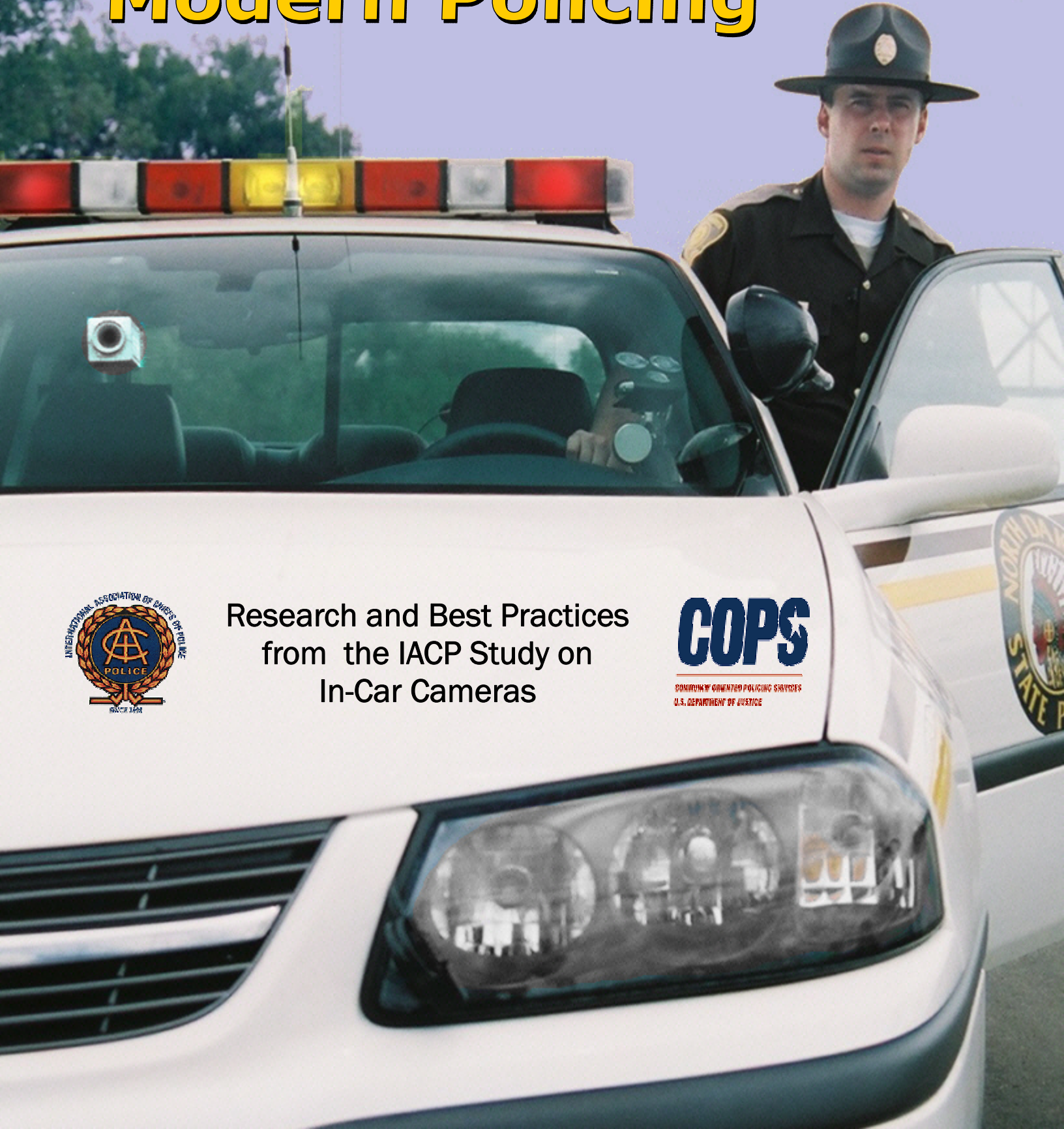


The Impact of Video Evidence on Modern Policing



Research and Best Practices
from the IACP Study on
In-Car Cameras

COPS

COMMUNITY ORIENTED POLICING SERVICES
U.S. DEPARTMENT OF JUSTICE

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(See Appendices for complete information on the participants)



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The Impact of Video Evidence on Modern Policing

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EXECUTIVE SUMMARY



The In-Car Camera Project

A National Study on the Use and Impact of In-Car Cameras

Executive Summary

In-Car Camera Use by Law Enforcement

Over the past decade, in-car camera technology for police vehicles has proliferated. Supporting this wave of video technology, the Office of Community Oriented Policing Services (COPS) has provided over \$21,000,000 in grants to help state police and highway patrol agencies purchase over 5,000 cameras. There are now over 17,500 cameras in state police vehicles in the United States. See Chapter II for details.

A major impetus of the COPS grant program was the enhancement of officer safety. Not only were officers being assaulted at an alarming rate; they were increasingly becoming accident victims while performing their duties on the highways. COPS believed that the use of the in-car camera would possibly deter assaults while providing a safer working environment. See Chapter VI for details.

Another emerging issue was racial profiling in policing. COPS leadership felt that providing agencies with technology capable of producing both video and audio records of traffic stops would be extremely useful to agencies investigating any public challenge regarding racial profiling. Based on these two critical police issues, forty-seven state police and highway patrol agencies quickly took advantage of these camera grants.

Inauguration of the IACP Evaluation

In 2002, the COPS Office sought the help of the IACP to conduct a nationwide study of in-car cameras, focusing on those in use by state police and highway patrol COPS grant recipients. This 18-month study looked at all 47¹ state agency grant recipients, and included intensive 3-day site visits to 21 agencies. The study consisted of two phases: 1) a process evaluation on camera acquisition and installation, and 2) an impact evaluation on the value of cameras to police agencies. For a list of participating agencies see appendix viii.

Using a variety of research methods, including survey research, on-site interviews, focus group discussions, continuing data collection and analysis, the IACP succeeded in capturing a broad array of information on the use and value cameras have had on modern policing. From the outset of the study, it became clear that while the focus of the research was on state police and highway patrol, the findings would be of substantial importance to all law enforcement agencies (state, county, local, Tribal) in the U.S. Thus this final report is intended for this broad audience. See Section III for details.

Process Evaluation Findings

The process evaluation of the study yielded extremely positive results regarding the success of the COPS grants program and its impact on supporting technology acquisition and use by police agencies. Results of the process evaluation included:

- 91 grants awarded to 50 agencies, totaling \$21,000,000

¹ When the study was initiated in 2002, only 47 state police and highway patrol agencies were participating in the COPS In-Car Camera Initiative Grant. By 2004, in-car camera grants were awarded to 49 state agencies and the District of Columbia totaling 50 agencies.

- 5,043 cameras selected and purchased by 50 agencies
- 5,000 plus, purchased cameras installed and in full use

The last bullet is of note, indicating that the agencies receiving COPS grants were highly effective in translating those funds into fast track acquisition and use of in-car camera technology. See Section V for details.

Impact Evaluation Findings:

The impact evaluation findings are dramatic. In the second phase of the project, researchers documented that in-car cameras provided a substantial value to agencies using them, including:

- Enhancing officer safety
- Improving agency accountability
- Reducing agency liability
- Simplifying incident review
- Enhancing new recruit and in-service training (post-incident use of videos)
- Improving Community/Media perceptions
- Strengthening police leadership
- Advancing prosecution/case resolution
- Enhancing officer performance and professionalism
- Increasing homeland security
- Upgrading technology policies and procedures

From all information sources; surveys, focus groups, and on-site interviews, it became clear to researchers that agencies were discovering a broad array of use and value to the cameras in use. See Section VI for details.

Lessons Learned

During the course of the study, a number of lessons were learned. Foremost was the need for agencies to conduct a thorough planning effort to ensure that they create a successful in-car camera program for their agency. Very often staff found agencies had failed to view the entire camera system continuum, falling short on key 'back end' components such as storing, filing and retrieving video evidence. Many agencies also reported that they had not gathered sufficient information on officer attitudes, long term equipment maintenance costs, analog versus digital formats and other policy areas as they began their programs.

Technology changes, and the pace of the changes are among the greatest challenges to police agencies. At the same time agencies are contemplating their camera purchases, vendors are introducing new equipment with enhanced features, causing agencies to reconsider purchase decisions. Further, the impending transition from analog to digital format is a daunting issue for law enforcement. Many fear that purchasing 'outmoded' analog will limit their programs while others fear that purchasing 'untested' digital may be just as problematic. In each case, agencies need expert guidance to make rational policy decisions. See Section VII for details.

Best Practices, Guidelines and Specifications

To maximize the value of the lessons learned, IACP staff began to move quickly into the development of ‘best practice’ information that would be of use to any agency contemplating the development of an in-car system. The best practices documents created over the course of this study include:

- Assessing your agency’s video evidence needs
- Developing an in-car camera strategy
- Navigating the acquisition process
- Managing your video evidence

Beyond these best practice guidelines, project staff also discovered that agencies often lacked the necessary policies, standards and/or guidelines that are requisite to successful program development. To assist in this area, staff helped craft two essential policy documents, each based on findings from the study:

- Working with the IACP’s National Law Enforcement Policy Center, an updated Mobile Video Recording Equipment Model Policy, and accompanying Discussion and Issues paper. See Section IX for details.
- Working with project advisors, the development of Suggested Guidelines: Mobile Video System, Part I: Vendor Bid Specifications, and Part II: Sample Bid Specifications. See Sections X for details.

Next Steps for the COPS/IACP Partnership

The in-car camera is one of several technologies in an officer’s ‘toolkit’ and, given the results of this study, it is proving to be an extremely flexible and useful tool, benefiting officers, agencies, and the communities they serve. Now that the evaluation is completed, the IACP in collaboration with the COPS Office will seek to achieve several new goals: 1) broad dissemination of evaluation results to the field, 2) provision of technical assistance to state, county, local, Tribal and other departments who are inaugurating or improving in-car camera systems, and 3) provide technical assistance training for police executives and prosecutors enabling them to make informed decisions.

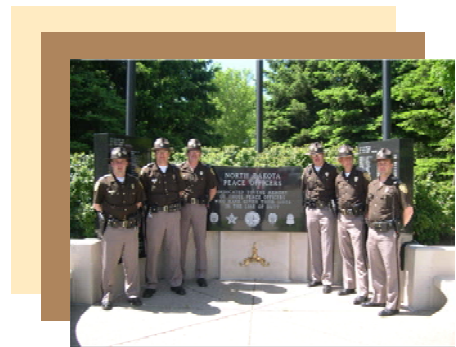
In the coming year, IACP will also team with the National Institute of Justice (NIJ), Office of Science and Technology (OST) to create a set of nationally recognized standards, specifications and guidelines for in-car cameras. These guidelines will be of significant use to police agencies as they work with vendors to identify and acquire the best system for their agencies. Overall, the combined expertise of the IACP, COPS and NIJ will provide clear direction to law enforcement on all aspects of in-car video programs.

One of the many lessons learned through this study is that police agencies require assistance when making technology acquisition and deployment decisions. An agency may acquire technology today that becomes obsolete by the time it is implemented or that cannot be shared with neighboring agencies. Recognizing these technology needs, the IACP, in collaboration with the COPS Office has been tasked with creating a nationwide technical assistance program that will assist agencies to make comprehensive assessments of their technological needs. The IACP’s Technology Technical Assistance Project’s (TTAP) over-arching goal is to help agencies make rational, informed and cost-effective technology acquisition decisions to improve the overall quality of policing, public protection, and community engagement.



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I. INTRODUCTION



Introduction

Advancements in policing over the past 20 years have been supported substantially by technology. For example, Report Management Systems (RMS) have streamlined report taking, information retrieval, and crime mapping. Mobile Data Terminals (MDTs) have given officers the ability to access the National Crime Information Center, state, and local data from their vehicles. Officers in the field are capable of retrieving motor vehicle, license, and warrant information in a much shorter time period. Calls for service are dispatched more effectively through computer aided dispatch (CAD) systems. Automated Fingerprint Identification Systems (AFIS) can identify criminals within hours and minutes instead of weeks and months.

The in-car cameras is another valuable policing and management tool. In the IACP national survey, *Closed Circuit TV/Video Cameras in Law Enforcement* (May 2001), departments reported that in-car video cameras were: 1) the most frequently used video technology within their agencies; and 2) the video technology of highest value.

Although in-car cameras have been in use in some agencies for over a decade, no comprehensive studies had been conducted to evaluate the impact of the technology on officer conduct, management of the agencies, and the public's perceptions of police.

In 2002, the IACP was commissioned by the United States Department of Justice, Office of Community Oriented Policing Services (COPS) to evaluate the impact of police in-car camera systems on state police and highway patrol agencies. The purpose of the study was to develop a *Best Practices Guide* for selection and acquisition of in-car camera equipment and to provide an updated *Model Policy* for the use of in-car cameras.

The study was divided into two phases. Phase I studied the process by which the cameras were selected and acquired and Phase II focused on impact evaluations.

Phase I: Process Evaluation - focused on:

1. Selection
2. Acquisition
3. Installation
4. Deployment

Phase II: Field Evaluation - measured the specific impact of in-car cameras on:

1. Officer safety
2. Officer performance and police professionalism
3. Agency liability and internal control
4. Training and education
5. Community perception
6. Agency policies, procedures and protocols
7. Agency leadership
8. Judicial process

The results of these evaluations are contained within this report.



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II. HISTORY OF IN-CAR CAMERAS



History of In-Car Cameras

The first videotape recording systems became available in the early 1960s. However, video technology of the 60's was not conducive to the mounting of cameras in police vehicles. In the late 1960s, a *Popular Science* magazine article featured an attempt by the Connecticut State Police to install a video camera and recorder in a patrol car. The camera was on a small tripod that required the full passenger side of the front seat with the back seat fully loaded with a recorder and cables that connected the two devices. While the equipment was far too cumbersome to make it practical for routine use in patrol vehicles, this experiment illustrated that video recording could play an important role in patrol operations.

Almost a decade passed with little noticeable advancement in the field of the audio/visual recordings, but by the early 1980's the self-contained Beta audio/visual recording system was introduced and revolutionized the recording industry. The next step in the evolution of the mobile video recorder was the introduction of the VHS recorder and tape, followed by the introduction of 8mm camcorders. Along with miniaturization came affordability, which catapulted audio/visual recordings into the mainstream of policing. In addition to the closed circuit televisions installed for monitoring lockup and holding facilities, agencies began using these devices to document crime scenes, giving a far more complete and comprehensive view of these situations than still photography could provide. The portability and ease of use allowed officers to operate these systems for surveillance, interrogations, and training.

In 1980, Mothers Against Drunk Drivers (MADD) was formed and brought a heightened awareness to the national problem of drinking and driving. Much greater emphasis was placed on convictions and punishment, particularly among prosecutors. The police began installing cameras in police vehicles to document the infractions leading up to the initial stop and the eventual field sobriety test. These recordings came to be viewed as the most effective method of providing the necessary evidence to support a conviction. MADD recognized the value of the in-car camera and began purchasing systems for police agencies involved in detecting and apprehending driving while impaired or under the influence of alcohol and/or drugs (DWI/DUI) violators.

In the 1990's, America's war on drugs further advanced the use of the in-car cameras by documenting interdiction stops. It was difficult for jurors to believe that an individual transporting large quantities of narcotics and hundreds-of-thousands of dollars of unexplainable cash would actually give the police permission to search his/her vehicle. However, time and time again the camera documented the consented search, which was later used to gain a conviction.

By 1999, allegations of racial bias or racial profiling were being lodged against police agencies across the United States. State police agencies, by virtue of their primary traffic responsibilities, found themselves in the center of controversy with complaints of racial profiling. At the same time, assaults on officers were on the increase. Responding to these concerns, state and federal legislative bodies began enacting laws requiring all police agencies within their jurisdiction to document details of every traffic stop. The Department of Justice, Office of Community Oriented Policing Services recognized the value of the in-car camera in addressing officer safety issues and allegations of racial profiling while enhancing the public trust. Recognizing that the purchase of cameras for police vehicles was expensive and beyond the budgets of most police agencies, the COPS Office initiated the In-Car Camera Initiative Program to state police and highway patrol agencies throughout the U.S., delivering the first funds to state agencies in 2000.

A 2000 National Institute of Justice study on the police use of technology reported that only 3,400 (11%) of state police and highway patrol vehicles used for patrol were equipped with in-car cameras. Over the following three years the COPS office awarded over \$21 million to state agencies for the purchase and support of in-car cameras. The number of state police vehicles equipped with in-car cameras grew to 17,500, now representing 72% of total state patrol vehicles.

Today, many police agencies in the United States and worldwide are applying this technology to patrol operations by equipping their vehicles with mobile video recording equipment. Although the early attempts to place cameras in patrol vehicles were plagued with technical and safety problems, miniaturization and advances in technology have made the use of the mobile video recorder practical and affordable. As technology in the field of audio/visual recordings evolves, equipping police vehicles with in-car cameras will be the norm and no longer the exception.



III. PROJECT METHODOLOGY



Project Methodology

To chart the initial course for the project, an In-Car Camera Advisory Board was established in 2002, consisting of noted experts in the field of Mobile Video Technology, members of the academic community, police executives from across the country, legal scholars, and researchers from within the IACP and Department of Justice. The Board members provided insight and suggestions for the development of the *Phase I process evaluations*, as well as for the *Phase II impact evaluations*.

Phase I: Process Evaluation

Written process surveys were distributed to 47 state law enforcement agencies that received a COPS In-Car Camera Initiative grant. The survey inquired about their progress in the selection, acquisition, installation and maintenance of in-car camera systems, the development of relevant policies and procedures, and in-car camera operation and training. Agencies were also asked to highlight the obstacles encountered as well as the benefits derived from the use of in-car cameras. The process survey was the platform from which the Phase II study was launched.

