommend that federal agencies make a serious effort to make it easier for rural and small urban police and sheriffs' departments with real, unmet needs, to obtain funding and other technology-related support. Although some rural and small departments may have crime rates too low to warrant more substantial investment in modern technology, other rural or small departments suffer unmet needs because they lack political clout or skilled personnel available to write grant proposals.
- As a cost-effective investment, we recommend increased federal funding of R&D of technologies that automate or otherwise increase productivity of what are presently labor-intensive or training-intensive processes. Such technology can help make high-quality law enforcement more affordable.
- To promote police accountability and to provide more objective evidence of lawbreaking, we recommend that all or most patrol cars be equipped with video cameras and wireless networked computers. Videotaping provides objective evidence useful for suspect identification and prosecution, as well as for resolving complaints of police misconduct. Rapid access to current data on stolen vehicles, outstanding warrants, etc., can reduce officer uncertainty in confrontational situations. The most practical federal role in this may be in defining or developing equipment suites or standards, rather than in funding their acquisition.
- To reduce confrontational uncertainty, risk of injury to officers and the public, as well as risk of confrontations escalating into civil disturbances or abuse of police power, we recommend continued federal support for the development, testing, and deployment of technology that can be carried in patrol cars or on officers to detect concealed weapons at a safe distance.⁶

⁶It is also important to note that there are significant applications for any non-portable versions of this technology that might be produced during development of patrol car or police officer models. For example, stationary devices that could detect the presence of concealed weapons could be placed in schools and airports detecting

These technology specific goals, if coupled with attention to the obstacles and challenges inherent in organizational technology adoption, could lead to more effective use of technology by law enforcement organizations nationwide which, we believe, has the potential to contribute significantly to public safety, long-run cost reduction, and justice.

the “arrival” of any weapons into a monitored area. Such technology, if it was made reliable and cost effective enough, could allow educational institutions in particular to devote less of their resources to security and more to the primary goal of student instruction.