198619

National Assessment of Technology and Training for Small and Rural Law Enforcement Agencies (NATTS): A Descriptive Analysis

Prepared by:

The Justice and Safety Center

Eastern Kentucky University

Prepared for:

U.S. Department of Justice

National Institute of Justice

Office of Science and Technology

December 2002

NIJ

Sarah V. Hart
Director

Office of Science and Technology

David Boyd
Director, OS&T

A. Trent DePersia
Director, Research and Technology Development Division

Steve Schuetz
Program Manager, Training and Simulation Technologies

This research was supported under award # NCJ 1999-LT-VX-K022 from the U.S. Department of Justice, Office of Justice Programs, National Institute of Justice. The products, manufacturers, and organizations discussed in this publication are presented for informational purposes only and do not constitute product approval or endorsement by the National Institute of Justice, U.S. Department of Justice, or Eastern Kentucky University.

The National Institute of Justice is a component of the Office of Justice Programs, which also includes the Bureau of Justice Assistance, the Bureau of Justice Statistics, the Office of Juvenile Justice and Delinquency Prevention, and the Office for Victims of Crime.

Table of Contents

Introduction

The primary goal of this project was to conduct an in-depth assessment of the technological capabilities and needs of small and rural law enforcement agencies. This project fills a great void because most of what is known about policing comes from systematically-conducted evaluations of urban and large-department policing. Little has been done to examine the current state of small and rural law enforcement. Just as large departments are influenced by such variables as agency size, degree of specialization, personnel sophistication, availability of training, volume and nature of workload, jurisdictional economic conditions, local history, and culture, so are small and rural departments, but perhaps in varying degrees. Issues such as these must be assessed and understood in order to guide science and technology development for small/rural policing, thereby designing effective and successful technology training for small/rural police agencies. This research project provides a comprehensive and national assessment of the technological capabilities and training needs for small/rural law enforcement organizations. A focus on small police departments is necessitated by the fact that over half of the nation's local police departments employ less than 10 sworn officers, and that 90% of all local police agencies maintain fewer than 50 sworn officers (Hickman and Reaves, 2001). Additionally, 90% of the nation's police departments serve populations of under 25,000 (Hickman and Reaves, 2001). For this research, small will refer to those agencies with 19 officers or less that serve a population of 50,000 or less.

What the research suggests is that law enforcement agencies are falling behind in the race to keep up with the speed at which criminals are using technology. Many police departments, due to a lack of resources and training, have failed to take a proactive approach in the adoption

of technology. For example, the use of crime mapping and crime analysis has been shown to be effective in concentrating law enforcement efforts toward eradicating or reducing certain types of crimes. Another example where technology could enhance officer response and safety in the small/rural community comes from the rural West. In these often remote and sometimes mountainous terrains, officers are often unable to maintain radio contact with their dispatcher. With the advent of global positioning systems, officers can take advantage of satellite communications systems. The availability of less expensive computers, the expansion of communication capabilities, and similar advances in technology could certainly benefit the small/rural police department. Information sharing, remote site training and improved communications across large jurisdictions are examples of how technology may benefit small departments (Weisheit et.al., 1999).

Methodology

Instrumentation

The Justice and Safety Center (JSC) research staff developed a mail survey during the summer of 2000, for the purpose of conducting a National assessment of small and rural law enforcement technology and training needs. The instrument's format was a pen/pencil self-report survey including both closed-ended and open-ended questions (See Appendix B - Survey Instrument). The survey was designed to meet the objectives listed in the proposal, i.e., to obtain information from a representative sample of small and rural law enforcement agencies regarding: (1) Types and frequency of technology currently used; (2) Perceived importance of technology; (3) Perceived technological competency levels and technological training needs; (4) Technology facilitation; and (5) Organizational demographics.

Sample Selection

Using the National Public Safety Information Bureau Directory Data Base of all police departments (both county and municipal) it was determined that 11,956 (88.5%) of all agencies listed in the database serve populations of 50,000 or less. These 11,956 agencies became the sampling frame from which the study sample was selected.

Because of the disproportionate numbers of county agencies (2,249 or 18.8%) as compared to municipal agencies (9,707 or 81.2%), it was decided that stratified systematic random sampling would be used to select agencies to be included in the sample. Thus, the sampling frame was split into two separate lists of county agencies and municipal agencies.

The next issue to resolve pertained to sample size. Using the following formula from Miller and Whitehead (1996, p. 224), it was determined that a random sample of 384 agencies

would be required in order to obtain data which would be generalizable to the population of all small and rural police departments.

Formula 1: Calculation of Desired Sample Size Allowing for 95% confidence Intervals

$n = (.5)(1-.5)[1.96/.05]^2$

$= .25\ (39.2)^2$

$= .25\ (1{,}536.64)$

$= 384.16$

This desired sample size (384), as determined by the above formula, was then stratified to reflect the same disproportionate breakdown of county and municipal agencies observed in the sampling frame. It was determined that 72 county agencies (18.8% of 384) and 312 municipal agencies (81.2% of 384) would be systematically, randomly sampled from their respective database lists. The well-known technique of systematic random sampling was then applied to each of the sampling frames (i.e., county and municipal data base lists) until the desired sample sizes were obtained.

Survey Administration

In October 2000, all 384 agencies selected for sample inclusion were mailed the National Assessment of Law Enforcement Technology and Training Needs survey that was developed by the Justice and Safety Center (JSC) staff at Eastern Kentucky University. A cover letter accompanied all mailed surveys. The cover letter described the purpose of the survey, authorization for study, and assured respondents of anonymity and confidentiality of the information they were providing. (See Appendix A - Cover Letter).

It is a well-known fact that mail surveys typically result in low response rates unless

follow-up mailings occur (e.g., see Frankfort-Nachmias and Nachmias, 1996). Thus, all surveys were given identification numbers so that non-responders could receive follow-up mailings of the survey. In all, three separate survey administrations were required in order to obtain an acceptable response rate. This means that we repeated survey mailings to non-respondents two additional times (November and December, 2000) until we achieved at least a 60 percent response rate (a well-established benchmark for assurance of maintaining the integrity of sample representative ness). Achieving a 60 percent response rate from this stratified sample meant that at least 43 county agencies and 187 municipal surveys (a combined total of 230) would need to be returned before we could feel confident that the obtained data were representative of all agencies comprising the original sampling frame.