The Advisory Board recommended that the written process survey be supplemented by a focus group study comprised of in-car camera users. This took the form of the Line Officers Roundtable, held in Wilmington, Delaware, and hosted by the Delaware State Police in January 2003. Camera users from 17 state law enforcement agencies across the country came together to discuss the problems and successes experienced in the use of the in-car camera systems.

Phase II: Impact Evaluation

Based on findings from the *Phase I: Process Survey*, 21 state police departments and highway patrols were identified as sites for *Phase II: Impact Evaluation*. The site selection process was guided by the following criteria to produce a representative sample: 1) the ratio of in-car cameras to patrol vehicles, 2) the size of the agencies and 3) their geographic locations. Formalized site visit protocols were developed to ensure consistent collection of data at each site. Site evaluation teams consisted of IACP staff and law enforcement consultants with in-car video camera expertise. At each site, independent meetings were held with a specified number of line officers and supervisors to obtain their collective input on their in-car camera program. The discussions focused on both the problems and successes that have arisen since the implementation of their program, and concluded with suggestions for possible solutions to the problems.

A series of surveys on the impact of in-car camera use was developed to gain insight into the perceptions of prosecutors, police line officers, police mid-level managers and executive staff, as well as private citizens. These surveys contained multiple-choice questions, scaled-rating questions, as well as comment areas for the respondents to add any supplemental information they deemed relevant.

Prosecutors' Survey - With assistance from the American Prosecutors Research Institute (APRI), a survey was developed and distributed to a nationally representative sample of prosecutors. Questions regarding their familiarity with video evidence and the problems and successes they encountered before, during and after trial were included in the survey instrument.

Line Officers' Survey - This survey sought information in the area of officer safety, officers' acceptance, performance, citizen reaction, and training and policy issues related to in-car cameras. Prior to the site visit, the agency received a pre-determined number of line-officer surveys that were to be distributed at random to the officers, completed with the guarantee of anonymity, and returned in a sealed envelope. The number of surveys distributed to agencies was determined by the size of their patrol fleet and the number of in-car camera systems currently in use. This was done to ensure that a statistically valid sample size was chosen from each agency.

Mid-level Managers' and Executive Surveys - These surveys were used to assess the management process. In addition, surveys that focused on how videotapes were used in complaint investigations were given to members of the Internal Affairs Division.

Public Opinion Survey - To capture the public's response to the use of police in-car cameras, public opinion surveys were given to the agencies to distribute to community members. Questionnaires were handed out at community and volunteer sessions at the agency or at university campuses.



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IV. BACKGROUND OF AGENCIES STUDIED



Background of Agencies Studied

According to the most recent Law Enforcement Management and Administrative Statistics (LEMAS)² survey, state police departments employ a total of 56,348 full time sworn officers. Of these, 39,273 are patrol officers, accounting for over 69% of total full time sworn officers. Obtaining the actual number of patrol officers is essential to identifying the target group of cameras users for this study.

Of the 47 state police and highway patrol agencies participating in the *Phase I – Process Evaluation*, only 21 agencies were selected to participate in *Phase II – Impact Evaluation*. The participants were selected based on the responses to the Process Surveys by the advisory board.

The 21 state police departments participating in the Impact Evaluation included:

1. Arizona Department of Public Safety
2. California Highway Patrol
3. Connecticut State Police
4. Florida Highway Patrol
5. Illinois State Police
6. Kansas Highway Patrol
7. Maine State Police
8. Maryland State Police
9. Mississippi Highway Patrol
10. New Hampshire State Police
11. New Jersey State Police³
12. New York State Police
13. North Dakota Highway Patrol
14. Oregon State Police
15. Oklahoma Highway Patrol
16. Pennsylvania State Police
17. South Carolina Highway Patrol
18. Tennessee Highway Patrol
19. Texas Department of Public Safety
20. Washington State Patrol
21. Wyoming Highway Patrol

The above agencies are a representative sample in terms of the size of jurisdictions they serve, geographic locations, size of the patrol fleet, and the number of cameras owned. According to the 2000 LEMAS survey, these agencies employ a total of 53,883 employees, 34,511 of which are full time sworn officers. There are 24,591⁴ patrol officers, whose duties consist of patrolling the numerous state-maintained roads and highways and providing police and patrol services throughout the state.

² Law Enforcement Management and Administrative Statistics (LEMAS): 2000 Sample Survey of Law Enforcement Agencies, Bureau of Justice Statistics

³ New Jersey participated in the on-site evaluation but did not participate in the survey portion of the study.

⁴ LEMAS Survey does not report the number of patrol officers in New Hampshire State Police. According to data in the Executive Questionnaire of the IACP In-Car Camera Evaluation, the number of patrol officers in New Hampshire is 225.



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V. PHASE I: PROCESS EVALUATION



Project Findings

Phase I: Process Evaluation

Focus Group - The Delaware State Police hosted a line officers' roundtable in January 2003. Representatives from 17 agencies across the country gathered to discuss both the problems and successes that they have experienced since acquiring camera systems.

Many of the concerns discussed were universal. The primary concern of the line officers was the overall quality of audio transmitters. In their opinion, transmitters were found to have limited range and were not durable. In addition, battery operated devices with extremely low amperage also caused concerns about reliability.

One of the most prolific benefits reported by the officers in the focus group was the number of citizen complaints that were either dismissed on the spot or handled at the first line supervisory level because the in-car recording enabled involved parties to review the evidence of the contact. Unfortunately, these instances are rarely documented, making them difficult to measure.

One of the most significant contributions of the roundtable was the opportunity for participants to design an ideal in-car camera system. This system would be ergonomically sound and officer safety conscious. The design features can be used by all police agencies in the negotiation phase of acquiring in-car camera systems from the various vendors. See Appendix E for full report.

Following the advisory board meeting and the roundtable discussion, written process surveys were formulated and distributed to all 47 state agencies that received grants from the COPS office. The following information was obtained from the process survey:

Total In-car Cameras Owned - In April 2003, the 47 state agencies surveyed owned a total of 31,498 patrol vehicles and a total of 17,500 camera systems. Of the in-car camera systems owned, 14,748 (90%) were in operation. Among the 1,752 in-car camera systems reported to be out of operation, approximately one third were to be repaired, about one third were to be installed, and a little under one third were surplus cameras. In addition, a small number of cameras were being used for training.

Grant Funded Cameras - The state police and highway patrol agencies surveyed reported receiving a total of \$10,036,377 in grant money from the COPS Office in 2000 (data from COPS office indicates that, in total, over \$21 million has been distributed to state police and highway patrol agencies to finance the purchase of in-car cameras). The Phase I survey results revealed that the In-Car Camera Initiative Grants awarded by the COPS Office had a significant impact on state police and highway patrol agencies. The grants funded 5,043 in-car cameras, accounting for 29% of all the in-car cameras owned by the state police and highway patrol agencies that were surveyed.

Timeline for the Acquisition Process - The average time from model selection to purchase was 2.5 months, from purchase to delivery was 2.4 months, and from delivery to installation was 4.2 months. On average, the process took just over 9 months from selection to installation.

Camera Systems Purchase - The majority of the reporting agencies selected their vendor using the competitive bidding process. Vendors were selected either because their products were considered of higher quality, they had certain desirable features such as the interface capability with existing radar instruments, or because they were the lowest bidder.

Camera Systems Installation - Thirty-one agencies have their own technicians perform the installation and maintenance on the in-car camera systems. The remaining agencies outsourced this service to vendors or third-party contractors. Most of the agencies did not report making modifications to the in-car camera systems during the installation process, while seven agencies made minor modifications such as adapting mounting brackets for specialty vehicles, installing mounting hardware and wiring power connections, or disabling the power switches to allow cameras to start recording upon emergency equipment activation.

Camera Deployment - The overwhelming majority of in-car cameras have been mounted in patrol cars. Only 10 of the 47 agencies have in-car camera systems installed in non-patrol cars, i.e., specialty vehicles, DUI Vans, or undercover surveillance vehicles.

The principal criterion for camera deployment was the personnel involved, geography or a combination of both. In some states, the camera systems were deployed equally or proportionately to all districts across the state; in other states, cameras were provided to officers working assignments that would most benefit from the new technology. Some of the agencies that chose personnel as their primary deployment criterion reported that they issued camera systems to many of their high activity personnel and personnel that perform higher risk duties, such as drug interdiction and DUI task force members. Other state agencies equipped all new patrol vehicles with camera systems.

In-car Camera Use Policy - At the time of the survey, 39 agencies (83%) reported having policies and procedures addressing the use of in-car camera systems in place; five agencies (11%) were in the process of creating policies; and the remaining three agencies (6%) planned to develop policies in the near future.

Training - Twenty-five agencies had either developed, or participated in, a training curriculum on policies, procedures and protocols to accompany the use of cameras. Training was usually delivered by state training academies, approved training providers, or manufacturers. Additional training agencies include the Law Enforcement Mobile Video Institute, South Carolina Criminal Justice Academy and the Institute of Police Traffic Management. The remaining 22 agencies did not have a training curriculum.

Benefits of Training

- ✓ Reduced equipment down time
- ✓ Better images for investigation & court
- ✓ Reduced liability concerns
- ✓ Increased officer safety
- ✓ Increased public support
- ✓ Cost-effective management

Benefits Derived from In-car Camera Use - Respondents cited numerous benefits, including, but not limited to: increased officer safety; documentation of traffic violations, citizen behavior, and other events; reduced court time and prosecutor burden; video evidence for use in internal investigations; reduced frivolous lawsuits; and increased likelihood of successful prosecution.

Problems Encountered - Improper installation of systems was identified as a problem that might endanger officers. Audio transmitters were consistently cited as unreliable, due to durability issues and frequency limitations. The majority of the state agencies believed the acquisition process was time consuming. Several agencies felt that accepting the low bid often created quality assurance problems and excessive down time for their systems. Other problems mentioned included: the absence of an organized infrastructure for the management, storage and handling of audiovisual recordings; officers' concern over cameras being used as a tool to monitor their performance; lack of training, funding, and written policies and procedures prior to the use of in-car camera systems.



VI. PHASE II: MEASURING THE IMPACT

Officer Safety

Agency Liability and Internal Control

Training

Community Perception

Judicial Process

Officer Performance and Police Professionalism

Citizen Demeanor

Agency Policies, Procedures and Protocols

Agency Leadership

Homeland Security



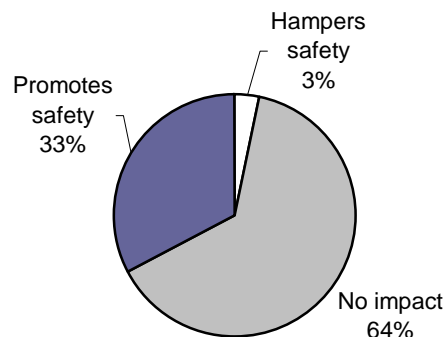
Phase II: Measuring the Impact

To measure the impact that in-car cameras have had on policing, the In-Car Camera Advisory Board selected eight critical areas on which the study would focus. The following are excerpts extracted from the study:

Officer Safety - One of the greatest values of the in-car camera is the positive impact that it has had on officers' perception of safety. To measure the perception of officer safety, two different approaches were used: a written survey and face-to-face interviews. In the survey, officers were asked to gauge the impact the cameras have had on their safety. The results indicated that about one third of officers perceived a feeling of increased safety when the camera was in use. However, in interviews, when officers were asked how they utilized the recordings, an overwhelming majority stated that they review the footage for self-critique. Officers said they review how they approach each situation and take mental notes of any officer safety issues they discover, such as turning their backs on a potentially dangerous individual, or allowing themselves to be distracted by other persons or events. Many officers also reported having used the presence of the camera to deescalate situations that they felt were becoming confrontational by informing citizens that they were being recorded.

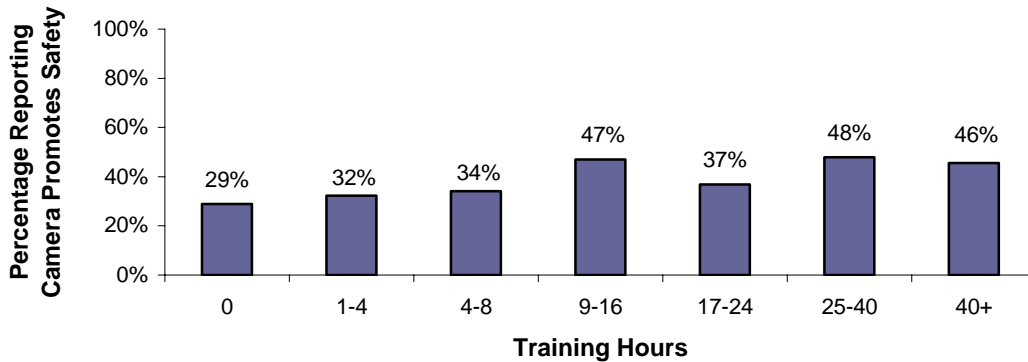
In terms of their personal safety, 33% of the officers reported in the survey that the use of the cameras caused them to feel safer on the job, while 64% reported that the use of the camera has had no impact on their level of personal safety. The remaining 3% reported that the camera has diverted their attention from the violator when they were operating the system, or they find themselves adapting their actions for the camera. Some officers believe that attempting to orchestrate situations to obtain the best possible camera angle may cause them to place themselves in an unsafe or less than favorable position. In general, the more experience officers had with cameras, the more likely they were to report an increased perception of safety resulting from the presence of the camera.

Survey Response: Level of Personal Safety



The same effect holds true with the issue of training. On average, the more in-car camera training an officer has received, the more likely he is to have reported that the in-car camera promotes safety. It should be noted that the majority of officers using in-car cameras (77%) reported that they had never received any, or had received less than four hours, formal training in the operation of their systems. Of those surveyed, fewer than half received training that covered departmental policies and/or related laws that apply to the use of audio/visual recording.

Training Hours vs. Officer Safety

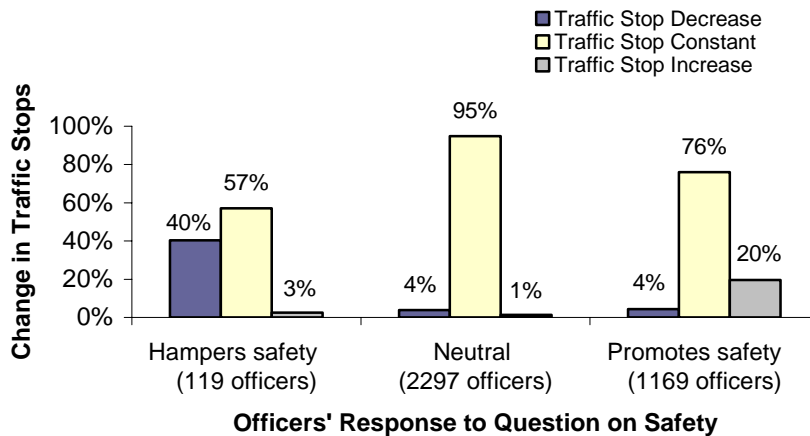


The study also shows that the more experience an officer has, the more likely they are to use the camera as a tool to deescalate a confrontational situation. Of the participating officers, nearly half (48%) reported that citizens have become less aggressive after learning the event was being recorded.

Officers reporting that in-car cameras promote safety are more likely to report an increase in job satisfaction. Overall, 15% reported greater job satisfaction after using in-car cameras, whereas 8% reported a decrease. The change in officers' level of safety correlates with the change in job satisfaction. For instance, 36% of officers reporting that cameras promoted safety also reported that they were more satisfied with their jobs.

Officers holding the belief that cameras promoted safety are more likely to report an increase in traffic stops. Of officers stating that cameras promoted safety, 20% reported an increase in the number of traffic stops, as opposed to 3% among officers thinking that cameras hampered safety. Overall, 7% of officers reported making more traffic stops, and 5% officers reported making fewer traffic stops after using in-car cameras.

Officer Safety vs. Change In Traffic Stops



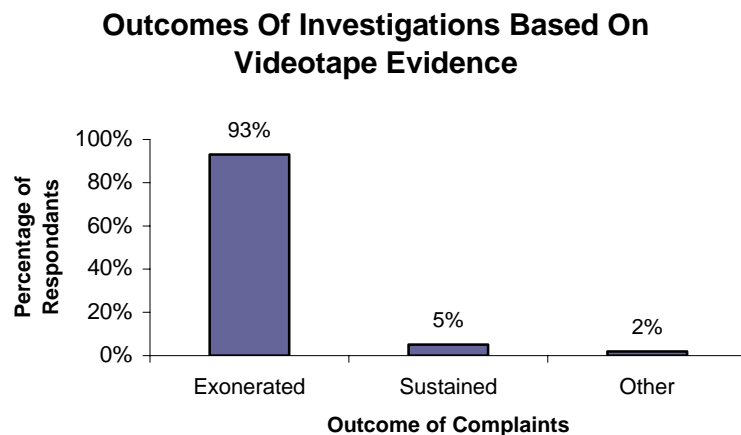
Agency Liability and Internal Control - The study showed the significant impact that the in-car cameras have had on improving the officers' ability to respond to complaints regarding professionalism and courtesy. The survey specifically asked line officers about complaints filed against them and the use of the recording to adjudicate the complaints. The majority of officers reported that the camera ultimately cleared them of accusations of wrongdoing; very few reported that the camera sustained a complaint filed against them. According to the responses of the over 3,000 officers who completed the surveys, in only 5% of the cases were complaints sustained based on video evidence captured by the in-car cameras.

A first line supervisor, or a supervisor of a similar command level, will generally handle a complaint against a police officer. Discussions with the supervisors mirrored the findings from the line officers survey, but added two new dimensions:

1. In at least half of the instances, once the complainant is made aware that the stop or contact was recorded, the complaint was withdrawn.
2. A significant amount of time was saved in conducting investigations, with the availability of the video evidence. Usually, this was conducted as an informal inquiry into the events. The supervisor reviewed the officer's recording of the event, and then contacted the complainant to discuss the incident. These cases were rarely documented when the findings are in favor of the officer. If video evidence was not available, the complainant would usually be asked to file a written complaint. The supervisor would then interview all witnesses and the officer or officers involved, would then prepare a written document of the findings.

In both the survey and interviews, officers were asked about their personal experiences with the use of in-car video evidence in the investigation of allegations of misconduct. Of the 3,680 surveys returned, a total of 2,244 officers responded to this question. The data revealed that in cases where video evidence was available, the officer was exonerated 93% of the time; in 5% of the cases the complaint was sustained. In the cases in which the complaint was sustained, the violation may not be the initial allegation, but rather a finding of other unreported misconduct observed upon review of the tape. These could range anywhere from not wearing the proper attire to major infractions. In the remaining 2% of the cases, the responding officers reported the outcome of investigation as "other." Overall, a majority of agencies using cameras reported a higher number of exonerations when there was video evidence of the incident.

Internal affairs sections also recognized the value of the in-car cameras. They found that following installation, an increasing number of cases were resolved or dealt with at the first line supervisor level rather than being forwarded to their office for formal investigations.



The in-car camera is not only a reactive tool that will expedite the internal investigative process and provide conclusive evidence of guilt or innocence, it is also proactive in preventing misconducts, officers are expected to conduct themselves more professionally when being recorded. The internal affairs investigation and external review of complaints are reactive measures to misconducts. Proactive measures such as the screening of applicants, training, and policy adjustments are necessary to prevent misconducts from occurring in the first place.

The amount of distrust generated by workplace surveillance depends on how officers perceive the purpose of the cameras. To determine the officer's perception, officers were asked what they believed was the reason their agency decided to install in-car cameras. Overall, officers believed that the most important reason was to collect evidence for trial and to protect the officers against false accusations. However, 28% of officers reported that monitoring officers' performance was the primary reason for installing cameras.

Rank of Importance	Officers' Perception of the Purpose of Camera Installation
1st	To collect evidence for trial; To protect officer from false accusation
2nd	To monitor officer performance
3rd	To be used for internal affair investigation; To guard against racial profiling
4th	To improve public relations

The use of in-car cameras does not hinder the officer from performing his or her duties. When asked if the camera affects how the officers deal with situations, 70% maintained that they affect them very little or not at all. In terms of the cameras' effects on officers' discretion in handling situations, 86% reported that cameras had no effect. An overwhelming majority of the responding officers (89%) said that the cameras had no effect on their decision to use force in a situation.

The line officers' survey reveals that only 11% of officers reported that camera usage was moderately stressful or very stressful and 30% believed that the use of the camera was slightly stressful. Officers who perceived that an internal affairs investigation was the primary reason for instituting in-car cameras were also more likely to report that camera usage was "Moderately Stressful" or "Very Stressful." The majority of officers (59%) did not believe the presence of the camera increased stress levels. Only 8% of officers indicated that they were less satisfied with their jobs, and 5% said they made fewer traffic stops. On the other hand, in-car cameras have resulted in 15% of the responding officers to be more satisfied with their jobs, and 7% reported making more traffic stops.

Realizing officers' concerns with regard to the perceived use of the camera for internal investigations caught the attention of many police agencies. A small number of agencies (7%) in an effort to alleviate undue fear, suspicion and reduce stress, sought input from line officers and mid-level managers prior to initiating in-car cameras. These agencies experienced a greater level of acceptance to new technology with little or no reduction in productivity⁵.

⁵ Job satisfaction is regressed on the following list of independent variables: agency, assignment, gender, race, law enforcement experience, camera usage experience, whether cameras are in use before starting the job, initial attitude, current attitude, stress, whether videotapes are reviewed periodically, whether cameras have been used to prove or disprove allegations against you, whether internal review makes you reluctant to use camera, whether your agency takes steps to relieve your concern over internal affairs investigation, rank of internal affairs investigation as purpose of camera installation, whether camera reduces discretion, whether the department seeks input prior to adoption of new technology.

Measuring the impact of the in-car camera on agency liability was a difficult task. In general, agencies did not keep records on the number of lawsuits filed or settled. As part of the impact evaluation, the team interviewed the commanders of their loss prevention or Attorney General's Office representing the various police agencies. Attorneys representing the agencies categorically support the use of the in-car camera. They pointed out that video evidence allows them to save time in case disposition. On rare occasions, after reviewing the video evidence, they decided to settle the case in lieu of proceeding to trial. Although the determination may be made to settle or pay damages, the presence of the video evidence often saved time in investigation and/or lengthy litigation cost and served to mitigate the circumstances surrounding the incident.

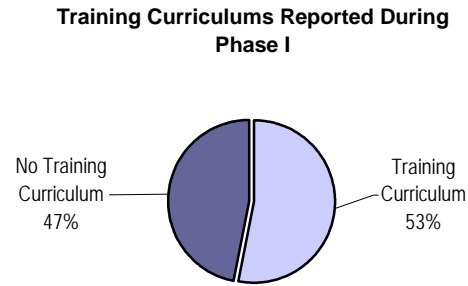
The majority of the cases that the solicitor or agency attorney receives stem from vehicle pursuits or accidents occurring while the officer is responding to priority calls. In most instances the video evidence indicated that the officer's actions were lawful and within departmental guidelines. The presence of video evidence allowed the agency to defend the officer with great success.

The following is a case that stands out depicting the value of the camera:

An officer was responding to a major incident requiring immediate police assistance. As he approached a busy intersection with lights and siren activated, he slowed to move around stopped traffic and then proceeded through the intersection. While in the intersection, he was struck by another vehicle. The officer reported that he had the green light and the right of way. No less than five independent witnesses to the accident stated that the officer ran a red light. The officer's vehicle was not equipped with a camera; however, the secondary officer who was behind the involved officer did have his camera activated. The video evidence recovered from the secondary officer's vehicle served as the unbiased witness and clearly proved that the involved officer's vehicle entered the intersection on a green light and in fact proved that the citizen's vehicle striking the officer's vehicle had run the red light. The video evidence disputed the testimony of five eyewitnesses. A multi-million dollar lawsuit had been filled against the police agency, which was dismissed based on the video evidence. The agency recovered all the costs and financial restitution for the damages to the police vehicle, as well as medical costs for the officer.

Regression result indicates that an officer is more likely to be satisfied with his job after using cameras if he believes that in-car camera makes him safer, if he welcomes camera usage, if he thinks that his department has sought input prior to the adoption of new technology, and has taken steps to relieve his concern over internal affairs investigation. Conversely, increase in work stress or decrease in officer discretion will reduce job satisfaction.

Training and Education - Phase I: Process Survey determined only 25 of the 47 grant recipients reported having some form of formalized training for their in-car camera users. Of the remaining 22 agencies, eight reported currently developing a program, and the remaining 14 agencies had no training in place. A year later, *Phase II: Impact Evaluation* found that all 21 agencies evaluated had implemented a form of training, or were in the process of developing a curriculum.



In the Phase II study, line officers were questioned regarding their level of training in the use of the in-car camera equipment. The majority of respondents (72%) reported they had received some form of training, while the remaining 28% reported they had not. Of those individuals who did receive training, 69% reported they had received between one and eight hours of formal training; however, 37% asserted that the training they received was inadequate and did not identify relevant laws and departmental regulations. In most instances, the training they received on operation of the system was either from the vendor or the technician who installed the system. Most respondents reported they were not provided with an operator's manual. The training that was provided often followed installation of the equipment. The officer initially assigned to the unit received some instruction on how to operate the system, but when the vehicle is passed on to the next officer, the second officer often receives no instruction on the operation of the additional equipment.

The value of the in-car camera for the purposes of training cannot be overlooked. Not only are officers using the cameras as an effective tool for self-critique, they have found them to be an invaluable resource for training new officers. New officers can review their actions with their training officers, through the objective eye of the camera immediately after an event occurs. It is important to remember that recordings from the field that depict either positive or negative police behavior are an asset to the training division of any agency; however, care must be taken to present the material in a way that will not embarrass an officer or undermine morale.

A successful in-car camera program requires that the users, managers, and judicial recipients have a clear understanding of how the equipment operates, its limitations, as well as potential drawbacks of the equipment.

During one of the line officers meetings, the officers were questioned regarding the operational status of their systems. Of the 15 officers present, seven reported their systems were not functioning. Further investigation revealed that these same officers had not received training in the operation of their equipment. During a break the evaluators accompanied the officers to their vehicles and discovered that five of the systems only required being reset. Unfortunately, these officers, having received no training on their systems, were unable to troubleshoot problems with their equipment; nor had they received manuals that included information on how to fix minor problems. (This problem was only magnified by the fact that there were only two shops in the state that could provide repairs.) The lesson learned from this story is that the number of functional in-car camera systems can be proportionally linked to the level of training the users are provided.

The following course of action is recommended:

1. Implement a course of instruction, that incorporates pertinent laws, Federal Rules of Evidence, departmental policies and procedures, and use and operation of the audio/video equipment.
2. Implement an introductory in-car camera course designed specifically for new recruits.
3. Implement a refresher course for advanced officer training.

As with any new technology, failure to properly train officers in the use, operation, and legal implications of improper use can result in disaster. Funding under the COPS In-Car Camera Initiative Program was dedicated specifically for the purchase and installation of the in-car cameras. However, early on the COPS Office recognized the need for training in this technology.

In 2001, the COPS Office awarded a grant to the Law Enforcement Mobile Video Institute (LEMVI) to provide a 40-hour instructors' course to state law enforcement agencies that received a COPS In-Car Camera Initiative award. LEMVI Director Jim Kuboviak was one of the early pioneers of in-car camera technology. He constructed and installed several of the prototypes for today's modern in-car camera systems.

One of his earliest systems was placed in the police vehicle of Constable Darrell Lunsford, of Nacogdoches County, Texas. This same device would later capture on video the homicide of Constable Lunsford. The video evidence captured by Constable Lunsford's camera provided suspect information that led to the capture and the subsequent conviction of the three perpetrators.

The tragic death of Constable Lunsford, coupled with the evidentiary value of the video media, inspired Kuboviak to develop and implement an instructor's training course in 1990. Today, LEMVI continues to be nationally recognized as the standard of excellence for in-car camera training. LEMVI was awarded additional funding from the COPS Office in 2003 to provide in-car camera training to local, municipal, county, sheriff, and tribal agencies through the national network of COPS Regional Community Policing Institutes (RCPI).

One of the most significant findings of the Impact Evaluation was the overwhelming need to extend the training beyond just the users, to include managers, executives and prosecutors. An effective program requires an understanding of the technology and unique issues involved in in-car video recording throughout the chain of command.

Funded by the COPS Office and coordinated through RCPIs throughout the United States, the IACP is presenting a series of training events focusing on agency executives, managers, and prosecutors. The program titled "Video in the Digital Age" introduces police executives and prosecutors to the technology, policies, and benefits of in-car video recording, and demonstrates how agencies can maximize the value of video technology throughout their agencies. The executive program provides executives and prosecutors with valuable information that will allow them to:

- Institute or enhance an in-car camera program
- Prepare their agency for the transition into the digital age
- Provide executives with model policies and best practices guidelines
- Develop current and realist bid specifications

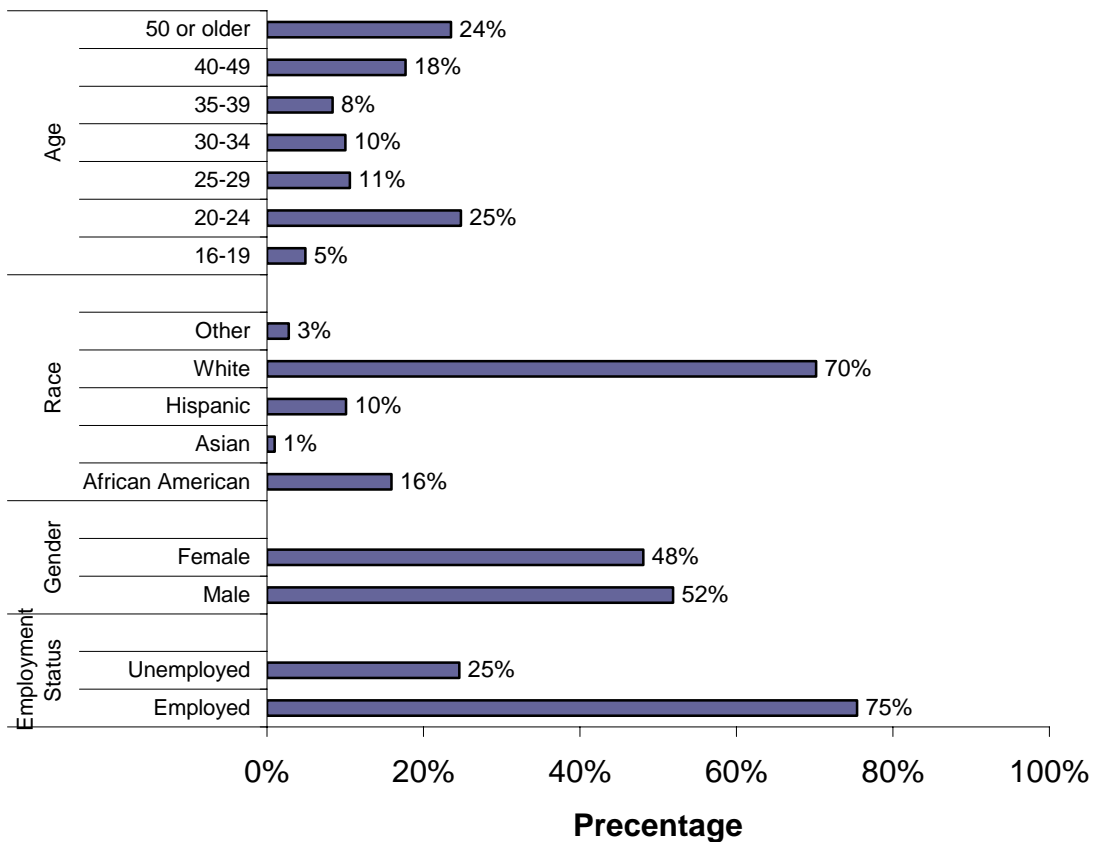
- Assist the agency by increasing accountability and public support
- Reduction of potential liabilities
- Establishing and managing a successful in-car camera program
- Enable agencies and prosecutors to obtain the best possible evidence for court

These sessions for executives and prosecutors will be followed a few weeks later by a comprehensive training opportunity for instructors and practitioners presented by LEMVI and hosted by the local RCPI. The dates and locations for these training events can be found at www.copscameras.org.

Community Perception – In addition to the surveys given to police and prosecutors, surveys were given to community members to gauge their support of the use of in-car cameras. In 12 of the 47 states, public forums were held to discuss the use of in-car cameras. Nine hundred citizens from 18 states completed and returned the surveys. When community members were asked if they support the police’s use of in-car cameras, 94% stated that they do support it and approve the use of the camera. However, 71% suggested that they should be informed when they are being videotaped.



Profile of Public Opinion Survey Respondents



Similar to the officers' surveys, the citizens were provided questions regarding behavior modification. When asked if they would modify their behavior if they were aware that they were being recorded, 51% of the respondents said that their behavior would change. The citizens added that the presence of a camera would make them less likely to drive aggressively.

The participants were asked if the presence of an in-car camera would impact their decision to initiate a complaint against an officer. A significant percentage (48%) responded that the presence of the camera would make them *less* likely to file a complaint. At the opposite end of the spectrum, 34% reported that the knowledge of police use of cameras made them *more* likely to lodge a complaint. A small representation, 2%, replied that their likelihood to complain was contingent on the particular circumstances; 15% did not think cameras would affect their decision to complain.

In addition to the surveys, community perception was measured through citizen forums held to gauge the public opinion in the participating states. It was discovered that the public held several common misconceptions. The general belief is that *all* police vehicles are equipped with in-car cameras. There was also a perception that the camera was mobile and shadowed the officer, as on television and in the movies. Current technology limitations generally restrict camera use to a stationary wide view of the event. This misconception needs to be recognized not only by the police, who deal with the complaints regarding police practices, but also by the prosecutors' who select jurors from the community at large. It also must be addressed in trial proceedings to ensure the jury does not have unreasonable expectations of what the video evidence can provide.

The single greatest value derived from the results of the public opinion survey and citizen forums is the fact that citizens support and even expect all police officers to be equipped with in-car cameras. The public recognizes that the camera systems not only help prevent the abuse of authority, but they also serve as a valuable tool to ensure the integrity of an agency.

Judicial Process – To measure the impact cameras have had on the judicial process, the IACP entered into a collaborative effort with the National District Attorney's Association (NDAA) and the American Prosecutors Research Institute (APRI). Of the prosecutors surveyed, an overwhelming number (91%) have used video evidence captured from the in-car camera in court. They reported that the presence of video evidence enhances their ability to obtain convictions and increases the number of guilty pleas prior to going to trial. The majority of the prosecutors (58%) reported a reduction in the time they actually spent in court. Although, when video evidence was used in the cases, 41% of the prosecutors reported an increase in their case preparation time.