Completed surveys were received from 43 of the county agencies that were surveyed, corresponding to a 60 percent response rate. Similarly, surveys were received from 196 of the municipal agencies that were surveyed, corresponding to a 63 percent response rate. Thus, the sample of responding agencies was considered to meet minimal standards with respect to sample representative ness.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 10 (2000) for the PC. Because most of the data collected were measured on rank-order scales (e.g., never, sometimes, often), most statistical analyses involved generating frequency and percentage distributions. These simple descriptive statistics provided the necessary information to address all five of the goals of this project.

Additionally, narrative responses were submitted to a content analysis. This allowed for

similar responses to be categorized according to common themes. The frequencies and percentages of responses on these content analyzed data are presented in tabular form in this report.

It was of additional interest to determine if differences existed between county and municipal law enforcement agencies with respect to their types and frequency of technology used their perceived technological needs, their attitudes toward technology, and their availability of training for technology. Statistically significant differences between the two agency types were examined primarily using chi-square tests for independence (as is appropriate for ranked data); however, t-tests were generated when the variable being tested was measured at the interval level of measurement (allowing for a comparison between the two agencies' means).

Results

Sample Characteristics

As mandated by the stratified sampling scheme that was employed in this study, the sample was comprised of 18 percent county agencies and 82 percent municipal. The responding agencies were fairly evenly distributed across a total of 43 states, regardless of county or municipal status.

The average number of full-time, sworn officers (i.e., not assigned to jail, court, or lock-up units) was 18.09 (SD=19.92). However, the distribution was negatively skewed, meaning that the median value of 11 full-time officers, or the modal value of 7 full-time officers, may be more typical of the responding agencies. The large amount of variability observed in responses indicated that the numbers fluctuated considerably across agencies. Furthermore, a statistically non-significant t-test (t_{235}=-.80, p=.424) indicated that county and municipal agencies did not

differ in their average number of full-time, sworn officers.

Conversely, a statistically significant difference was observed between county and municipal law enforcement agencies with respect to the size of the population served (t_{52}=4.57, p=.000). While responding municipal agencies served an average of 9,702 persons (SD=11,406), county agencies served an average of 21,298 persons (SD=15,762), over twice the population of municipal law enforcement jurisdictions.

Nearly half (47%) of all survey respondents reported holding the rank of Chief, followed by Sergeant (9.4%), then Captain (8.6%), then Sheriff (6.9%). Another six percent reported being Lieutenants, roughly four percent indicated they were Chief Deputies, and two percent Deputies. Only three percent of respondents were Patrolmen and less than one percent were Detectives. The remaining 15 percent could be categorized as holding some "other" type of rank.

Types and Frequency of Technology Used

Data collected to indicate the types and frequency of technology used by responding law enforcement agencies are reported in Tables 1-4. The first three table's present data on specific computer-related types of technology, while Tables 4 pertains to a variety of communications-related and in-field technologies. Analysis by agency type is reported in Table 11 on page 27.

As can be seen in Table 1, majorities of the sample had used computers for only three law enforcement functions. The vast majority (86.6%) of responding agencies indicated that they used computers for records management purposes, while 73.6 percent reported using computers for Internet access, and 72 percent indicated they used computers for criminal investigation. Nearly half (46.0%) of agencies reported using computers for dispatch (CAD), and 41.4 percent said they used computers for crime analysis. Less than one-third of the sample reported using

computers for crime mapping, fleet management, in-field communications or report writing, and resource allocation. Other recorded functions for which agencies used computers tended to fall in the incident or offender record-keeping category.

Table 1: Functions for which agencies currently use computers (N=239).

Function	% of Agencies Yes
Records Management	86.6
Internet Access	73.6
Criminal Investigation	72
Dispatch (CAD)	46
Crime Analysis	41.4
In-Field Report Writing	31.1
Fleet Management	24.3
In-Field Communications	23
Resource Allocation	18.8
Crime Mapping	16.7
Other (e.g., incident or offender record-keeping)	3.8

The types of computerized files that are maintained by the responding agencies are presented in Table 2. The largest majority (85.4%) of the sample reported that incident reports are maintained in computer files. Another large majority (83.3%) reported maintaining computerized arrest files, while 71.1 percent said they keep calls for service in computerized files. As can be seen in Table 2, a majority of the sample also indicated that their agency maintains computerized files for traffic citations, stolen property (both vehicle and non-vehicle), warrants, department inquiry, and uniform crime reports. Only a few of the types of computerized files listed in Table 2 resulted in one-third or less of the sample responding in the affirmative, such as linked reports for crime analysis, vehicle registration, and domestic violence orders.

Table 2: Computerized files maintained by agencies (N=239).

Type of Computerized File	% of Agencies Yes
Incident Reports	85.4
Arrests	83.3
Calls for Service	71.1
Traffic Citations	64.9
Stolen Property Other Than Vehicles	61.5
Traffic Accidents	61.5
Criminal Histories	57.3
Uniform Crime Reports–Incidence Based (NIBRS)	57.3
Stolen Vehicles	55.6
Warrants	54.8
Evidence	49.8
Uniform Crime Reports–Summary	46.4
Alarms	46.0
Personnel	42.3
Domestic Violence Orders	39.7
Department Inquiry	37.2
Field Interview Information	35.1
Payroll	32.6
Summonses	31.4
Driver's License	29.4
Vehicle Registration	24.3
Linked Reports for Crime Analysis	18.8
Other (misc.)	2.5

When asked whether their agency had either exclusive ownership or access to an Automated Fingerprint Identification System (AFIS) terminal, the vast majority indicated that they did not. Specifically, only 8.8 percent of the sample reported that their agency has exclusive ownership of an AFIS, and only 4 percent said they operated a terminal that has access to a remote AFIS site (see Table 3). Of the 21 agencies reporting ownership of an AFIS, only three agencies indicated that the ownership was exclusive; 18 of the agencies noted that they had to share the system with another agency. When asked who they share the technology with, 16 identified a local police agency and 5 said they shared the AFIS with their State police (data not presented in

tabular form).

Table 3: Other computer-related technology used by agencies (N=239).