Problems associated with the use of video evidence in trial as reported by the prosecutors are as follows:

- The cameras' limitations or field of vision
- Poor quality audio and video
- Obtaining copies from law enforcement prior to trial
- Lack of equipment or skills necessary to redact inadmissible portions of the video evidence
- Obtaining copies for defense attorneys through disclosure requests, contradiction between video evidence and officers' testimony, the absence of equipment

- Issues surrounding the chain of custody of the video evidence

In spite of the aforementioned issues, a great majority of prosecutors (93%) rated the overall use of video evidence as successful or highly successful. The types of cases in which video evidence is most successful are: driving under the influence, traffic violations, vehicular pursuits, assaults on officers, narcotics enforcement, domestic violence, and civil litigation against law enforcement agencies.

Police officers have also been questioned about whether video evidence has reduced their court time. Line officers reported that in the majority of cases where video evidence is present, the defendant pleads guilty. As for actual reduction in time spent in court, it is dependent on the officers' court schedule. If they are summoned to appear for trial on a particular case and the case is pled, then numerous hours waiting to testify and actually testifying were saved.

It is important to recognize that many of the problems facing prosecutors and officers alike result from the lack of training in the field of video evidence. Through training and specific departmental policies and procedures, most of the aforementioned obstacles will be overcome. The complete IACP/APRI survey is included as Appendix F of this report.

Officer Performance and Professionalism - The majority of police work is accomplished out of the supervisor's view and control, and this is more prominent in state police and highway patrol agencies due to the vast geographic area to be patrolled. In many instances, the officer/trooper may only return to the barracks once every 30 days, so an additional level of agency trust is afforded to them. Video evidence captured by in-car cameras provides the supervisors with an additional tool to monitor personnel performance, especially the performance of those officers working in remote areas.

While officers are aware that the in-car camera provides additional scrutiny of their performance, the question of whether or not it impacts their performance remains. The line officer surveys revealed that a majority of officers reported that the camera has not altered their performance. One-fifth of the officers reported that the presence of the camera improved their professionalism and courtesy.

During the line officer interviews, participants were asked to describe the impact that the camera has had on their professionalism and courtesy. Initially they responded in the same manner as they did in the survey. However, during the discussion a majority of officers confessed that when they are aware that they are on camera, they strive to present the best possible professional image.

Regarding citizen complaints, 8% of the responding officers reported a reduction in the number of complaints lodged against them. Statistical correlations indicate that officers who reported improvements in their courtesy or professionalism were more likely to report a reduction in the number of sustained complaints filed against them.

Further analysis reveals that an improvement in courtesy is positively correlated with a number of factors, including: the length of camera experience; whether an officer has undergone an internal investigation with video evidence used to either exonerate or sustain the complaint; amount of camera training; and the officer's perception of the periodic departmental review of the video evidence. That is, as the aforementioned factors increase, courtesy increases as well. Officers having undergone internal investigations in which video evidence was present also reported an improvement in their courtesy.

Officers who believe that their department reviews their tapes periodically are more likely to improve their level of courtesy. These officers tend to have a higher level of perceived monitoring than officers who do not believe their department reviews tapes periodically. This indicates that an enhanced level of monitoring can yield an improvement in an officers' demeanor.

Police encounters with the public involve an exchange of words and gestures, and previous research has demonstrated that the demeanor of the police and public are interdependent. Citizen mannerisms and responses have been used to interpret police actions and tactics⁶. If citizens are aggressive towards officers, the officers are more likely to react with aggressiveness and vice versa⁷. A systematic observational study⁸ conducted for the Presidents' Commission on Law Enforcement and Administration of Justice found that nearly half of the observed use of excessive force cases occurred when the victims verbally defied police authority.

In-car cameras not only impact the officers' performance, they also modify the behavior of the citizens being stopped. A bivariate correlation test demonstrates that officers reporting contact with citizens were less aggressive when cameras are present also reported an improvement in their courtesy. Of the officers who reported citizens becoming less aggressive, 26% reported being more courteous versus the 14% who reported that they have not observed a reduction in aggressive behavior during their contact with citizens.

Complaint information was collected through internal affairs divisions and the line officers' survey. Due to the scarcity of available data, it is premature to reach a generalized conclusion. Agency level data provided by a few police agencies show mixed responses. The number of complaints concerning police conduct in some agencies dropped after implementing the use of in-car cameras; however, in at least one of the agencies, the total number of complaints increased after the introduction of cameras. The total ratio of sustained complaints decreased after the introduction of in-car cameras.

Researchers are aware that allegations of misconduct are not the only variable dictating the number of complaints concerning police practices. Previous research⁹ on this topic confirms that complaints can, and do, result from good police work as well. More strenuous law enforcement efforts are sometimes accompanied by an increase in the number of citizen complaints. The public's willingness to file complaints is another factor that might affect the number of complaints. The more confidence the public has in complaint investigation, the more likely they are to report abnormal police behaviors. Changes in the procedures for complaint intake and demographics also cause fluctuations in the number of complaints an agency receives. However, the majority of the agencies studied have not initiated significant changes in procedures dealing with complaints since the introduction of in-car cameras.

The effects of in-car cameras on the number of complaints vary among departments. In some departments, the number of in-car cameras is too few to influence the number of complaints. Complaints might drop as a result of improved officer demeanor, and frivolous complaints may decrease if the public understands that in-car cameras will

⁶ Klinger, 1994; Worden and Shepard, 1995; and Worden, Shepard and Mastrofski, 1996

⁷ Mastrofski et al. 1996 and 1999; Paternoster et al. 1997

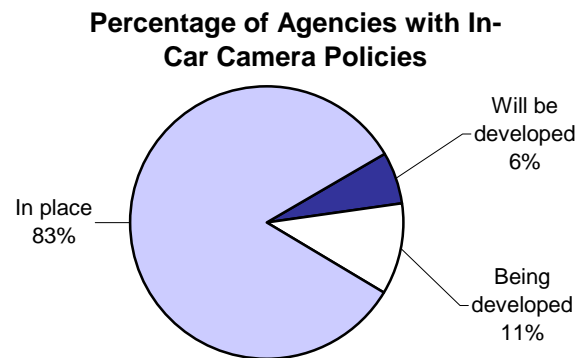
⁸ Albert Reiss, 1968

⁹ Reiss 1970 and Brereton 1999

support the truth. In-car cameras may also drive up the number complaints, because after using cameras, some officers have become more stringent in their traffic enforcement. A number of officers remarked that before using in-car cameras, they were more likely to give a warning for some minor offenses; when using in-car cameras, they tend to give citations in similar circumstances out of concern that their supervisors might review the videotape and question their decisions. This sentiment is often stronger in agencies that have only been using in-car cameras for a short period of time.

The study has examined whether in-car cameras have different impacts on the number of complaints received by law enforcement agencies in states that do not require the officer to disclose the presence of audio and video recording (one-party consent), as opposed to states requiring that recording is disclosed (two-party consent). Only a small number of the police departments studied require officers to notify subjects that they are being videotaped: New Hampshire Highway Patrol, Pennsylvania State Police, Maryland State Police, and the Illinois State Police. No sufficient evidence was found to establish a correlation between required notification of recording and a change in the number of complaints concerning police conduct.

Agency Policies, Procedures, and Protocols - A valuable lesson learned from the Impact Evaluation was the need for any agency implementing an in-car camera program to have a strong and clearly defined policy in place prior to implementation. In 2001, the Commission on Accreditation for Law Enforcement Association (CALEA) issued standard 41.3.8, regarding agencies that use in-car audio/video recording systems. The standard requires that any policy and/or procedure must address situations for use, tape security and access, and tape storage and retention schedule.



In 2003, during the process evaluation, 39 (83%) agencies reported having policies in place addressing the use of in-car camera systems; five (11%) agencies were in the process of creating policies; and the remaining three (6%) agencies planned to create a camera usage policy in the future. During the impact evaluation in 2004, only one of the 21 selected agencies did not have a policy in place.

The in-car camera documents the actions and demeanor of both the violator and the officer. A police chief may regard the in-car camera as a method of ensuring honesty, integrity and accountability. However, the officer may regard the same equipment as a disciplinary tool. This difference in philosophy must be taken into account when implementing or measuring the effectiveness of an in-car camera program.

The value of in-car cameras hinges, to a great extent, upon the willingness of officers to record their daily actions and subject themselves to periodic scrutiny. The agencies studied have made excellent inroads with this difficult task. Almost all of in-car camera policies reviewed for this study mandate that all traffic stops, police pursuits and citizen contacts be recorded in their entirety. The policies of many agencies have also highlighted the value of in-car cameras by demonstrating that officers are performing professionally.

Supervisory Review - Most of the agencies have developed a policy for reviewing videotapes to ensure integrity and accountability. This process is a valuable supervisory and management tool, yet a degree of caution should be exercised. If officers feel they are singled out and disciplined for minor infractions (i.e.; not wearing a hat or tie) following a review of their tapes, this could have a detrimental impact on the program and effect the morale of the officers and the program itself. Instead, these minor policy violations should be addressed through training or informal counseling.

Therefore, to ensure understanding and to promote trust with the in-car camera user, the agency may consider using the following or similar statements in their general order and/or policies and procedures:

Minor infractions (not criminal in nature) discovered during routine review of the recorded material should be viewed as training opportunities and not as routine disciplinary actions. Should the behavior or action be repetitive after being informally addressed, the appropriate disciplinary or corrective action shall be pursued.

Another important observation made by the evaluation team is the importance of communication between management and the rank and file. The majority of the agencies evaluated displayed exceptional communication at all levels throughout the chain of command. However, in a few rare cases, the evaluators found that a lack of communication was hampering the program. In some cases, officers using in-car cameras had different interpretations of when policy required the use of the cameras. Some officers and supervisors were unsure of policies regarding the retention of tapes, therefore problems with the storage of the media and subsequent chain of custody issues also occurred.

Line officers need a clear understanding of what is expected of them. Mid-level managers and executives need to be cognizant of all problems the officers are facing and become actively involved in problem solving, while also engaging line officers in the decision making and problem solving process.

To assist police agencies in creating a successful in-car camera program, the IACP has developed a Model Policy, which is included in the Best Practices Chapter of this report. The IACP In-Car Camera Policy is intended as a guideline, which can be adapted or modified to the unique needs of an agency.

Agency Leadership - The in-car camera is an unbiased witness to events to ensure the accountability and the integrity of their officers. Although the “virtual ride-along” can never, nor should it ever, take the place of the personal contact between supervisor and subordinate, periodic review of the officers’ recordings by the supervisor cannot be overvalued. Issues of officer safety, demeanor and professionalism can be diagnosed and addressed accordingly. The recordings, along with other supervisor observations, may serve as an early warning of an officer experiencing problems that should be addressed. The normally professional officer, who suddenly becomes easily agitated or short with the public, may alert the supervisor that the officer in question is under additional stress. The camera, in effect, can provide another level of supervision while providing additional protection for the agency against liability.

In addition, by streamlining the investigative process the agency can save hundreds of supervisory hours required to conduct a thorough investigation. The video evidence provides tangible, unbiased proof of officers’ actions. The study proved that in the

majority of cases, complaints are either withdrawn or brought to a speedy conclusion when there is video evidence available to the investigating supervisor or commander.

Proper management of an in-car camera program is essential to its success. Executives must have a thorough understanding of the entire scope of needs before instituting an in-car camera program. By utilizing the video assessment profile provided in the *Best Practices* section of this document, and ensuring that all parties with a vested interest are provided input into structuring of the program, police executives will be able to maximize the effectiveness of their program and ensure all needs are met. Building an infrastructure first may avoid many of the managerial pitfalls experienced by the agencies participating in this evaluation.

On a cautionary note, once the agency commits to the use of the in-car cameras, the use of the systems will become the norm and not the exception. Community leaders, the courts, and investigators will expect video evidence in all cases. This became apparent during one site visit where it was reported by officers that many prosecutors would not try a driving while intoxicated case without video evidence.

Many officers that use in-car cameras do not wish to patrol without them. Building a successful in-car camera program requires much more than the simple purchase and installation of the systems. There must be appropriate policies and guidelines in place to ensure that while citizens are being protected, their personal privacy is not being violated. Agency executives and community leaders must ensure adequate resources for the proper management, storage, and retrieval mechanisms in hardware, software, and personnel are provided. When dealing with the many forms of analog and digital media, for instance, automation may be the most cost effective method to pursue.

The value of this technology is self-evident. Public safety and citizen support for law enforcement will benefit from having in-car video cameras available for all police officers. All of these objectives can be accomplished through the efforts of law enforcement and our partners - the public.

Homeland Security - There are times when information collected by in-car video cameras can be used to address other fundamental concerns in this country, such as assisting agencies in identifying potential threats to homeland security. It has been nearly three years since the attacks of September 11th on the United States. It is important that we learn from the past and gain a better understanding of how to improve our ability to prevent future attacks.

Prior to September 11th, terrorists freely traveled around our country gathering intelligence on potential targets and acquiring materials to carry out their plans. Police officers routinely come in contact with these people, as evidenced by the findings of the 9/11 Commission. The state, local, city, and county police departments, as well as, sheriffs departments' and tribal police agencies will continue to be on the front line of the war against terrorism.

The in-car camera is a vital tool for gathering intelligence and documenting events. Audio tracks and visual images captured can be compared to existing voice samples and images of known individuals. The video images captured also provide a time and date stamp, which can place a person or a vehicle on or near strategic targets or subsequent major incidents. One example of this is found in the tragic bombing of the Murrah federal building in Oklahoma. A video camera operating at an apartment complex near the Murrah building captured the image of a Ryder truck shortly before the massive explosion. It was later determined the explosion was caused by a homemade bomb in the Ryder truck and this piece of video evidence was later used in trial to convict Timothy McVeigh.

State police in two states stopped terrorists linked to the September 11th attacks, hundreds of miles apart, within weeks and even days before the event. Research has also uncovered that on the day of the attacks, county police officers stopped two individuals outside a major military facility. The Federal Bureau of Investigation identified the two individuals as persons of interest. On September 14, 2001, a local police officer stopped an individual that presented only a passport for identification. The name given to the officer by the suspect revealed an open warrant for driving while suspended. Due to the officer's heightened awareness following recent events, the officer also contacted the Federal Bureau of Investigation. After taking the individual into custody, fingerprint analysis revealed that the suspect was in fact a known terrorist whom the FBI was seeking.

With recent advances in wireless mobile video technology, images and video files can be instantly transmitted to a central location where they are compared with state records, suspect files, or terrorist watch lists. Not only could this information help protect the officer, but the recorded audio and video could provide the information needed to allow authorities to intercede before citizens are killed or injured. For these reasons and more the in-car video cameras are an important tool for providing maximum national security.



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VII. LESSONS LEARNED



Lessons Learned:

Based on the process and impact studies, the IACP concludes that the COPS In-Car Camera Initiative Grant had a tremendous impact in advancing technology for the state police and highway patrol agencies. In 2000, the National Institute of Justice reported that 3,400 state police vehicles were equipped with cameras. Boosted by COPS funding of 5,034 systems by the end of 2003 the total number of in-car cameras in use by state agencies grew to 17,500. This represents a fivefold (515%) increase in the number of cameras. While the number of in-car camera systems grew significantly, with 14,100 new camera systems, COPS funding represents 26% of the cameras of the overall cameras being used. Seed money provided through the COPS Initiative Grant sparked the proliferation of in-car cameras systems throughout state police and highway patrol agencies.

Prior to installing the first in-car camera, departmental policies and procedures regarding use, storage and handling of the video evidence must be in place. This approach ensures the future admissibility of video evidence in court. Users should be properly trained in the operation of the equipment as well as federal and local laws relating to the use of electronic capturing of audio and visual images. The IACP study revealed that training needs to go beyond the users to the executive levels. Executives must have a basic understanding of the technology to ensure its compatibility with the agency's video evidence needs.

Finally, user perception is an additional factor that must be addressed when implementing an in-car camera program. If officers believe that the system is only being installed for disciplinary purposes, the program will falter and may fail. An agency can use the lessons learned through pioneer participants in this study to increase the chances for a successful in-car camera program.

Implementing an effective program requires more than simply purchasing and installing camera systems. A comprehensive video management plan must be in place. As we enter the digital age, planning for a system should be developed from the back-end (storage, filing and retrieving images) to ensure that technology will support the system selected. In addition, the plan begins with a broad assessment of an agency's video evidence needs and should bring together all parties with an interest in the success of the program. Prosecutors are integral to this process. Ultimately, they will have to defend the video medium selected in court. The video management plan must provide a means for proper installation and maintenance for the systems. Key considerations when selecting a system include the durability and reliability of the system; assurances of officer safety through the placement of the various components; and ease of operation.

How does an agency effectively negotiate with union representatives who may be concerned with negative aspects of the cameras use? The following facts may be useful:

- *In 93% of the time a complaint is filed regarding police conduct and there is video evidence available, the officer is exonerated.*
- *The officer is provided with a tool that can enhance their individual performance through self-critique.*
- *The overwhelming majority of officers having used in-car camera systems do not wish to patrol without them.*
- *In the worst-case scenario, the camera must speak for the officer who cannot speak for him/herself.*

When all the facts are taken into consideration, the rumors and fears begin to fade.

Today's in-car camera enjoys overwhelming public support and can enhance an agency's image while ensuring integrity and accountability. Camera technology, if applied properly, will enhance officer safety and provide valuable insight on the effectiveness and application of departmental policies. When it comes to purchasing technology, police executives must avoid the temptation to settle for an off-the-shelf technology solution when that solution may not meet an agency's needs. Technology designed for a city police department may not be suitable for a state agency. *Police must be educated consumers of technology.* This was illustrated by the industry's reaction to the Line Officers Roundtable in January 2003, where the in-car camera users identified problems with their in-car camera technology and made specific recommendations for change. By the IACP Conference in October 2003, every major manufacturer of in-car camera systems encompassed the user requested changes.

The in-car camera is a multifaceted tool that assists police executives by ensuring integrity and accountability while enhancing public trust. In-car cameras allow officers to critique and enhance their performance and provide training material for new recruits and advanced officer training. With the proper education, video evidence can be of great value to prosecutors as well as police. Video evidence can be used to refresh an officer's recollection of events while validating the officer's testimony. In many cases when video evidence is present, both time and monies can be saved if the defendant elects to plead guilty to the charges. In civil, criminal, and administrative cases, the presence of video evidence streamlines the investigative process and allows an agency to come to a timely conclusion. Even when revealing departmental violations, video evidence allows investigators, supervisors and executives to make sound assessments of the facts. With videos, mitigating circumstances that may impact the severity of discipline can be addressed.

The information provided in Chapter VIII, Best Practices, will help agencies create an organized plan of action that will serve as a blueprint for the successful acquisition and implementation of an in-car camera program. This comprehensive plan takes into account all of an agency's video evidence needs and will assist in the assessment, design, selection, acquisition and implementation processes. Additional information is provided on managing video evidence along with making the transition to digital systems.



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VIII. BEST PRACTICES

Assessing Your Agency's Needs

The In-Car Camera Acquisition Process

Managing Your Media



Assessing Video Evidence Needs:

When instituting an in-car video initiative, an agency must take into consideration how to collect, track, review, analyze, and store their recorded video. Police officers and supervisors must have equipment available to them in order to review and copy a video for training or evidentiary purposes.



Detective Joseph Giufrida, forensic video analyst with the Prince George's County Division of the Maryland Park Police, analyzing video evidence collected from a crime scene.

In recent years, the proliferation of affordable video technology has resulted in a rapid increase in the use of surveillance systems in businesses, schools, government offices, even churches and private homes. Law enforcement has been

challenged to manage vast amounts of video evidence from various sources. Many agencies have elected to maximize the value of their investments in in-car video by integrating video management and support functions into an, enterprise-wide strategy for handling video evidence. This strategy supports investigative review and analysis of video from many sources, including in-car camera footage, recorded interviews, surveillance footage, video recovered from a crime scene, or incidental video that may provide evidence of a crime or investigative leads.

The following are four levels of video support systems that an agency may choose to consider:

- Level 1 – Basic In-Car Video Support
- Level 2 – Expanded Video Support
- Level 3 – Agency Wide Video Support, Forensic Video Analysis
- Level 4 – Forensic Video Analysis, Intra-Agency Support

The Basic level of support is considered by IACP to be the minimum requirement for agencies using in-car video systems.

Level 1: Basic In-car Video Support - Basic In-Car Video Support is the minimum level of support for agencies with an in-car camera program. The agency is equipped with playback and recording equipment compatible with the in-car systems in use. This level of support will allow the review and duplication of tapes or tape segments. The agency maintains a log of videotapes for archives and monitoring of tape use. Depending on the size of the agency, there may be just one log or, more likely one at each patrol district. If advanced levels of video support are instituted, it is a good idea to maintain access to this equipment so that officers have the opportunity to review tapes for the purpose of report writing and case preparation.

Level 2: Expanded Video Support - While primarily designed to support the in-car program, an agency may elect to offer expanded video services by adding additional playback formats for conversion, duplication, or capturing and printing still images. The services or access to the equipment (with proper training) would be made available to investigative divisions. Digitization of analog video could be supported to create CD, DVD, or streaming video conversions for distribution or archiving. A log would be maintained for tracking tapes and documenting caseload.

Level 3: Agency-wide Video Support, Forensic Video Analysis - Level 3 includes the establishment of centrally located audio/video support for all investigations involving video processing within an agency. Additional specialized equipment can include demultiplexers, time-lapse VCRs, time base correctors, or photo printers. A digital forensic audio/video analysis system should be considered and or included at this stage. Computerized case tracking and evidence management is recommended at this level, as cases may include digitally processed video as well as the original tape or video file.

The video examinations at this level and above may be significantly more complex than simple contrast and brightness adjustments. Therefore, personnel should be required to receive comprehensive training in the specialized techniques and procedures, including courtroom testimony. Because of the time and effort required for this level of video support, basic support systems for quick review and copying of tapes should still be available to line officers, preferably located in patrol stations. Any video considered to be evidentiary should be forwarded to the central video support unit for examination, ensuring chain of custody procedures are followed.

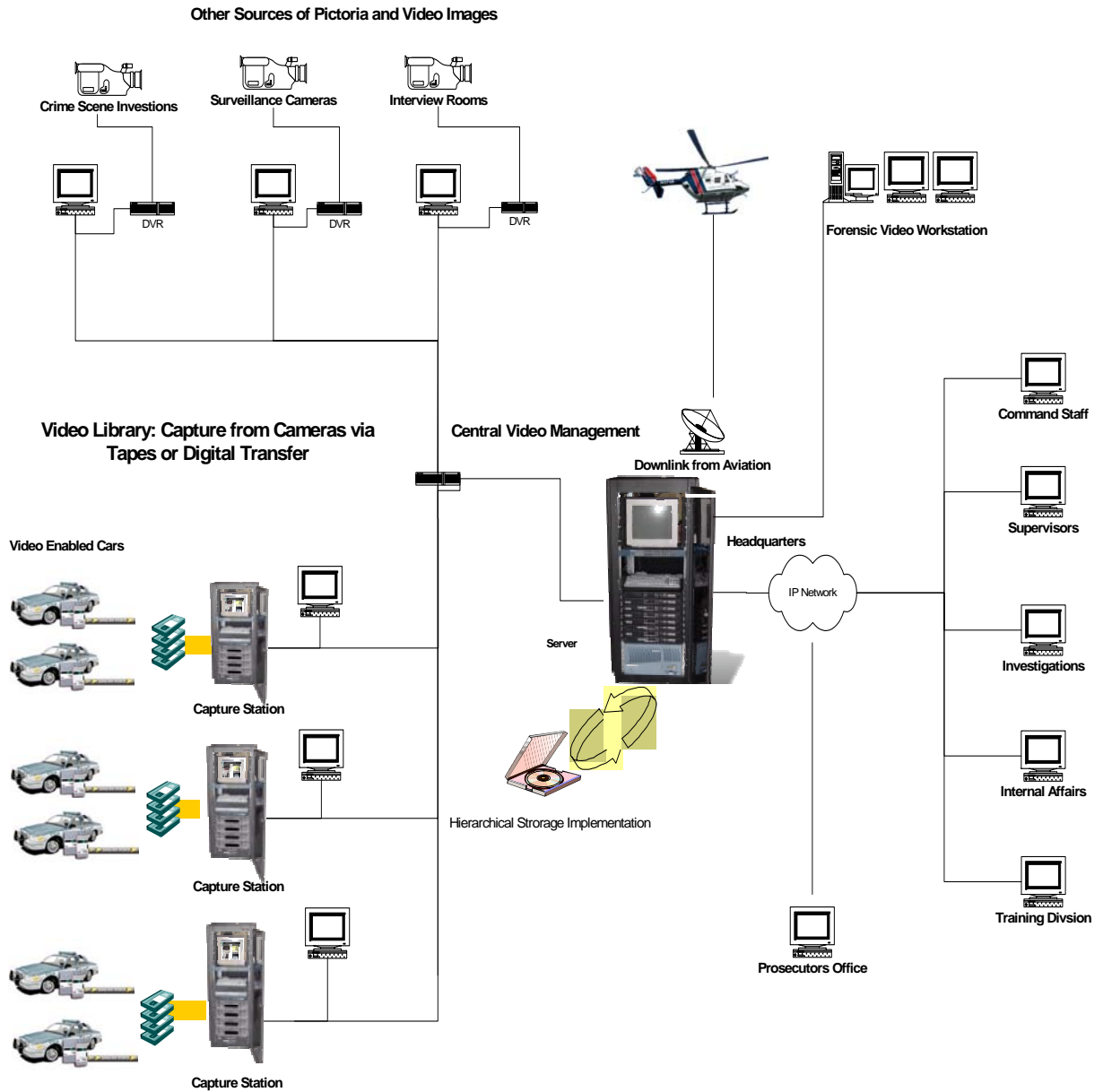
Level 4: Forensic Video Analysis, Inter-agency Support - The most advanced and extensive level of support, the forensic video analysis unit will provide full-service audio/video examination and support. It includes a digital forensic video analysis system, network connectivity, and secure wide area network access to stream video clips to investigators throughout the agency. A secure communication system with the District Attorney's office and other agencies may be in place to foster information sharing. Digital asset management software should be utilized to maintain video files in a "virtual property room." If possible, the agency should consider adding support for professional broadcast video formats, to facilitate analysis of news tapes and distribution of material to media outlets.

Note: Video examinations performed at Levels 3 and 4 may be subject to crime laboratory accreditation guidelines as set forth by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB). Agency managers should be familiar with ASCLD/LAB accreditation guidelines and local regulatory requirements when considering the establishment of a forensic video analysis unit. Specific training and/or certification of personnel may be required for accreditation.

Many agencies use audio, video, and imaging technology for a wide variety of tasks, from undercover surveillance to monitoring local newscasts. By identifying all these technical and human resources, an agency may be able to negotiate more cost-effective supply and maintenance contracts, build internal support and training infrastructure, and expand operational capabilities.

To best assess an agency's needs for audio/visual support, the IACP has developed the *Agency Video, Audio, and Imaging Inventory*, which is included as Appendix F of this report. This inventory will help identify all the resources currently in use within the agency.

Developing a Strategy - Once you have completed a video evidence needs assessment and identified the personnel that require input into a possible solution, the next step is to develop a plan or a blueprint that addresses the needs of all involved. The flowchart below is an example that may address the needs of a larger police agency. The example can be scaled down to accommodate smaller agencies.



The Acquisition Process:

When acquiring fixed assets of significant value (capital outlay expenditures), three basic methods are used. The piggyback contract, allows an agency to acquire the desired product based on another agency's contract with the vendor. This method requires the host agency to provide a "me too" clause in the original contract that allows for other federal, state, and local agencies to be provided the same service or product at the same rate of exchange. The second method is the sole source contract. This allows an agency that has delineated specific needs to identify the single vendor that can accommodate their needs. This practice is rarely utilized and is often discouraged by procurement offices due to the civil implications that only one vendor can provide. The third and most commonly practiced method is the competitive bid process. Of the 47 state police and highway patrol agencies receiving COPS funded in-car camera systems, the competitive bid process was the most commonly used (please refer to the Appendix D for Vendor Bid Requirements and Sample Bid Specification).

The following steps are an example of a generic template that should be addressed in the acquisition process:

1. *Needs Assessment.* This essential first step is a written document or study that justifies the application or request for a particular product or item of equipment. The needs assessment should take into account the agency's entire video evidence needs and the interoperability with existing or future equipment acquisitions.
2. *Bid Specifications.* Bid specifications are a crucial part of the process for any agency. Failure to be detailed when setting your minimum standards may result in an inferior product based solely on the lowest bid. At this juncture in the process, it is essential that all persons or sections having interest in the end result be included in the design of the bid specifications. By bringing the components together you ensure interoperability with existing equipment and ensure the equipment purchased will meet the needs of the end user.
3. *Legal and Budget Review.* The office of procurement will review the bid specifications to ensure compliance with local, state and federal regulations regarding the bid process.
4. *Request for Bid (RFB)* will be publicized. The RFB will contain the minimum standards acceptable for the fulfillment of this contract. This process generally takes between 30 – 90 days.
5. *Review of Bids* submitted to ensure they meet the minimum standards and specifications set forth in the original RFB. A committee will provide written recommendations to the governing body or departmental executive as to which bid is acceptable and why. A contract will then be awarded according to the rules of the governing body.
6. *Project Manager.* The project manager will work with the vendor throughout the terms of the contract to ensure delivery and installation of the product in a timely fashion and will maintain quality control. The project manager shall also ensure that all facets of the contract are fulfilled to include service, maintenance and training.

Timeline - Our study discovered that the average time from model selection to purchase is 2.5 months, from purchase to delivery is 2.4 months, and from delivery to installation is 4.2 months. The maximum time from model selection to purchase is 11 months, from purchase to delivery is 10 months, and from delivery to installation is 18 months.

Source - Eighty-three percent of state police and highway patrol agencies reported purchasing their in-car camera systems directly from the vendor. Eleven percent reported purchasing their systems from a subcontractor. The majority of the reporting agencies selected their vendor via the competitive bidding process. The reason provided for the vendor selection was that the product met with their specific product specification i.e.; their systems have interface capability with existing RADAR instruments, they were reliable and of high quality or simply because they were the lowest bidder.

Installation - Seventy-six percent of agencies surveyed reported having in-car camera systems installed by their agency technicians, and 24% agencies surveyed had cameras installed by vendors or subcontracts. Forty of 47 agencies reported not having any modifications to either the vehicles or the mobile video cameras when completing installation. However, seven agencies made minor modifications such as modifying mounting brackets for specialty traffic cars, installing mounting hardware and wiring power connections, and disabling power switch allowing cameras to come on with red light activation.

When purchasing, installing, or repairing in-car cameras, officer safety should always remain the number one priority:

- Overhead consoles with protruding corners should be avoided. In the event of a rollover accident, these sharp corners may cause serious head trauma to vehicle occupants.
- The camera casing should be mounted forward on the windshield and rest in front of the rearview mirror. This will minimize the peripheral obstruction of view and remove the camera from the passenger side airbag deployment zone.

Many times when vendors provide installation, they have the tendency to place equipment where it is easiest to install and usually do not take into account potential hazards that may affect the officer.

The reputable vendors, as part of the purchase agreement, will provide installation of the in-car camera systems or train personnel to properly install and reinstall equipment at no cost. As the number of in-car camera units increase, the installation of camera equipment will need to be transferred to either the fleet maintenance or radio repair shops. This will require factory training for those parties involved.

The Process Study also finds that a little under half of the 47 COPS grant recipients (46%) have their own technicians perform all maintenance, and 54% of the agencies contract maintenance out to vendors or manufacturers. In the event that emergency repairs are required, most of the agencies report that they replace the broken camera with a reserve camera or use camera parts to repair the camera, and then order new parts for the reserve. Rarely do any of the agencies have to send the entire system back to the manufacturer for repairs. Others contract with a local company or radio shop for minor repairs.

As equipment ages, more repairs will be required; therefore, having a trained technical staff at a central location for repairs and installation is essential to the development of the program.

Camera Deployment - The study found that in-car cameras have been primarily distributed to departments based on personnel and geographical regions. In some cases the camera systems were deployed equally or proportionately to all districts across the state; in other states, camera systems were provided to areas and assignments that would benefit the most from the new technology. For instance, counties with the highest average alcohol related crashes, largest number of D.U.I. arrests, areas that had the highest volume of traffic stops, or to specific areas where officer safety was of the greatest concern. Those agencies that selected personnel as their deployment criteria reported that they issued camera systems to many of their high activity personnel and personnel who would perform higher risk activities such as drug interdiction or D.U.I. task force members. Other state agencies equipped every new patrol vehicle with camera systems.

Although equity in the disbursement of equipment and new technology is understandable, this policy creates problems managing, controlling, training and when implementing new programs. Therefore, it is recommended that agencies implement in-car cameras incrementally (by district or barrack) to make the most of limited resources and allow for future program development. Incremental implementation allows for a smoother transition and new challenges to be met and addressed. Subsequent installation and implementation of in-car cameras in the remaining districts should then be seamless.

Managing Video Evidence:

As CALEA standards stipulate, “The products of this technology could become an important piece of evidence in any type of case and should be maintained in a way to insure the integrity of contents. When tapes become evidence, they should be treated as any other evidentiary items...” Therefore, all recordings should be treated as potential evidence until it can be established that the contents are not required as evidence in either a criminal, civil, or administrative matter.



Ms. Eliza Windsor, Video Evidence Technician, Prince George's County Police Department, Maryland working in their video evidence locker.

After conducting site assessments throughout multiple jurisdictions, one common problem emerged. The issue of storage and management of audio/video recordings has become one of the largest obstacles agencies have had to overcome. The purchase, acquisition, duplication, and storage of recorded media requires personnel time commitment, space, and resources that the majority of agencies are not prepared to deal with. Maintaining and guarding the integrity of the recorded media was an overarching theme in our assessment.

Once an audio/visual recording is admitted as evidence in a court of law, the test for admissibility becomes whether an officer can authenticate the audio/video recording as a true and accurate depiction of what transpired during the incident. However, to prevent incriminating evidence from being presented at trial, the defense may challenge the recording's admissibility based on the chain of custody. Although prosecutors across the country are split on whether video recordings fall into this category, the best policy, as with any physical evidence, is to always guard the integrity of the evidence and ensure policies and procedures maintain a strict chain of custody and are followed.

During the impact evaluation, discussions with the mid-level managers developed a common concern of the increased amount of time supervisors dedicate to reviewing and copying tapes along with the limited amount of space they have available for secure storage. As the program expands this demand on their valuable time will only increase. A mathematical example: Agency AAAA has 100 video enabled patrol vehicles and the average analog recording media is changed out or turned every 5 days. This means the agency goes through approximately 5,000 analog media (VHS or Hi8) per year. Supervisor B is assigned as the recorded media custodian at a district. Supervisor B's salary is approximately \$30.00 per hour. It takes supervisor B on the average 15 minutes to recover the recorded media from the patrol vehicle, log it in and place the media in a secured environment. Supervisor receives 30 requests per month to reproduce segments of the media for prosecuting attorneys or the defense attorneys. This process takes anywhere from 45 minutes to two hours depending on the length of the incident and the fact that the copies are made in real-time. Based on the aforementioned facts, the agency will spend approximately \$59,100 in administrative labor costs per year. Underestimating workload and costs were common problems experienced by the majority of the agencies participating in the study.

With any new program there is always an opportunity for enhancement, either through technology, systematic review or self-critique and this program is no exception. These suggestions come from study of both the problems and solutions experienced by a number of agencies with in-car camera programs.