Technology	% of Agencies Yes
Agency operates an AFIS terminal that has access to a remote AFIS site.	40
Agency maintains an official homepage on the World Wide Web/Internet.	26.8
Agency has computer crime investigation capabilities.	24.5
Agency has exclusive ownership of an Automated Fingerprint Identification System (AFIS) that includes a file of digitized prints.	8.8

Approximately one-fourth of agencies reported that their law enforcement agency maintains an official homepage on the Internet, and has computer crime investigation capabilities (see Table 3). When asked what information is maintained on the homepage website, most of the responding agencies listed general police department information, available services, and contact information.

When asked who the agency contacts for computer crime assistance if the agency does not have its own computer crime investigation capabilities, 13 percent of responding agencies (N=152) reported that they would contact another local police department, 37 percent of agencies said they would contact their state police, and 5 percent indicated that they would contact the FBI (data not presented in tabular form).

Table 4 presents a wide array of technologies which respondents were specifically asked about in terms of their frequency of use. Clearly, most of the technology employed by the sample pertained to communication. Large majorities of the sample indicated that their agency "often" uses mobile radios (98.7%), portable radios (95.3%), base station radios (82.5%), and cellular phones (59.5%). The personal computer was the only other type of technology reported to be used by a majority of the sample agencies. Most of the other technologies listed in Table 4 resulted in majority percentages of the sample indicating that their agency "never" used that particular type of technology (e.g., MDT, MDC, Digital Imaging, Global Positioning Systems, less than lethal force weapons, night vision/electro optic devices, video cameras, and vehicle - related devices).

Table 4: Frequency that technology is used by agencies (N=239).

	% of Agencies		
Technology	**Often**	**Sometimes**	**Never**
Communication–Mobile radios	98.7	0	1.3
Communication–Portable radios	95.3	2.1	2.6
Communication–Base station radios	82.5	7.7	9.8
Personal computer (PC/Microcomputer)	66.4	11.1	22.6
Communication–Cellular phones	59.5	30.8	9.7
Mainframe computer	43.6	9.4	47
Video Camera (in patrol cars)	33.6	18.1	48.3
Digital Imaging–Mug Shots	31.2	14.1	54.7
Mini-computer	25.8	10	64.2
Car-mounted mobile digital/data terminal (MDT)	15.9	3.1	81.1
Car-mounted mobile digital/data computer (MDC)	12.9	1.3	85.8
Laptop Computer (in-field)	11.3	15.2	73.5
Digital Imaging–Fingerprints	9.6	7.9	82.5

Video Camera (Fixed-site surveillance)	8.3	30.9	60.9
Video Camera (Mobile surveillance)	8.3	31	60.7
Digital Imaging–Suspect Composites	6.9	30.2	62.9
Vehicle (Tire deflation spikes)	3.9	37.4	58.7
Night Vision/Electro-Optic (Image intensifiers)	3.5	38.2	58.3
Night Vision/Electro-Optic (Infrared - thermal imagers)	1.8	23.7	74.6
Vehicle (Stolen vehicle tracking)	1.3	5.3	93.4
Global Positioning Systems–Mobile surveillance	1.3	7.4	91.3
Night Vision/Electro Optic (Laser range finders)	1.3	8.4	90.3
Global Positioning Systems–Vehicle location	0.9	1.8	97.4
Hand-held digital terminal	0.9	1.8	97.4
Less than lethal force–Hand held electrical device/direct contact	0.4	7	92.5
Less than lethal force–Stun devices	0.4	8.8	90.8
Less than lethal force–Choke carotid hold or neck restraint	0.4	15.7	83.9
Less than lethal force–Flash/bang grenade	0.4	21.6	78
Less than lethal force–Three-pole trip	0	0	100
Less than lethal force–Tranquilizer darts	0	1.3	98.7
Vehicle (Electrical/engine disruption)	0	1.3	98.7
Less than lethal force–Capture Net	0	2.2	97.8
Less than lethal force–Rubber bullets	0	8.8	91.2
Less than lethal force–Soft projectiles	0	14.5	85.5

Perceived Importance of Technology

Respondents were asked to rate the importance to their agency of each of the technologies presented in Table 4. The frequencies of these ratings are presented in Table 5. If a respondent's agency did not use the technology being rated, the agency was coded as "not applicable" for that particular rating.

As can be seen in Table 5, almost all of the responding agencies indicated that they perceived two communication technologies as being "very important" to their agency, namely, mobile radios (97.8%) and portable radios (97.4%). The other two types of communication technologies, base station radios (86.5%) and cellular phones (62.9%) received a rating of "very important" by a majority of the respondents as well.

Table 5: Perceived importance to agency of each technology used (N=239).

Technology	% of Agencies		
	Very Important	Somewhat Important	Not Important
Communication–Mobile radios	97.8	1.3	0
Communication–Portable radios	97.4	1.8	0
Communication–Base station radios	86.5	5.7	3.5
Personal computer (PC/Microcomputer)	72.4	12.2	2.3
Communication–Cellular phones	62.9	30.1	2.2
Video Camera (in patrol cars)	55.2	18.6	3.2
Mainframe computer	53	10.2	7
Digital Imaging–Mug Shots	44.1	22.1	5.4
Vehicle (Tire deflation spikes)	35.3	26.2	5.9
Car-mounted mobile digital/data terminal (MDT)	34	16.5	5.7
Car-mounted mobile digital/data computer (MDC)	33	17.2	7.7
Video Camera (Mobile surveillance)	31.1	32.9	5
Mini-computer	30	21.6	8.5