The majority of the agencies studied purchased videotapes (standard consumer T-120 VHS six-hour tapes) in bulk. The same black plastic housed tape can be purchased at any local convenience store, allowing easy replacement of a tape containing questionable actions. This occurrence is hypothetical and would be an obvious integrity violation, as well as criminal, but the possibility can be avoided by the following recommendations:

- Purchase eight-hour videotapes as opposed to six hour tapes in bulk from a reputable vendor
- Order videotapes in a distinct color housing, such as red
- Adding a permanently affixed barcode or label to the videotape before it is issued.



By implementing a bar-coding or labeling system, the agency is able to better track and monitor both used and unused videotapes, serving to protect the integrity of the program. Using widely available commercial off-the-shelf database software, the agency can make future projections of supply needs and provide a chain of custody report by logging the videotape number, vehicle assigned, officer issued to, date and time issued, officer or vehicle recovered from, date and time recovered, and date and time placed in storage. Utilizing a relatively inexpensive bar-code reader, inventory can be taken in minutes. Additional fields can be added to the database to capture the date it is copied, by whom, and for what reason. This program is available from the IACP upon request at no cost to the agency. (See Appendix iii for sample document)

Our study revealed that on occasions when the system failsafe did not work and videotapes were accidentally overwritten because the equipment failed to recognize the imprinted images already on the tape. This generally occurs when the videotape is removed from the recorder to be copied or viewed and then placed back into the original system. Although this may be a factory defect, not removing the videotape until it is ready for storage would prevent this occurrence. If the videotape is removed for viewing, new or refreshed videotape should then be installed and the viewed tape placed in storage.

Acquisition and Storage of Recorded Media - The majority of police and highway patrol agencies studied are currently using analog video as their recording media. Issuing, ordering, filing, retrieving, or copying videotapes, are all labor-intensive tasks. The most efficient way to deal with the majority of these tasks is through automation. Automated storage systems designed to manage recorded media are currently available. As in-car camera projects expand, automation will prove to provide long term cost savings. On a cautionary note, before investing in a media storage system, ensure that the system has an open architecture that will handle all your recorded media needs. A media storage system should be capable of handling analog and digital formats, as well as multiplex recordings. The open architecture should also allow for expansion and must be upgradeable as new technology becomes available. Purchasing an open system allows the agency to select or change recording equipment as needed without limiting the agency to a specific brand or model. Purchase of a proprietary system may handicap

the agency's ability to advance their technological needs.

Lessons Learned from the Acquisition, Installation and Management of the Process - The best way to avoid problems is to recognize and learn from those agencies that have experienced the same problems.

The most commonly reported problems include:

1. *Acquisition:*

- a. Experiencing delays in the delivery of the in-car camera systems.
- b. Awaiting legislative approval for spending authority delayed bid process.
- c. Changes in new computer technology delayed bid opening.
- d. Vendors questioning the bid process delayed closing the bid.

2. *Equipment:*

- a. The number one complaint was with the poor quality of the audio portion of the recording. More specifically, the transmitters were providing poor reception, the microphones were too fragile and the life cycle of the batteries were insufficient.
- b. Excessive vibration on dash mounted cameras caused excessive system failure.
- c. Poor quality recording media is causing poor quality recordings.

3. *Installation:*

- a. Improper installation has caused multiple problems with the monitors and cameras. For instance, improper mounting can cause video recorder failure. One agency reported that 15% to 20% of units broke due to human errors.

4. *Management/Administration:*

- a. The collection, storage and cataloguing of videotape evidence is becoming a tremendous burden, especially for agencies that do not employ full time technicians assigned to the task. In most police agencies available storage space is at a premium.
- b. The absence of policies and procedures that dictate the use and explain the operations of the in-car camera equipment.
- c. Officers are not provided with adequate training for the use and operation of the in-car camera.
- d. Lack of funding for service contracts after the warranties on the existing equipment expire.
- e. Not having factory trained representatives on site.

5. *Human Element:*

- a. Negative attitude directed towards the forced use of the in-car camera. Agencies had to overcome the hurdle of officers being reluctant to use the in-car video systems, believing that the system purpose was to allow "big brother" to be watching. Now patrols that do not have systems are asking for them, after seeing all the positive effects they can have towards making their jobs easier, especially in the elimination of citizen/officer complaints.
- b. Destruction or disabling of camera systems by officers that do not wish to participate.



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IX. MODEL POLICY

IACP In-car Camera Model Policy

Concepts and Issues Paper



Model Policy

Effective Date March 2005		Number	
Subject Mobile Video Recording Equipment			
Reference		Special Instructions	
Distribution	Reevaluation Date	No. Pages 4	

I. PURPOSE

The purpose of this policy is to provide law enforcement agencies with guidelines for the use, management, storage, and retrieval of audio-visual media recorded by in-car video systems.

II. DEFINITIONS

Recorded media: Refers to audio-video signals recorded on any of several storage devices, including analog tape (VHS, SVHS, Hi 8mm), digital tape (DV), or other portable digital storage devices (CD, DVD, hard drive, etc).

In-Car Camera System and Mobile Video Recorder (MVR): These are synonymous terms and refer to any system that captures audio and video signals capable of installation in a vehicle, and that includes at minimum, a camera, microphone, recorder, and monitor.

Supervisor: Sworn personnel officially appointed responsibility for a departmental component.

MVR Technician: Personnel trained in the operational use and repair of MVRs, duplicating methods,

storage and retrieval methods and procedures, and who possess a working knowledge of video forensics and evidentiary procedures. (Dependant on the size and needs of the agency, the role of the MVR Technician may be delegated to the supervisor.)

Degaussing: Electronic cleansing of analog recording media returns the media to its original state and when it is ready for the imprinting of new images.

III. POLICY

The use of an MVR system provides persuasive documentary evidence and helps defend against civil litigation and allegations of officer misconduct. Officers assigned the use of these devices shall adhere to the

operational objectives and protocols outlined herein so as to maximize the effectiveness and utility of the MVR and the integrity of evidence and related video documentation.

IV. PROCEDURES

A. Program Objectives

The agency has adopted the use of MVRs to accomplish the following objectives: 1.To enhance officer safety. 2.To accurately capture statements and events during the course of an incident. 3.To enhance the officer's ability to document and review statements and actions for both internal reporting requirements and for courtroom preparation/presentation. 4.To provide an impartial measurement for self-critique and field evaluation during recruitment and new officer training. 5.To capture visual and audio information for use in current and future investigations.

B. General Procedures

1.It shall be the responsibility of this department to ensure that the audio-video recording equipment is properly installed according to the manufacturer's recommendations. a. MVR equipment shall automatically activate

when emergency equipment (lights) or a wireless transmitter is operating. The system may also be activated manually from the control panel affixed to the interior of the vehicle. b. Placement and operation of system components within the vehicle shall be based on officer safety requirements.

- c. All officers shall successfully complete this department's approved course of instruction prior to being deployed with MVR systems in operational settings.

C. Officers' Responsibilities

- 1. Inspection and general maintenance of MVR equipment installed in departmental vehicles shall be the responsibility of the officer assigned to the vehicle.
 - a. MVR equipment shall be operated in accordance with the manufacturer's recommended guidelines and departmental training and policies.
 - b. Prior to beginning each shift, the assigned officer shall perform an inspection to ensure that the MVR is performing in accordance with the manufacturer's recommendations covering the following matters.
 - (1) Remote Audio Transmitter functional:
 - Adequate power source
 - Connected to the recording equipment
 - Remote activation of system via transmitter
 - (2) Camera Lens:
 - Windshield and camera lens free of debris
 - Camera facing intended direction
 - (3) Recording mechanism capturing both audio and video information:
 - System plays back both audio and video tracks
- 2. Malfunctions, damage or theft of in-car camera equipment shall be reported to the immediate supervisor prior to placing the unit into service.
 - a. A subsequent written report shall include information on the suspected cause(s) of equipment failure, as available, and any recommendations for corrective action.
 - b. The supervisor shall determine if the unit shall be placed in service. If the vehicle is placed in service without an operating MVR, the emergency communications center (e.g., dispatch) shall be so informed.

D. Mandatory Recordation

- 1. Traffic stops (to include, but not limited to traffic violations, stranded motorist assistance and all crime interdiction stops)
- 2. Priority responses
- 3. Vehicle pursuits
- 4. Prisoner transports
- 5. Crimes in progress
- 6. Any situation or incident that the officer, through training and experience, believes should be audibly and visually recorded.

The following applies to those states and jurisdictions that require two-party consent in which a person must be advised of the audio recording.

In addition to the aforementioned incidents, officers may record with the audio portion disabled anytime the officer believes such recording has a legitimate law enforcement purpose. Officers may audibly and visually record any incident in which all involved parties consent. At the beginning of any public contact or traffic stop, the officer shall notify the citizen that the events are being audibly and visually recorded. This notification does not apply to crimes in progress or similar situations where notification is impractical.

- 7. When the MVR is activated, officers shall ensure that the audio portion is also activated so all events are properly documented. Officers are encouraged to narrate events using the audio recording, so as to provide the best documentation for pretrial and courtroom presentation.

E. Operational Protocols

- 1. To prevent bleed over and/or noise from other MVRs in systems using low band transmitters (analog), only the primary officer initiating the contact shall activate his or her audio recorder.
- 2. Officers using the 900Mhz digital transmitters that are individually synchronized to their individual MVR shall activate both audio and video recordings when responding in a support capacity in order to obtain additional perspectives of the incident scene.
- 3. Officers shall review the recordings when preparing written reports of events to help ensure accuracy and consistency of accounts.
- 4. With the exception of police radios, officers shall ensure that the volume from other electronic devices within the police vehicle does not interfere with MVR recordings.
- 5. Officers shall not erase, alter, reuse, modify or tamper with MVR recordings. Only a supervisor or MVR technician may erase and reissue previously recorded recordings and may only do so pursuant to the provisions of this policy.
- 6. To prevent damage, original recordings shall not be viewed in any equipment other than the equipment issued or authorized by the MVR technician.
- 7. MVR recordings shall be marked as containing evidence and submitted to the property custodian or MVR technician to be held and/or duplicated for criminal prosecution when they record any of the following.
 - a. Arrests
 - b. Assaults
 - c. Physical or verbal confrontations, vehicle pursuits
 - d. Vehicle searches in which contraband is recovered

- ered
- e. Driving while intoxicated or under the influence arrests
- f. All prisoner transports
- 8. When the MVR is activated to document an event, it shall not be deactivated until the event has been concluded unless
 - a. the incident or event is of such duration that the MVR may be deactivated to conserve recording times; and
 - b. the officer does not reasonably believe that deactivation will result in the loss of critical documentary information; and
 - c. the intention to stop the tape has been noted by the officer either verbally or in a written notation.
- 9. The recording media shall be replaced when the recording time remaining is less than 1 hour, for long playing media lasting 6-8 hours, or 30 minutes for Hi8 analog or digital media with recording time of 5 hours or less.

F. Supervisors' Responsibilities

1. Supervisors shall issue unrecorded media and when possible prior to issuance, shall assign and affix an identification number to the exterior of the media.
 - a. The numbered media is then recorded in the chain of custody log.
 - b. Should the media be a computer hard drive, a computer generated file number shall be generated internally.
2. The chain of custody log shall include, but need not be limited to:
 - a. Tracking number of media
 - b. Date issued
 - c. Officer or vehicle issued
 - d. Date submitted
 - e. Officer submitting the media
 - f. Hold for evidence indication
(In the event an officer works at a remote location and reports in only periodically, multiple recording media may be issued.)
3. When an incident arises that requires the immediate retrieval of the recorded media (e.g., serious crime scenes, departmental shootings, departmental accidents), a supervisor shall respond to the scene and ensure that the appropriate MVR technician or crime scene investigator removes the recorded media.
 - a. The technician or investigator shall then
 - (1) place the media into evidence and provide copies to authorized investigative personnel; and
 - (2) ensure the appropriate notation is made in the chain of custody log
4. The supervisor shall periodically review the chain

- of custody log to ensure that issued media is surrendered in a timely manner. The supervisor is responsible for determining causes for such problems (e.g., unreported problems with the MVR equipment or equipment not being used in accordance with departmental policy).
- 5. Supervisors who are informed or otherwise become aware of malfunctioning equipment shall ensure that authorized personnel make repairs in a timely manner.
- 6. Supervisors shall conduct periodic reviews of officer assigned media in order to periodically
 - a. assess officer performance;
 - b. assure proper functioning of MVR equipment;
 - c. determine if MVR equipment is being operated properly; and
 - d. identify recordings that may be appropriate for training.
- 7. Supervisors shall conduct bi-weekly reviews of personnel who are newly assigned MVR equipment in order to ensure compliance with departmental policy. Supervisors shall thereafter conduct quarterly reviews.
- 8. Minor infractions (not criminal in nature) discovered during the routine review of recorded material should be viewed as training opportunities and not as routine disciplinary actions. Should the behavior or action become habitual after being informally addressed, the appropriate disciplinary or corrective action shall be taken.
- 9. Supervisor shall ensure that adequate recording media is on hand and available for issuance.

G. Technicians' Responsibilities

1. A designated officer or other employee (MVR technician) shall be responsible for the ordering, issuance, retrieval, storage, cleansing (degaussing), and duplication of all recorded media.
2. The MVR technician shall be responsible for collecting all completed media. Once the media is surrendered, the technician shall
 - a. ensure it is placed in a secured location with authorized controlled access; and
 - b. make appropriate entries in the chain of custody log.
3. Recorded media may only be degaussed/erased:
 - a. pursuant to a court order; or
 - b. in accordance with established retention guidelines.
4. For the purpose of accountability, all media will be assigned an identification number prior to issuance to the field. The MVR technician will maintain a record database of issued media.
5. The MVR technician shall coordinate with field supervisors to ensure that an adequate supply of recorded media is available.
6. The MVR technician shall be responsible for the

following.

- a. Long-term storage of media deemed to be of evidentiary value consistent with the department's evidence storage protocols and retention schedule.
- b. The cleansing (degaussing) and re-issuance of all other media deemed to be of no evidentiary value consistent with the department's document retention requirements.

H. Media Duplication

1. All recording media, recorded images and audio recordings are the property of this department. Dissemination outside of the agency is strictly prohibited without specific written authorization of the agency's chief executive or his or her designee. 2. To prevent damage to, or alteration of, the original recorded media, it shall not be copied, viewed or otherwise inserted into any device not approved by the departmental MVR technician or forensic media staff.

3. When possible and practical, a copy of the original media shall be used for viewing by investigators, staff, training personnel, and the courts (unless otherwise directed by the courts) to preserve the original media in pristine condition.

4. At the conclusion of the trial proceedings or as otherwise authorized by the prosecutor's office for which the media was required, all copies shall be submitted to the MVR technician for further storage.

Every effort has been made by the IACP National Law Enforcement Policy Center staff and advisory board to ensure that this model policy incorporates the most current information and contemporary professional judgment on this issue. However, law enforcement administrators should be cautioned that no "model" policy can meet all the needs of any given law enforcement agency. Each law enforcement agency operates in a unique environment of federal court rulings, state laws, local ordinances, regulations, judicial and administrative decisions and collective bargaining agreements that must be considered. In addition, the formulation of specific agency policies must take into account local political and community perspectives and customs, prerogatives and demands; often divergent law enforcement strategies and philosophies; and the impact of varied agency resource capabilities among other factors.

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Mobile Video Recording Equipment

Concepts and Issues Paper

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I. INTRODUCTION

A. Purpose of Document

This paper was designed to accompany the *Model Policy on Mobile Video Recording Equipment* established by the IACP National Law Enforcement Policy Center. This paper provides essential background material and supporting documentation to provide greater understanding of the developmental philosophy and implementation requirements for the model policy. This material will be of value to law enforcement executives who are developing an in-car camera program or currently using mobile video recording equipment.

B. Background

The goal of an in-car camera program is to ensure that audiovisual recordings provide as true and accurate a depiction of events as is reasonably possible in order to provide the best possible evidence and documentation of events. In many cases, accurate, reliable recordings can help defend officers and their agencies against false accusations and unjustified litigation.

Many of the findings and recommendations of the model policy and this discussion paper are based on a comprehensive study of in-car video cameras that was commissioned by the U.S. Department of Justice's (DOJ) Office of Community Oriented Policing Services (COPS)¹ and performed in state police and highway patrol agencies in 21 states. Initiated in June 2002, the study focused primarily on the use of the in-car video equipment to document police-public interaction within the context of traffic enforcement. The recommendations reflect what the IACP has identified as the best practices observed during the site visits to the 21 agencies identified in the study, which included written surveys and face-to-face discussions with line officers, supervisors, commanders, and citizens.

C. Historical Overview

The first videotape cameras became available to the consumer in the early 1960s. However, technology of the 1960s was not sufficiently advanced to permit mounting cameras in police vehicles. In the late 1960s, a *Popular Science* magazine article featured an attempt by the Connecticut State Police to mount a video cam-

era and recorder in a patrol car. The camera was on a small tripod that required the full passenger side of the front seat while the back seat was fully loaded with a recorder and cables that connected the two devices. The equipment was far too cumbersome to make it practical for routine use in patrol vehicles, but the experiment illustrated that video recording could play an important role in patrol operations.

Almost a decade passed with little noticeable advancement in the field of audiovisual recordings, but in the early 1980s the self-contained Beta audiovisual recording system was introduced and revolutionized the recording industry. The next step in the evolution of the mobile video recorder was the introduction of the VHS recorder and tape, followed by development of the 8mm camcorder. Along with miniaturization came affordability, which catapulted audiovisual recordings into the mainstream of policing. In addition to installing closed-circuit televisions to monitor lockup and holding facilities, agencies began using these devices to document crime scenes, a step that provided a far more complete and integrated view of these situations than still photography alone could provide. The portability and ease of use allowed officers to operate these systems for surveillance, interrogations, and training.