Video Camera (Fixed-site surveillance)	29.2	29.6	6.9
Laptop Computer (in-field)	25.2	30.3	7.3
Digital Imaging–Fingerprints	24.3	28	5.5
Digital Imaging–Suspect Composites	23.9	37.4	5.9
Night Vision/Electro-Optic (Infrared - thermal imagers)	19.4	29.9	8.1
Night Vision/Electro-Optic (Image intensifiers)	18.4	38.2	8.8
Night Vision/Electro Optic (Laser range finders)	13.7	14.6	18.4
Vehicle (Stolen vehicle tracking)	13.1	22.4	11.7
Less than lethal force–Flash/bang grenade	11.4	27.9	14.2
Less than lethal force–Soft projectiles	10.1	30.3	10.1
Global Positioning Systems–Mobile surveillance	8.3	22.7	20.4
Less than lethal force–Stun devices	7	21.4	15.3
Less than lethal force–Rubber bullets	6.9	24.4	15.7
Global Positioning Systems–Vehicle location	6.5	20.5	21.4
Vehicle (Electrical/engine disruption)	6.1	19.7	14.6
Less than lethal force–Capture Net	5.1	15.2	20.7
Less than lethal force–Choke carotid hold or neck restraint	4.7	16.4	22.5
Less than lethal force–Hand held electrical device/direct contact	4.7	17.8	19.7
Hand-held digital terminal	3.8	16.9	21.1
Less than lethal force–Tranquilizer darts	1.4	9.4	22.6
Less than lethal force–Three-pole trip	0.5	6.6	25.5

Three other types of technology received "very important" ratings by the respondents (see Table 5). These included personal computers (72.4%), video cameras in patrol cars (55.2%), and a mainframe computer (53.0%). The technology receiving the next largest proportion of

respondents' ratings of "very important" was digital imaging mug shots (44.1%).

Also evident in Table 5 are the technologies, which respondents did not think were very important to their agency. Approximately 20-25 percent of respondents gave a "not important" rating to the following less than lethal force technologies: three pole trip (25.5%), tranquilizer darts (22.6%), choke carotid hold or neck restraint (22.5%), capture net (20.7%), and hand held electrical device/direct contact (19.7%). Similarly, about 20 percent of respondents reported that they perceived the following technologies to be "not important" to their agency: Global Positioning Systems–vehicle location (21.4%), Global Positioning Systems–mobile surveillance (20.4%), and a hand held digital terminal (21.1%).

In most cases, respondents either perceived a technology to be "not important" or "very important." However, there were some technologies which resulted in the largest proportion of respondents to indicate that a technology was "somewhat important" to their agency (see Table 5). These technologies comprised the remaining less than lethal force items, a laptop computer for in-field use, night vision/electro optic devices, mobile and fixed-site surveillance video cameras, vehicle disruption device, and stolen vehicle tracking technology installed in the vehicle.

Perceived Technological Competency Levels of Agencies

Responding officers were asked to rate the knowledge or skill level of their agency for each of the specified technologies. Possible ratings were "fully competent," "somewhat competent," and "no competence." The frequency of responses is reported in Table 6.

Interestingly, a large majority of the respondents perceived their agency's technological knowledge or skill level to reflect "no competence" for most of the listed technologies (see Table

6). This paucity of knowledge or skill was associated with the following types of technology: all of the less than lethal force devices (i.e., capture net, choke carotid hold or neck restraint, flash/bang grenade, hand held electrical device/direct contact, rubber bullets, soft projectiles, stun devices, three-pole trip, and tranquilizer darts); the car-mounted digital/data terminal (MDT) and computer (MDC); digital imaging (fingerprints and suspect composites); Global Positioning Systems (mobile surveillance and vehicle location); hand held digital terminal; mainframe computer, night vision/electro-optic devices (infrared-thermal imagers and laser range finders); vehicle engine disruption and stolen vehicle tracking devices.

Table 6: Perceived knowledge/skill level of agency for each technology (N=239).

Technology	% of Agencies		
	No Competence	Somewhat Competent	Fully Competent
Less than lethal force–Three-pole trip	92.0	5.5	2.5
Less than lethal force–Capture Net	90.4	7.1	2.5
Less than lethal force–Tranquilizer darts	88.9	8.6	2.5
Vehicle (Electrical/engine disruption)	87.9	9.0	3.0
Hand-held digital terminal	86.1	11.4	2.5
Global Positioning Systems–Vehicle location	84.6	13.4	2.0
Global Positioning Systems–Mobile surveillance	80.4	16.7	2.9
Vehicle (Stolen vehicle tracking)	79.6	15.4	5.0
Less than lethal force–Hand held electrical device/direct contact	72.0	19.0	9.0
Car-mounted mobile digital/data computer (MDC)	69.7	19.7	10.6
Digital Imaging–Fingerprints	69.6	24.5	5.9
Less than lethal force–Rubber bullets	68.2	21.4	10.4
Less than lethal force–Stun devices	67.7	19.9	12.4
Night Vision/Electro Optic (Laser range finders)	66.8	24.8	8.4
Car-mounted mobile digital/data terminal (MDT)	65.3	18.3	16.3

Less than lethal force–Choke carotid hold or neck restraint	64.4	22.8	12.9
Less than lethal force–Soft projectiles	59.9	27.2	12.4
Less than lethal force–Flash/bang grenade	59.5	21.5	19.0
Night Vision/Electro-Optic (Infrared - thermal imagers)	57.3	32.5	10.2
Digital Imaging–Suspect Composites	56.5	33.0	10.5
Digital Imaging–Mug Shots	47.2	30.4	22.4
Night Vision/Electro-Optic (Image intensifiers)	46.3	36.1	17.6
Vehicle (Tire deflation spikes)	40.9	28.8	30.3
Mini-computer	39.7	42.1	18.2
Video Camera (Fixed-site surveillance)	39.5	41.5	19.0
Mainframe computer	39.3	38.4	22.3
Video Camera (Mobile surveillance)	36.7	43.5	19.8
Laptop Computer (in-field)	34.3	47.3	18.4
Video Camera (in patrol cars)	31.8	32.2	36.0
Personal computer (PC/Microcomputer)	12.6	49.3	38.1
Communication–Base station radios	4.1	10.6	85.3
Communication–Cellular phones	3.2	8.7	88.1
Communication–Mobile radios	1.3	4.0	94.6
Communication–Portable radios	1.3	4.0	94.6

It should be noted that all of the technologies which respondents perceived to be unimportant to their agency are technologies for which they gave "no competence" ratings (see Tables 5 and 6). Furthermore, these are the same technologies that the sample of rural law enforcement agencies tended not to use (see Tables 4).

Also revealed in Table 6 are the technologies at which respondents perceived their agency to be "fully competent." Over 85% of the sample perceived their agency to be fully

competent at all four of the communication-related technologies (i.e., base station radios, cellular phones, mobile radios, and portable radios). These are the same technologies which respondents tended to have access to in their agencies (see Table 4), and subsequently, they perceived these devices to be important to the law enforcement efforts of their agencies (see Table 5).

However, the next largest proportion of the sample to indicate full competency of their agency on a specific technology was for the personal computer, and only 38 percent of the sample did so (see Table 6). Close behind the personal computer was the video camera in patrol cars (36%). For almost all of the remaining technologies, less than one-third of the respondents perceived their agency to be "fully competent" in terms of knowledge or skill in the specific technology.

Perceived Technological Training Needs

Respondents were asked to rate the amount of training their own agency needs in each of the listed technologies. Frequencies for these ratings can be found in Table 7. It should be noted that much more variability in responses was observed for these ratings than for any ratings previously discussed. With respect to the perceived training needs of small law enforcement agencies, there were several technologies in which a majority of the sample indicated that there was "much training needed" (see Table 7). These technologies included: Global Positioning Systems (mobile surveillance and vehicle location); hand held digital terminal; digital imaging (fingerprints); vehicle engine disruption; stolen vehicle tracking device; less than lethal force (three-pole trip and capture net); and a car-mounted mobile digital/data computer (MDC). It is of interest to note that all of these technologies were discussed earlier as being skills that agencies tended not to be using, that they did not rate as being that important to their agency, and in which they did not perceive their agency to be competent.

Table 7: Perceived technology training needs (N=239).

Technology	% of Agencies		
	Much Training Needed	Some Training Needed	No Training Needed
Global Positioning Systems–Mobile surveillance	61.7	16.4	21.9
Global Positioning Systems–Vehicle location	61.6	15.2	23.2
Hand-held digital terminal	59.7	13.3	27
Vehicle (Electrical/engine disruption)	55.8	14.7	29.4
Digital Imaging–Fingerprints	55.8	25.1	19.1
Vehicle (Stolen vehicle tracking)	55.3	20.6	24.1
Less than lethal force–Three-pole trip	54.9	10.3	34.9
Less than lethal force–Capture Net	54.4	14.4	31.3
Car-mounted mobile digital/data computer (MDC)	52.3	21	26.7
Less than lethal force–Tranquilizer darts	51.3	11.8	36.9
Car-mounted mobile digital/data terminal (MDT)	48.7	24.6	26.6
Less than lethal force–Stun devices	47.7	21.3	31
Digital Imaging–Suspect Composites	46.6	35	18.4
Night Vision/Electro Optic (Laser range finders)	46.2	28.1	25.6
Less than lethal force–Hand held electrical device/direct contact	45.2	23.4	31.5
Less than lethal force–Rubber bullets	44.7	24.4	31
Night Vision/Electro-Optic (Infrared - thermal imagers)	43.6	33.2	23.3
Less than lethal force–Soft projectiles	42.4	27.8	29.8
Less than lethal force–Flash/bang grenade	42	26.5	31.5
Less than lethal force–Choke carotid hold or neck restraint	40.2	27.1	32.7
Digital Imaging–Mug Shots	38.9	37	24.2
Night Vision/Electro-Optic (Image intensifiers)	36.5	38.4	25.1
Mainframe computer	32.4	37.2	30.4
Mini-computer	31.5	40.9	27.6
Vehicle (Tire deflation spikes)	29.2	37.6	33.2
Video Camera (Mobile surveillance)	27.1	46.8	26.1

Video Camera (Fixed-site surveillance)	26.9	44.3	28.9
Laptop Computer (in-field)	26.5	49.5	24
Video Camera (in patrol cars)	26.2	38.3	35.4
Personal computer (PC/Microcomputer)	18.4	53.3	28.3
Communication–Base station radios	5.6	26.9	67.6
Communication–Cellular phones	3.7	10.2	86.1
Communication–Portable radios	3.7	13.8	82.6
Communication–Mobile radios	2.3	15.1	82.6

Three of the communication technologies resulted in the largest proportion of responses indicating that no training was needed (see Table 7). Over 82% of respondents reported that their agency did not need training in the use of cellular phones, mobile radios, and portable radios. The only technology to result in a majority of the sample reporting that only "some training" is needed was the personal computer. Again, it should be noted that these are the technologies that rural law enforcement officers are most likely to have in their agency, are most likely to perceive as being important to their agency, and consider their agency to be fully competent in these communication technologies.

Respondents also were asked to list narratively, in order of greatest need, the three most important types of technology training their agencies need. These qualitative data were content analyzed as described in the methodology section. Responses are reported in Tables 8-10. Any specific technologies receiving 10 or fewer responses from the sample were combined into category labeled "other."

As can be seen in Table 8, the largest proportion of respondents (17.6%) identified a car-mounted mobile digital/data terminal (MDT) as the technology for which their agency needs the greatest amount of training. Another 11.3 percent listed some form of digital imaging as the technology for which their agency is in greatest need of training.

Table 8: Greatest technology-training needs of agencies (N=239).

Greatest Training Need	% of Agencies
Car-mounted mobile digital/data terminal (MDT)	17.6
Digital Imaging (all types)	11.3
Personal computer (PC/Microcomputer)	9.2
Car-mounted mobile digital/data computer (MDC)	7.1
Less than lethal force (all types)	7.1
Global Positioning Systems(mobile surveillance & vehicle location)	7.1
Laptop Computer (in-field)	6.3
Video Cameras (all types)	6.3
Other (18 different technologies receiving <10 responses each)	17.2
No Answer	17.9

Car-Mounted mobile digital/data computers, Global Positioning Systems and Less than Lethal Force technologies were all given equal value with 7% of the respondents indicating they would like training on these three topics.

Technology Facilitation

Respondents were asked to respond to a few narrative questions about interagency cooperation, barriers and impediments, as well as resources and facilitators their agency experiences in attempting to acquire technology training. These content analyzed data are

presented in Table 10.

As can be seen in Table 10, a large majority (64.9%) of respondents indicated that their agency does have interagency cooperation to provide assistance with technology. These officers were then asked to list the type of interagency cooperation their agency receives. The most frequently listed response was other local agencies (18.0%), followed by other state agencies (8.9%).

Table 10: Facilitation of technology (N=239).