The formation of Mothers Against Drunk Drivers (MADD) in 1980 brought heightened public awareness to the national problem of drunk drivers and began changing public opinion. A pervasive attitude of "There but for the grace of God go I" began to change, particularly among prosecutors, who placed more emphasis on convictions and punishment. The police began installing cameras in police vehicles to document infractions and other reasonable suspicion that justified vehicle stops and subsequent field sobriety tests. These recordings became regarded as a preferred method of providing the necessary evidence to support a conviction. MADD recognized the value of the in-car camera and began purchasing systems for police agencies involved in DWI detection and apprehension.

In the 1990s, America's war on drugs advanced the use of the in-car cameras by documenting interdiction stops. The recordings repeatedly documented for juries what they might not otherwise have found plausible. For example, it was difficult for jurors to believe that an individual transporting pounds or kilos

of narcotics and hundreds of thousands of dollars of unexplainable cash would actually give the police permission to search their vehicle. However, time and time again the camera documented consent searches that were used to convict suspects.

By 1999, numerous allegations of racial bias or racial profiling were being lodged against police agencies across the United States. State police agencies, by virtue of the primary traffic responsibilities, found themselves in the center of this controversy and the target of many of the accusations. Responding to these concerns, state and federal legislative bodies began enacting laws requiring police agencies to document details of every traffic stop.

The DOJ's COPS office recognized the value of the in-car camera in better documenting vehicle stops and bringing a more complete perspective to the allegations of racial profiling. Purchasing cameras for police vehicles was an expensive proposition that was beyond the budgets of most police agencies. To overcome the financial obstacles, the COPS office initiated the first In-Car Camera Incentive Program to state police and highway patrol agencies throughout the United States. A study of the police use of technology by the National Institute of Justice (NIJ) in 2000 reported that only 3,400 state police and highway patrol vehicles used for patrol (11 percent of the total) were equipped with in-car cameras. Over the following three years the COPS office awarded over \$21 million to state agencies for the sole purpose of purchasing and installing in-car cameras. The number of state police vehicles equipped with in-car cameras grew to 17,500, or about 72 percent of state police vehicles.

Today, many police agencies in the United States and Canada are applying this technology to patrol operations by equipping their patrol vehicles with MVR systems. Although the early attempts to place cameras in patrol vehicles were plagued with technical and safety problems, miniaturization and advances in technology have made the use of the mobile video recorder practical, more affordable, and less intrusive within the passenger compartment.

D. Utility of Mobile Video Recording Systems

Motorist Rodney King, attempted to elude police in a high-speed pursuit in Los Angeles, California, in 1992. At the conclusion of the pursuit, a witness using a simple handheld home videorecorder captured the subsequent events on tape. This now infamous recording became the most important item of evidence at the officers' subsequent criminal prosecution. Although the incident came as a shock to the law enforcement community, it clearly demonstrated the value of video evidence in court. The video camera has become the silent witness. It is not subject to many of the questions of recall, interpretation, misperception, bias, or prejudice that are often used at trial to refute eyewitness testimony. As a result, experience has shown that those agencies that use mobile audiovisual recording in patrol operations have much higher conviction rates and substantial reductions in the amount of time officers spend in court.

The use of mobile video cameras in police vehicles can also give patrol officers added protection against false accusations of police misconduct during traffic stops. Contact with citizens during routine traffic stops or in other circumstances can result in confrontational situations even if the officer is professional and courteous. However, when the citizen becomes aware that the

officer is wearing a wireless microphone and the conversation and actions of each are being recorded, a tense situation will generally de-escalate. The use of MVR systems also gives a patrol officer the ability to record a variety of dangerous situations such as felony stops and vehicular pursuits. In instances where an officer is injured or killed, investigating officers can review the audiovisual recording and through video forensics clarify and identify evidence that can lead investigators to specific persons or vehicles. The chance of apprehending offenders in these instances is dramatically improved and can save hundreds of hours of investigative time.

The effectiveness of recorded audiovisual evidence for prosecution of offenders has many ancillary benefits for law enforcement agencies and for the administration of justice in general. Court systems throughout the country are overcrowded and backlogged with cases waiting to be heard. In this environment, police officers spend substantial amounts of time awaiting court appearances, even when manpower and financial resources are desperately needed in street enforcement activities. The availability of audiovisual evidence greatly increases the ability of prosecutors to obtain guilty verdicts more quickly if they go to trial and to more effectively plea-bargain cases and avoid lengthy trial proceedings. This greatly reduces the amount of time that officers and others spend in court appearances. In many jurisdictions that employ MVR systems, the officer routinely submits videotape evidence with the written report. This material is reviewed by the prosecuting attorney and is then presented to the defense attorney. In many cases, a guilty plea is accepted or a lesser charge negotiated by the defendant without the need for trial.

The Royal Canadian Mounted Police (RCMP) Highway Patrol Division has been using MVR systems in some of their patrol cars since the early 1990s. Over a two-year period, none of the officers using patrol vehicles with video cameras were required to testify in court where video evidence was obtained, as all of the defendants involved pleaded guilty. Other officers assigned to the same detachment but not provided with video-equipped cars had repeated court appearances, frequently with the same defendant. Law enforcement agencies in the United States report similar experiences. In Michigan, one sheriff's department experienced about a 50 percent reduction in overtime court costs for those officers assigned to video-equipped patrol cars. The cost savings in reduced court appearances alone more than paid for the cost of the video systems.

Judicial process was one of the impact areas evaluated during a national study to measure the impact of in-car cameras on state police and highway patrol agencies, conducted by the IACP in 2002. The study revealed that most prosecutors welcome the use of the in-car camera, and added that case preparation time does increase when video evidence is submitted. In many jurisdictions, officers reported that their prosecutors would not try a DUI or DWI case without video evidence. They also cautioned that with the proliferation of the in-car cameras, additional training would be necessary for prosecutors in understanding the use, application, and limitations of the camera systems. In cases of impaired driving as opposed to intoxicated driving, defense attorneys are beginning to use the audiovisual recordings to support their contention that the accused person's behavior was not significantly impaired. Video recordings have some limitations in

DWI prosecutions. For example, they do not provide the viewer with the ability to smell alcohol on the violator, and the recording's resolution (detail) is not sufficient to reveal the bloodshot eyes or the results of the nystagmus test. Therefore the prosecutors must be prepared to accurately set the stage for judges and juries so that the evidence will remain admissible and relevant.

Another benefit of MVR systems is that they provide law enforcement agencies the ability to more effectively defend themselves against civil litigation filed against officers and the agency. Frequently, there are no independent witnesses to a citizen-officer encounter that results in citizen complaints or civil charges. Many jurisdictions are inclined to resolve these situations by paying minor damages rather than spend the time and money to litigate the matter. However, with a video camera and wireless microphone for the patrol officer, all comments and actions of both parties are on record. As a result, an impartial witness to the event is available and many would-be complaints and civil suits are withdrawn or quickly resolved.

For example, a township police officer in Ohio was accused of unnecessary use of force after a verbal encounter developed with a woman at a traffic stop. The woman subsequently gave notice that she intended to file a civil suit against the officer and the jurisdiction and, with her attorney, confronted the chief of police with this threat. Anticipating this action, the chief showed the woman an audiovisual recording of the incident. The recording clearly showed that the officer did nothing wrong. A backup officer who responded to the incident was also able to record the event on his video system, which provided another angle of view and clear corroboration of the officer's statements. Immediately after this video presentation, all suits were dropped against the officer and the agency. During the national in-car camera study, every agency told researchers about similar incidents in which the camera had exonerated the officer and the agency.

If the community served by an agency is unusually distrustful of the police, the agency might consider additional policies to help build public trust. For instance, minimizing the officer's access to the recordings can help protect the officer from charges of tampering with evidence. Some agencies require supervisors to install and remove recording media. Though this practice adds additional responsibility to the supervisors' duties, it can be an effective way to ensure a secure chain of custody of recordings.

Mobile video recordings also provide the agency with a wealth of material that may be used for training purposes. Unusual or even routine events recorded on videotape can be used in academy basic training as well as in advanced officer training to reinforce appropriate behavior and procedures, to demonstrate inappropriate practices and procedures, to enhance interpersonal skills and officer safety habits, and to augment the instructional routines of field training officers and supervisory personnel.

Finally, during any activity, an officer can use the remote microphone to record his thoughts or observations and create an audible record of events as they happen. This is valuable in many instances where an officer needs to establish probable cause for enforcement actions. In any situation, it allows an officer to create a record during an incident and avoid lapses of memory that may create deficiencies in written reports prepared following the incident.

E. Legal Concerns

Patrol car video recordings provide officers with another tool for use in court to corroborate their testimony. As a result, defense attorneys have challenged the use of this evidence; some of the challenges have been procedural and some technical.

First, the courts have clearly recognized that there is a reduced expectation of privacy in an automobile as opposed to a private residence. This principle was made clear by the U.S. Supreme Court nearly 60 years ago in *Carroll v. United States*² and has been reaffirmed in courts throughout the United States since that time. Persons traveling public thoroughfares with occupants and contents in plain view are subject to routine government examination and regulation. From this, it is reasonable to conclude that video recording of vehicular activity and vehicle operators in the same environment is also a legally acceptable practice.

In 1984 the Michigan Court of Appeals addressed this issue in *People v. Davis*.³ In this case a motor vehicle was placed under surveillance for five days, during which time the suspects committed a breaking and entering for which they were later convicted. The defendants argued at trial that it was unreasonable under the meaning of the Fourth Amendment for the police to follow them over this period of time and to record their actions. The Court of Appeals ruled that the officers' actions did not constitute a search and that the actions of people on a public roadway are public and not private. Further, since it was not a search to see these items in public view, neither was it a search to videotape them on the roadway. Although the Michigan Court of Appeals' decision does not bind other state courts to like findings in similar cases, it does establish a compelling precedent for arguing the legality of video recording in other jurisdictions, particularly since the ruling is founded on long-established case law on this subject.

The issue of audio recording has also caused law enforcement administrators to ask whether it violates the Fifth Amendment prohibitions against self-incrimination. Generally speaking, comments made to an officer during the course of a traffic stop are admissible. However, once the stop of the offender has become custodial, *Miranda* warnings must be issued whether or not an audio recording is being made. Concerning the issue of *Miranda* rights being required prior to questioning, the U.S. Supreme Court ruled in 1984 in *Berkemer v. McCarty*⁴ that the scene of a traffic investigation and sobriety tests on a public roadway prior to arrest do not violate a subject's Fifth Amendment rights. Spontaneous and voluntary statements made to a police officer during a traffic stop are admissible in court as evidence.

Similarly in a Michigan case, *People v. Hill*, the court also ruled that interrogation at the roadside prior to arrest is not an infringement of a suspect's Fifth Amendment rights. The U.S. Supreme Court in *Pennsylvania v. Muniz* ruled that videotaping after arrest (in this case at booking) did not violate the defendant's rights. Muniz, who had been arrested for driving while intoxicated, was transported to the county detention center. There he was informed that he was being recorded but was not, nor had he been, given a *Miranda* warning. The officers followed standard procedures in asking the defendant to respond to questions concerning his name, age, address, height, weight, eye color, and date of birth, and in conducting a sobriety test. At trial, the defendant contended that the videotape and his testimony related to the field sobriety test should be suppressed because they were incriminating and completed prior to his receiving *Miranda*

warnings. The appellate court ruled that the routine booking questions and the field sobriety testing did not constitute custodial interrogation and that any responses made by the defendant were therefore voluntary and did not fall within the protections of *Miranda*.

Although the findings of the cases cited above do not give explicit sanction to the use or admissibility of evidence recorded on videotape, it does provide some insight into judicial interpretation of the use of videotape. Whether or not a suspect is being videotaped appears to be less significant than the way statements are elicited from the suspect. Statements that are secured under duress, for example, or without appropriate *Miranda* warnings will be suppressed irrespective of whether they are video or audio taped. However, officers cannot always be sure that their questions will not be interpreted as interrogation or its "functional equivalent" under the law of their state and the particular situation at hand. Therefore, it is always recommended that whenever an officer takes someone into custody that the suspect be given *Miranda* warnings whether or not audiovisual recording is taking place. But there does not appear to be any legal requirement for officers to inform individuals that they are being recorded, although some agencies, as a safeguard, make this warning a routine requirement of their officers.

Because of other potential legal challenges to the use of in-car video systems, police departments must also take steps to ensure that the system used has physical integrity so that evidence presented in court has not been compromised and can be demonstrated to be an authentic and factual depiction of the incident. Specifically, the system must be secure so that one cannot intentionally or inadvertently record over already recorded evidence. In order for the audiovisual recording to be admitted, the recording must display a date and time stamp. Officers and supervisors must periodically check the equipment to ensure the date and time stamps are correct. In order to prove that the recording has not been tampered with or altered, the officer must be able to establish a strict chain of custody for the item of evidence being submitted. Unless the officer has been trained and is recognized as a video forensic examiner, the officer should avoid testifying to the mechanics or nomenclature of the equipment. This is a trap often presented by defense attorneys to disprove statements by the arresting officer. The officer should only testify that the recording is a true and accurate depiction of events. If a suspect can reasonably contend that the video recording equipment used by the officer allows him to record over or otherwise alter the evidence, the evidence may be suppressed.

In a case in Tennessee, for example, the jury was so concerned about the integrity of the video system used by the police that they ordered the patrol car brought to court and the officer to demonstrate the safeguards built into the mobile video system. The jury was satisfied and returned a guilty verdict in the case.

Much like the communications industry, mobile video recorders have also entered into the digital age. The speed and versatility of digital recording are highly beneficial for law enforcement operations. For example, digital technology allow for pre-event recording. In this mode, an officer can activate the system to immediately download images of events that occurred during the previous 30 seconds. This permits the officer, among other things, to witness an event and then go back in time and record probable cause as captured in the recorder's buffer.

However, the advent of new technologies can also give rise to new technology-based challenges. Currently on the market are systems that offer a variety of recording formats, such as, mpeg1, mpeg2, mpeg4, jpeg, and wavelet. Unlike analog technology wherein videotape is the medium used for viewing images, each of these formats require special software and equipment for viewing that are not interchangeable. In the absence of standards for the industry, each product has proprietary software configurations that require users to purchase only that particular product. Each of these formats uses watermarking to authenticate their images in order to prevent tampering. But potential jurors who use their home computers to alter, enhance, and improve their digital pictures may be predisposed to accept defense attorneys' suggestions that police could have tampered with the evidence.

Admitting new scientific evidence into court is an arduous task for prosecutors, as not all lawyers and judges are aware of new technology. The two biggest challenges to digital video evidence are the *Frye* and *Daubert* cases. In *Frye v. United States*,⁵ a second-degree murder case in which early polygraph (systolic blood pressure test) was used, sets out a test that scientific evidence must "have gained general acceptance in the particular field in which it belongs." Only after the scientific community has agreed that the technique is valid will evidence of its use be admissible in court. Although the *Frye* case is over 80 years old, the courts still follow this standard when deciding new scientific evidence.

*Daubert v. Merrell Dow Pharmaceuticals*⁶ dealt with the admissibility of expert evidence under the Federal Rules of Evidence, requiring that expert evidence is "scientific knowledge" supported by validation, and the evidence must assist the court in understanding the evidence or determining a fact in issue. The case evolved from a petitioner, Daubert, who sued the respondent, Dow Pharmaceuticals, claiming Dow was responsible for Daubert's children's serious birth defects. The allegation stemmed from the petitioners ingestion of the drug Bendectin, a prescription drug marketed by Dow. The lower court ruled in favor of the respondent based on the expert's affidavit concluding that the maternal use of Bendectin had not been shown to produce birth defects in humans in spite of the petitioner's expert testimony, which stated that maternal use of the drug had caused birth defects in animal studies. The Court of Appeals affirmed the lower court's decision citing *Frye v. United States*, which states that an expert opinion based on scientific technique is inadmissible unless the technique is "generally accepted" as reliable in the relevant scientific community. In 1993 the Supreme Court accepted the case and identified the following four standards for admissibility of scientific evidence:

- Has the theory or evidence been tested?
- Has the scientific theory of evidence been published or subject to peer review?
- What is the error rate of the theory or technique and are there controlling standards?
- Has the scientific community generally accepted the theory or technique?

As digital video is a relatively new science and there are currently no standards set for digital video, prosecutors and police agencies can expect and must prepare for similar challenges if they intend to use digital video as evidence.

Police officers using digital video should recognize that they are simply the operators of technology. Much like radar and laser equipment, an officer's testimony should be limited to their ability to set up and test the equipment and read the results. In the case of video, be it analog or digital, the officer need only be able to testify that the video images are a "true and accurate depiction of events." If a defense attorney successfully lures a witness officer into testifying on matters beyond their training and expertise, valuable evidence may be suppressed.

With this in mind, police executives must be cognizant of the challenges of implementing a digital video system and should seek guidance from or employ experts in the field who are experienced in the intricacies of presenting digital evidence in court.⁷

II. Procedures

A. Technical Requirements

The aforementioned cases demonstrate that mobile video recording systems must conform to technical requirements if evidence thus collected is to be of value in prosecution of suspects. While overall cost is a factor that agencies must take into consideration when deciding upon the purchase of video systems, it cannot be the sole criterion if this technology is to adequately serve the police agency. The operating environment and requirements of a mobile audiovisual recording system should be evaluated prior to implementing a system. Consider the following issues when purchasing a system.