Question	Response	% of Agencies
Agency has interagency cooperation to provide assistance with technology?	No	35.1
	Yes	64.9
Types of Interagency Cooperation?	Other local agencies	18
	Other state agencies	8.9
	No answer	7.5
	Both local and state agencies	6.7
	FBI, local and state agencies	3.3
	Other	20.5
	Not Applicable	35.1
Three primary barriers/impediments to agency acquiring its technology training needs? (Multiple Responses Allowed)	Funding/Budget Constraints	83.7
	Limited Personnel/Manpower	25.9
	Lack of Available Training	13.8
	Location of Training	11.7
	Time	11.7
	Lack of Technology/Equipment	8.8

	Need Has Not Been Established	8.8
	Community Support	6.7
	Size of Department	4.6
	Other	13
	No Answer	10.9
Three primary resources/facilitators to agency acquiring its technology training needs? (Multiple Responses Allowed)	Grants (Federal and State)	31
	Funding	25.5
	State Training (Police Academy)	21.3
	Local Training (College)	13.0
	Shared Training w/other Agencies	10.5
	Community Support	7.1
	Knowledgeable Personnel	7.1
	Available Training	5.0
	Private Training (Vendors)	5.0
	Donations	5.0
	Other	19.7
	No Answer	25.1

With respect to the three primary barriers/impediments agencies face in acquiring technology training, a sizeable number of respondents (83.7%) listed funding/budget constraints, followed by limited personnel/manpower (25.9%) and a lack of available training (13.8%). The final data presented in Table 10 indicate the three primary resources/facilitators to an agency acquiring its technology training needs. The most frequently reported resource (31.0%) was grants (both state and federal), followed by general funding (25.5%), and state training (21.3%).

County vs. Municipal Agencies

Finally, the last goal of this project, which pertains to organizational demographics, was investigated by generating chi-square analyses to see if the frequencies of responses for any given survey item were distributed in a disproportionate fashion across type of agency (county vs. municipal). The results of the statistically significant findings are reported in Table 11. It should be noted that a more conservative alpha rate (i.e., .01 level) was used to determine statistical significance in order to control the Type I error rate (i.e., to control the statistical probability of finding a significant difference simply by chance, a problem which arises when many of the same type of statistical tests are generated).

As revealed in Table 11, statistically significant differences were found between county and municipal law enforcement agencies on only six of the survey items, and most of these items pertained to the use of computerized data files.

Table 11: Statistically significant chi-square tests between county and municipal agencies (N=239).

		County		Municipal				
Variable	**Response**	**#**	**%**	**#**	**%**	**χ^2**	**df**	**p-value**
Agency uses computers for in-field report writing?	No	37	86	127	65.4	7.20	1	.007
	Yes	6	14	68	34.9			
Agency maintains computerized files for alarms?	No	35	81.4	94	48	15.87	1	.000
	Yes	8	18.6	102	52			
Agency maintains computerized files for traffic accidents?	No	27	62.8	65	33.2	13.07	1	.000
	Yes	16	37.2	131	66.8			
Agency maintains computerized files for traffic citations?	No	25	58.1	59	30.1	12.16	1	.000
	Yes	18	41.9	137	69.9			
Agency maintains computerized files for warrants?	No	8	18.6	100	51	14.96	1	.000
	Yes	35	81.4	96	49			

Frequency of use for Global Positioning Systems–Mobile Surveillance?	Never	33	82.5	176	93.1	15.02	2	.001
	Sometimes	4	10	13	6.9			
	Often	3	7.5	0	0			

The chi-square analyses indicated that a much higher proportion of municipal agencies (34.9%) use computers for in-field report writing than does county agencies (14.0%). Similarly, a much higher proportions of municipal agencies than county agencies indicated that they maintained computerized files for alarms (52.0% vs. 18.6%, respectively), for traffic accidents (66.8% vs.37.2%, respectively), and for traffic citations (69.9% vs. 41.9%). Conversely, a higher proportion of county agencies than municipal agencies reported that they maintained computerized files for warrants (81.4% vs. 49.0%).

The final entry in Table 11 pertains to the agencies' frequency of use for Global Positioning Systems–mobile surveillance. The statistically significant chi-square value suggests that a larger proportion of municipal agencies (93.1%) never use this technology than was observed for county agencies (82.5%). However, vast majorities of both types of agency have not used the technology.

Summary of Results

In general, the current data suggest that rural and small law enforcement agencies nationwide do not utilize many of the types of technology at focus in this survey effort. Responding agencies tended to use, to be competently trained in, and to perceive as important to the agency, a variety of communications-related technology, as well as the personal computer. On the other hand, they tended not to use, not to be competently trained in, and to be ambiguous as to the need or importance of a variety of more sophisticated technologies, such as car-

mounted mobile digital/data terminals and computers, digital imaging, Global Positioning Systems. This was found to be true to a lesser extent for night vision/electro-optic devices and video cameras.

Not many differences were observed between county and municipal agencies on the survey items, and the ones that were observed pertained to the use of computerized files. No differences were found that would suggest that the two types of agencies differ in terms of their current use of technology, or their training needs.

When asked about the barriers or impediments to acquiring technology training, respondents indicated that funding/budget constraints were the primary problem, followed by a lack of available training. These were also the same factors that were listed to explain successful facilitation of technology training. Clearly, these issues will have to be systematically addressed in order for agencies to become well trained in more sophisticated law enforcement technology.

References

Frankfort-Nachmias, C., and Nachmias, D. (1996). Research Methods in the Social Sciences, 5th ed. New York, NY: St. Martin's Press.

Hickman, M.J. & Reaves, B.A. (2001). Local Police Departments 1999. United States Department of Justice, Bureau of Justice Statistics – NCJ 186478.

Miller, L.S., and Whitehead, J.T. (1996). Introduction to Criminal Justice Research and Statistics. Cincinnati, OH: Anderson Publishing. p. 224.

SPSS Version 10 for Windows. (2000). Chicago, IL: SPSS Inc.

Weisheit, R.A., Falcone, D.N., Wells, L.E. (1999). Crime and Policing in rural and Small-Town America. Prospect Heights, IL. Waveland Press, Inc.

APPENDIX A:

COVER LETTER

EASTERN KENTUCKY UNIVERSITY
JUSTICE AND SAFETY CENTER
College of Justice and Safety
"A Program of Distinction"
245 Stratton Building
521 Lancaster Avenue
Richmond, Kentucky 40475-3102

August 30, 2000

Dear Police Administrator:

Your agency has been selected to receive the National Assessment of Law Enforcement Technology and Training Needs survey. In this study, researchers are surveying small and rural police agencies around the Nation. This study is being conducted by the Justice and Safety Center at Eastern Kentucky University and is funded by the National Institute of Justice, Office of Science and Technology. The researchers are interested in finding out about the technological needs and capabilities of police agencies. It's important to emphasize that this is NOT A TEST; there are not right or wrong answers. At the end of the study, the researchers will make suggestions based on what is found in order to improve the technological capabilities of small and rural police agencies.

All information that you give will be strictly confidential. The answers you give will be reported in such a way that an agency cannot be identified. No one but the researchers will know your agency is in the study. The information will be used for research purposes only; no one outside the study project will have access to the information you are providing. Please understand that taking part in this study is voluntary. There cannot be and will not be any consequences for your refusal to participate. However, your willingness to participate will result in highly beneficial information regarding the technological needs of small and rural police agencies.

This project was reviewed and approved by the Eastern Kentucky University's Human Subjects Committee. Question regarding your rights as a participant in this research may be addressed to the Committee Chairperson, Division of Grants and Contracts, Million House, Eastern Kentucky University, 40475.

Please take the time to fill out the enclosed survey and return to me in the enclosed, self-addressed, stamped envelope. If you have any questions, please call Ryan Baggett, Law Enforcement Technology Specialist at 859-622-8261.

Your participation in our study is greatly appreciated.

Sincerely,

Dr. Pam Collins, Director
Justice and Safety Center

APPENDIX B:

SURVEY INSTRUMENT

National Assessment of Law Enforcement Technology and Training Needs

1. Agency Name: _____
2. County: _____
3. City: _____ 4. State: _____
5. Rank of person completing survey: _____
6. Number of full-time sworn officers
   (NOT assigned to jail, court, or lock-up units): _____
7. Population served: _____
8. Type of agency:

   ____ County sheriff's department

   ____ County police department

   ____ Municipal/local police dept.

   ____ Other (please list) _____

9. Mark (X) for each of the functions for which your agency uses computers. (Check all that apply)

- ☐ Crime analysis
- ☐ Crime mapping
- ☐ Criminal investigations
- ☐ Dispatch (CAD)
- ☐ Fleet management
- ☐ In-field communications
- ☐ In-field report writing
- ☐ Internet access
- ☐ Records mangement
- ☐ Resource allocation
- ☐ Other (please list)

10. Mark (X) the types of computerized files maintained by your agency. (Check all that apply)

- ☐ Alarms
- ☐ Arrests
- ☐ Calls for service
- ☐ Criminal histories
- ☐ Department inquiry
- ☐ Driver's license
- ☐ Domestic violence orders
- ☐ Evidence
- ☐ Field interview info.
- ☐ Incident reports
- ☐ Linked reports for crime analysis
- ☐ Payroll
- ☐ Personnel
- ☐ Stolen vehicles
- ☐ Stolen property other than vehicles
- ☐ Summonses
- ☐ Traffic accidents
- ☐ Traffic citations
- ☐ Uniform Crime Reports - Incident based (NIBRS)
- ☐ Uniform Crime Reports Summary
- ☐ Vehicle registration
- ☐ Warrants
- ☐ Other (please list)

11. Does your agency have exclusve ownership of an Automated Fingerprint Identification System (AFIS) that includes a file of digitized prints? Mark (X) in only one box.

- ☐ Yes - Exclusive
- ☐ Yes - Shared
- ☐ No

With whom? _____

11b. Does your agency operate an AFIS terminal that has access to a remote AFIS site?

- ☐ Yes
- ☐ No

12. Does your agency maintain an official home page on the world wide web/internet? Mark (X) in only one box.

- ☐ Yes
- ☐ No

If yes, briefly describe types of information maintained on your web page:

Please list your URL address:

13. Does you agency have computer crime investigative capabilities?

- ☐ Yes
- ☐ No

If not, who would your agency contact for computer crime assistance?

TYPES OF TECHNOLOGY	14. PLEASE CIRCLE THE FREQUENCY EACH TECHNOLOGY IS USED BY YOUR AGENCY			15. PLEASE CIRCLE THE PERCEIVED IMPORTANCE TO YOUR AGENCY OF EACH TECHNOLOGY USED			
	Never	Sometimes	Often	Not Applicable	Not Important	Somewhat Important	Very Important
A. Car-mounted mobile digital/data terminal (MDT)	1	2	3	0	1	2	3
B. Car-mounted mobile digital/data computer (MDC)	1	2	3	0	1	2	3
C. Communication - Base station radios	1	2	3	0	1	2	3
D. Communication - Cellular phones	1	2	3	0	1	2	3
E. Communication - Mobile radios	1	2	3	0	1	2	3
F. Communication - Portable radios	1	2	3	0	1	2	3
G. Digital Imaging - Fingerprints	1	2	3	0	1	2	3
H. Digital Imaging - Mug shots	1	2	3	0	1	2	3
I. Digital Imaging - Suspect composites	1	2	3	0	1	2	3
J. Global Positioning Systems - Mobile surveillance	1	2	3	0	1	2	3
K. Global Positioning Systems - Vehicle location	1	2	3	0	1	2	3
L. Hand-held digital terminal	1	2	3	0	1	2	3
M. Laptop Computer (in-field)	1	2	3	0	1	2	3
N. Less than lethal force - Capture net	1	2	3	0	1	2	3
O. Less than lethal force - Choke carotid hold or neck restraint	1	2	3	0	1	2	3
P. Less than lethal force - Flash/bang grenade	1	2	3	0	1	2	3
Q. Less than lethal force - Hand held electrical device/direct contact	1	2	3	0	1	2	3
R. Less than lethal force - Rubber bullets	1	2	3	0	1	2	3
S. Less than lethal force - Soft projectiles	1	2	3	0	1	2	3
T. Less than lethal force - Stun devices	1	2	3	0	1	2	3
U. Less than lethal force - Three-pole trip	1	2	3	0	1	2	3
V. Less than lethal force - Tranquilizer darts	1	2	3	0	1	2	3
W. Mainframe computer	1	2	3	0	1	2	3
X. Mini-computer	1	2	3	0	1	2	3
Y. Night Vision/Electro-Optic (Image intensifiers)	1	2	3	0	1	2	3
Z. Night Vision/Electro-Optic (Infrared - thermal imagers)	1	2	3	0	1	2	3
AA. Night Vision/Electro-Optic (Laser range finders)	1	2	3	0	1	2	3
BB. Personal computer (PC/Microcomputer)	1	2	3	0	1	2	3
CC. Video Camera (in patrol cars)	1	2	3	0	1	2	3
DD. Video Camera (Mobile surveillance)	1	2	3	0	1	2	3
EE. Video Camera (Fixed-site surveillance)	1	2	3	0	1	2	3
FF. Vehicle (Tire deflation spikes)	1	2	3	0	1	2	3
GG. Vehicle (Electrical/engine disruption)	1	2	3	0	1	2	3
HH. Vehicle (Stolen vehicle tracking)	1	2	3	0	1	2	3
II. Other - Please list (up to 3) II1. II2. II3.	1	2	3	0	1	2	3

TYPES OF TECHNOLOGY	16. PLEASE CIRCLE ONE FOR EACH LINE. RATE KNOWLEDGE SKILL ONLY IN TERMS OF YOUR OWN DEPARTMENT.			17. PLEASE CIRCLE FOR EACH LINE. CIRLE TRAINING NEEDS IN TERMS OF YOUR OWN DEPARTMENT.		
	FULLY COMPETENT	SOMEWHAT COMPETENT	NO COMPETENCE	NO TRAINING NEEDED	Some Training Needed	Much Training Needed
A. Car-mounted mobile digital/data terminal (MDT)	1	2	3	1	2	3
B. Car-mounted mobile digital/data computer (MDC)	1	2	3	1	2	3
C. Communication - Base station radios	1	2	3	1	2	3
D. Communication - Cellular phones	1	2	3	1	2	3
E. Communication - Mobile radios	1	2	3	1	2	3
F. Communication - Portable radios	1	2	3	1	2	3
G. Digital Imaging - Fingerprints	1	2	3	1	2	3
H. Digital Imaging - Mug shots	1	2	3	1	2	3
I. Digital Imaging - Suspect composites	1	2	3	1	2	3
J. Global Positioning Systems - Mobile surveillance	1	2	3	1	2	3
K. Global Positioning Systems - Vehicle location	1	2	3	1	2	3
L. Hand-held digital terminal	1	2	3	1	2	3
M. Laptop Computer (in-field)	1	2	3	1	2	3
N. Less than lethal force - Capture net	1	2	3	1	2	3
O. Less than lethal force - Choke carotid hold or neck restraint	1	2	3	1	2	3
P. Less than lethal force - Flash/bang grenade	1	2	3	1	2	3
Q. Less than lethal force - Hand held electrical device/direct contact	1	2	3	1	2	3
R. Less than lethal force - Rubber bullets	1	2	3	1	2	3
S. Less than lethal force - Soft projectiles	1	2	3	1	2	3
T. Less than lethal force - Stun devices	1	2	3	1	2	3
U. Less than lethal force - Three-pole trip	1	2	3	1	2	3
V. Less than lethal force - Tranquilizer darts	1	2	3	1	2	3
W. Mainframe computer	1	2	3	1	2	3
X. Mini-computer	1	2	3	1	2	3
Y. Night Vision/Electro-Optic (Image intensifiers)	1	2	3	1	2	3
Z. Night Vision/Electro-Optic (Infrared - thermal imagers)	1	2	3	1	2	3
AA. Night Vision/Electro-Optic (Laser range finders)	1	2	3	1	2	3
BB. Personal computer (PC/Microcomputer)	1	2	3	1	2	3
CC. Video Camera (in patrol cars)	1	2	3	1	2	3
DD. Video Camera (Mobile surveillance)	1	2	3	1	2	3
EE. Video Camera (Fixed-site surveillance)	1	2	3	1	2	3
FF. Vehicle (Tire deflation spikes)	1	2	3	1	2	3
GG. Vehicle (Electrical/engine disruption)	1	2	3	1	2	3
HH. Vehicle (Stolen vehicle tracking)	1	2	3	1	2	3
II. Other - Please list (up to 3) II1. II2. II3.	1	2	3	1	2	3

18. USING TECHNOLOGY LISTED IN THIS SURVEY, AND ANY OTHER TYPES OF TECHNOLOGY YOU CAN THINK OF, LIST IN ORDER OF **GREATEST** NEED THE THREE MOST IMPORTANT TYPES OF TECHNOLOGY TRAINING YOUR AGENCY NEEDS.

1. _____
2. _____
3. _____

19. USING TECHNOLOGY LISTED IN THIS SURVEY, AND ANY OTHER TYPES OF TECHNOLOGY YOU CAN THINK OF, LIST IN ORDER OF **LEAST** GREATEST NEED THE THREE LEAST IMPORTANT TYPES OF TECHNOLOGY TRAINING YOUR AGENCY NEEDS.

1. _____
2. _____
3. _____

20. DO YOU HAVE INTERAGENCY COOPERATION TO PROVIDE ASSISTANCE WITH TECHNOLOGY WHEN YOUR DEPARTMENT NEEDS IT?

☐ Yes ☐ No

20b. IF YES, BRIEFLY DESCRIBE THE TYPES OF INTERAGENCY COOPERATION YOUR AGENCY RECEIVES.

21. WHAT ARE THE THREE PRIMARY BARRIERS/IMPEDIMENTS TO YOUR AGENCY IN ACQUIRING THE TECHNOLOGY TRAINING YOUR AGENCY NEEDS?

1. _____
2. _____
3. _____

22. WHAT ARE THE THREE PRIMARY RESOURCES/FACILITATORS OF YOUR AGENCY IN ACQUIRING THE TECHNOLOGY TRAINING YOUR AGENCY NEEDS?

1. _____
2. _____
3. _____

23. PLEASE LIST ANY ADDITIONAL COMMENTS YOU MAY HAVE:

_____
_____
_____
_____
_____
_____