B. System Components

It is extremely important that the video camera system be securely mounted in the patrol vehicle with the media recorder secured and not accessible for possible tampering, destruction, or vandalism. Although the trunk of the patrol vehicle is still the preferred location for the recorder installation, many of the new digital products are more compact and easier to conceal allowing a multitude of installation locations. Nevertheless, miniaturization and concealment do not relieve the manufacturers or agencies from the responsibility of ensuring that the media is secure and protected from persons who wish to tamper with or destroy evidence. Recording systems that allow general access to the media can expose officers to charges that the tape was altered or that the videotape evidence was not properly protected.

A typical MVR system consists of a windshield-mounted camera, secured vault containing the recording mechanism, control center, compact monitor, wireless microphone and transmitter system to capture audio outside the vehicle for traffic stops, and a hardwired microphone to capture audio from inside the police vehicle. The entire system should operate on the vehicle's 12-volt power system and must maintain an even voltage supply for all components without excessive power drain on the patrol vehicle's electronic system. The MVR system should be totally compatible with all electronic systems of a patrol car.

Camera. Usually mounted on the dash or windshield, the camera must be able to withstand extreme heat and cold. The camera should be mounted in a position that minimizes obstruction of the driver's view through the windshield but still captures a clear view of a vehicle in front of the patrol car, including the occupants of the vehicle and the license plate. Special attention

should be given to testing the system's ability to recover a license plate image at night when a police vehicle's high beam and emergency lights are reflected off the rear of the target vehicle. A field of view 16 feet wide at a distance of 20 feet from the camera is recommended. Any system selected should include a camera with automatic and manual focus, automatic white balance (color adjustment) and automatic exposure. Cameras with low-light, night vision capabilities will provide better images in dark or otherwise difficult lighting conditions.

In the digital realm, in order to obtain better nighttime images by reducing glare and bleed over, the camera should be equipped with a CCD chip set. This provides a high degree of isolation between pixels to prevent spillover of charges from one pixel to the next. Lenses designed to reduce internal lens flare and reflections are also necessary. A resolution of at least 450 horizontal lines is recommended.

Video Monitor. A high-quality color LCD video monitor should be installed to monitor live audio and video and to playback recorded images and sound. The location of the monitor should be carefully considered for ease of use, visibility, and safety, and may vary depending on the type of vehicle in which it is installed. The operator must have the ability to independently turn off the sound and video display. For example, if a suspect is in the vehicle while another is being interviewed outside, it is advisable to turn off at least the audio playback so the suspect in the rear of the vehicle cannot hear the conversation. The monitor should display all video and text (time stamp, brake or emergency light indicator, and related data) that is being recorded.

Microphone. Microphones are often overlooked or an inferior model is chosen as a cost-saving measure. But they are critical components of any in-car video system, and audio shortcomings can diminish the effectiveness of the in-car camera strategy. The IACP recommends, at a minimum, a wireless microphone operating on the 900 MHz band that uses digital spread spectrum technology. The microphone transmitter should be equipped with an internal antenna and should not use the microphone cable for an antenna.

Analog microphones, though generally less expensive than digital, are more prone to interference and have fewer frequencies available, which can lead to cross-talk from other units. Many microphones use thin cables that connect the microphone to a transmitter clipped to the user's belt or uniform. Often, these fragile wires also serve as transmission antennas and can break if stressed or bent sharply. A wireless system is recommended that includes a secondary microphone built into the transmitter unit that is automatically activated if the primary microphone is separated from the transmitter.

If a system requiring batteries is used, it is necessary to maintain an adequate stock of fresh batteries, including at least one spare set in each video-equipped patrol vehicle at all times. This can be a significant expense that will have to be considered in the agency-operating budget. Consideration should be given to systems that have microphones with built-in batteries that can be recharged by chargers located in the vehicle. Using a rechargeable lithium ion battery will provide 8-10 hours of use before recharging and an effective range of 1000 feet. The charging station for the microphone transmitter device should also serve as a linking station that synchronizes the transmitter to the individual recording device.

A second, hardwired microphone should be located inside the patrol vehicle, with the audio recorded on a separate channel from the wireless microphone where possible.

Control Panel. An ergonomically designed control panel should be installed in each video-equipped vehicle in a convenient location for operation by the vehicle's driver. The panel should include controls for camera operation (such as zoom, focus, exposure, shutter speed, and so on), recorder operation (such as record, play, fast forward, rewind, and so on), and indicators informing the operator of system status (such as power on, microphone on, tape inserted, record, warning alarms, and so on). Controls should be illuminated to facilitate their use at night.

Recorder. The majority of police in-car camera systems in the United States use VHS or Hi-8 tapes. These analog recording systems generally provide good image quality and have a long, proven history with law enforcement agencies, prosecutors, and the courts. However, handling and storage of large numbers of videotapes can require the dedication of significant resources in both employee time and physical space within a facility.

Digital recorders are now widely available and offer a number of attractive features not available on analog devices. For instance, digital recording systems can use buffers that collect video for a period of time before the recorder is activated, often capturing the underlying infraction that leads to a traffic stop or other event. Digital storage might appear to be a desirable alternative to costly and cumbersome videotapes, but an agency may need to purchase expensive servers and digital asset management software to handle the exceedingly large digital video files. Compression of digital video files reduces the storage space requirements but can also severely diminish the quality and reliability of the recorded images.

An agency must carefully weigh the advantages and disadvantages of digital and analog recording systems and choose the equipment most closely suited to the agency's needs and performance expectations.

Secure Storage of Media. The preferred method of securing the recording mechanism and the media is to secure it in a vault in the trunk of the patrol vehicle. If vaulted, the outer casing should be composed of heavy gauge material that is fire resistant and capable of withstanding crash damage. Any storage or containment device should have restricted access. Keep in mind that when the device is open, the system should not allow the operator to circumvent any record-over protection components of the exposed controls. The operator should only be able to insert and remove the media, thereby providing total physical integrity for the system.

Environmental Controls. The environmental controls of the mobile video system should be able to accommodate wide ranges in operating temperatures from 60F degrees below zero to over 120 degrees Fahrenheit regardless of whether they are trunk or interior mounted. Systems encased within the trunk will require independent environmental systems.

Computer-Based Upgradeability. A microprocessor computer that controls all facets of the system operation should drive a mobile video recorder system. The system should be easily upgraded by computer hardware and software modifications. Although great improvements have been made over the past few years, mobile audiovisual systems continue to be refined. Systems that do not provide for these improvements risk obso-

lescence in the near future.

Time and Date Stamp Identifiers. In order for a video recording to be admissible in court, it must have a time and date stamp imprinted on the media. Using a global positioning function (GPS) will ensure accuracy in accordance with the time and date accessed by the Greenwich mean time clock. This function eliminates the need to use an additional tracking number. The system must be designed with an internal backup battery to ensure continuous operation of the time and related functions for up to 30 days in the event of a loss of power. The time and date functions must appear continuously on the monitor and on the videotape recording. The system should allow for additional identifiers such as name, officer identification number, and vehicle number. Care should be taken when placing identifiers on the recording. The fewer identifiers on the media the better, as they are being imprinted directly on the media. As such, they may interfere later with forensic analysis of the media by blocking artifacts when they need to be enhanced for clarification. This also holds true for selecting placement of the identifiers the media face (that is, bottom, top, right, or left).

C. Procedural Requirements

In addition to the technical requirements of audiovisual recording systems, law enforcement personnel should be cognizant of the operational differences between systems and how they factor into their working environment.

A department that employs MVR systems must establish policy and procedures on the use of these systems. In the final analysis, even the best systems are of limited use if they are not employed properly in the operations of the agency. For example, many law enforcement agencies require that their officers only activate the recording system during a traffic stop or when the officer's safety is an issue—in effect, once the patrol car's emergency lights are activated. Although this provides a record of the events at the time of the stop, it does not record any of the activity prior to the stop. In many situations, such as those in which probable cause must be established, it is essential to record all events precipitating the use of emergency lights and siren.

At the scene of accidents, when conducting roadside sobriety tests or in a multitude of other situations where emergency lights and siren might not be used, the video recording may be useful as evidence in a criminal proceeding or in civil litigation. Therefore, at a minimum, mobile video systems must be capable of allowing the officer to record at his or her discretion provided they are legally justified. Most analog MVR systems, once activated, take at least five to six seconds to begin recording. During that period of time, much valuable information could be lost. This problem is being resolved with the advent and use of the newer digital systems.

As mobile audiovisual recording systems become more widely used in law enforcement patrol and related operations, procedures for their use will become more refined and uniformly accepted. To ensure that important events are captured, MVR systems should be in operation whenever an officer is involved in the following:

- Priority responses
- Vehicular pursuits
- Prisoner transports
- Crimes in progress

- Traffic stops

In order for an agency to engage in a successful mobile video program, it is essential that it build from the management side outward to the practitioners. The management of the system includes, but is not limited to the following:

- Selection of products to include media formats
- Acceptance of the media format by the prosecutors
- Establishing policies and procedures
- Ensuring a clear and defined chain of custody for all recorded media
- Establishing a standard operating procedure for duplication and distribution of all recorded media
- Establishing a retention schedule for media consistent with state and local legislation
- Providing training in applicable laws involving audio and video interception
- Providing training for practitioners with regard to equipment operation and limitations
- Establishing a schedule of supervisory review of recorded media
- Establishing protocols to ensure access to media that can prove valuable to training

D. Additional Resources

Technological innovations now allow law enforcement greater flexibility in the use of audio and video recording. However, as with other technologies, proper selection and use of these systems is essential if they are to meet the needs of the agency and the officers in the operational environment. Agencies that are considering the purchase and use of mobile video recording equipment should contact the IACP In-Car Video Camera Evaluation Program at 1-800-THE-IACP or in-car-camera@theiacp.org.

Endnotes

¹ Grant No. 2001-CK-WX-0157 awarded by the Office of Community Oriented Policing Services, U.S. Department of Justice.
² *Carroll v. United States*, 267 U.S. 132; 45 S. Ct. 280; 69 L. Ed. 543.
³ *People v. Davis*, 52 Mich. App.59; 216 N.W. 2d 440; 1974.
⁴ *Berkemer v. McCarty*, 104 S. Ct., 3138; 1984.
⁵ *Frye v. United States*, 293 F. 1013 (D.C. Cir.1923).
⁶ *Daubert v. Merrell Dow Pharmaceuticals*, 509 U.S. 579 (1993).
⁷ Further assistance in this matter can be obtained through professional organizations such as the Law Enforcement Emergency Video Association (LEVA), the International Association of Identification (IAI), or the IACP.

Every effort has been made by the IACP National Law Enforcement Policy Center staff and advisory board to ensure that this model policy incorporates the most current information and contemporary professional judgment on this issue. However, law enforcement administrators should be cautioned that no "model" policy can meet all the needs of any given law enforcement agency. Each law enforcement agency operates in a unique environment of federal court rulings, state laws, local ordinances, regulations, judicial and administrative decisions and collective bargaining agreements that must be considered. In addition, the formulation of specific agency policies must take into account local political and community perspectives and customs, prerogatives and demands; often divergent law enforcement strategies and philosophies; and the impact of varied agency resource capabilities among other factors.

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X. APPENDICES

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 - Evaluation Team Members



CALEA Standards for In-Car Audio/Video Recording Systems

41.3.8 *If agency-owned, in-car audio or video recording systems are used, a written directive establishes policy and procedures for the following:*

- a. situations for use;*
- b. tape security and access; and*
- c. tape storage and retention schedule.*

Commentary: *The policy and procedure should provide direction to field personnel for the use of this technology. The products of this technology could become an important piece of evidence in any type of case and should be maintained in a way to insure the integrity of contents. When tapes become evidence, they should be treated as any other evidentiary items in accordance with standards in Chapters 83 and 84. (M M M M)*

The report that follows represents the data collected from the National Prosecutors In-Car Camera Survey. The Internal Association of Chiefs of Police and the Department of Justice, Community Oriented Policing Services Office wish to express our sincerest gratitude to the National District Attorneys Association and the American Prosecutors Research Institute for their collaboration in the presentation of this information.

Prosecutors' Response to In-Car Cameras

To evaluate the prosecutors' perspective on a national level the IACP entered into a collaborative research effort with the National District Attorney's Association (NDAA) and their research counterpart, the American Prosecutors Research Institute (APRI) to develop a national survey. This survey examined the positive and negative aspects of acquiring and using video evidence, along with the legal challenges prosecutors are facing.

Respondents - The prosecutors' survey was distributed to a nationally representative sample of approximately 330 prosecutors throughout 42 states. The respondents covered a wide range of jurisdictions; local police and sheriff's departments; county law enforcement agencies; and state police and highway patrol agencies. The majority of the prosecutors serve jurisdictions with a population under 250,000. Their experience ranged from less than two years to over eight years. In total, 45 percent of the surveys distributed were returned.

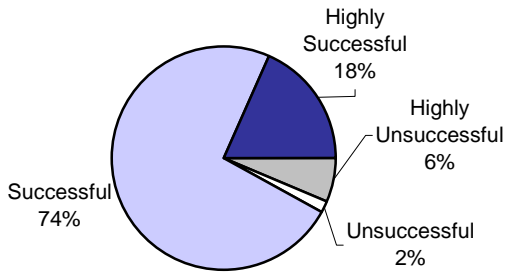
Overview - The survey revealed that 90.5 percent of the prosecutors questioned have had experience with video evidence captured by police in-car cameras. The respondents concluded that the presence of video evidence has improved their ability to prosecute cases successfully. According to the prosecutor respondents, the most common and effective uses of video evidence have been in the prosecution of: driving under the influence (DUIs), traffic violations, vehicle pursuits (attempting to elude), assaults on officers, narcotics enforcement, cases of domestic violence, and defense of civil litigations against law enforcement. The majority of prosecutors reported that the use of video evidence has reduced the actual time spent in trial, however the same video evidence has increased their case preparation time. When the video clearly shows the defendant's guilt, time is usually saved because the defendant will most often accept a plea offer. Almost two-thirds (64.3 percent) of the prosecutors reported that cases involving video evidence were usually less successful for the defendants in the appellate courts.

Prosecutors also identified several of the challenges they encountered when using video evidence in court. The most frequently cited problems were: 1) limitation of the system's field of view, 2) poor quality or lack of audio, 3) the poor quality of the video image, 4) obtaining copies of the videos from law enforcement, 5) having inadmissible portions of the audio/visual recording redacted, 6) obtaining copies for disclosure to defense, 7) video evidence contradicting the officer's testimony, 8) the lack of available equipment to display the video evidence in court, and 9) the chain of custody when handling the video evidence.

To avoid the aforementioned pitfalls, it is essential that law enforcement agencies properly train their officers in the use and application of in-car cameras and provide them with the proper equipment to ensure quality audio/visual images are captured. There must be policies and procedures in place to ensure the integrity of the video evidence is preserved and a chain of custody can be established.

The Value of Video Evidence – As previously stated, the majority of the prosecutors surveyed have experience in prosecuting cases involving video evidence captured through the in-car camera. Most of the respondents (95%) reported that law enforcement agencies in their jurisdiction use in-car cameras or other audio/visual recording equipment. Although most of the prosecutors have experience using video evidence in court, 87% have never received training in the use, or operation, nor do they understand the limitations of the recording equipment they are defending.

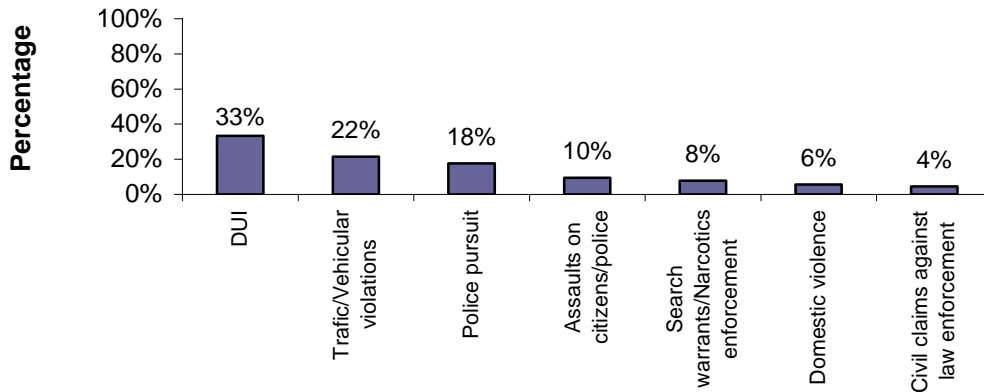
Rating the Value of Video Evidence



Prosecutors were asked to rate the value or effectiveness of video evidence in court proceedings. A large percentage (93%) of prosecutors reported that video evidence is an effective tool for prosecutors. When asked to rate the effectiveness of video evidence, 92% characterize their experience as either highly successful or successful.

Effective Use of Video Evidence – In the survey, prosecutors were asked to identify the types of cases where they found the use of video evidence to be of more use. The results are depicted in the following graph.

Cases Best Supported by Video Evidence



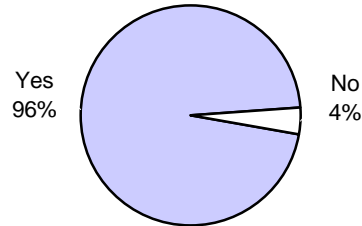
Preparing a Case with Video Evidence – To successfully prosecute a case involving video evidence certain precautions need to be taken. Video evidence must be reviewed to ensure the facts presented in the case are not in dispute. The following pretrial steps have been recommended by prosecutors: 1) Ensure the officer reviews the video to

recall events, sequence of events and facts that may have been omitted from the report. 2) Compare the video evidence with the officers' reports for accuracy. If any discrepancy is noted, be prepared to offer a logical explanation. 3) Review the video evidence with the officer present. This will allow the prosecutor insight into events that may be occurring off screen and allow the officer a review of events to refresh his or her memory. Preparation is the key to the successful prosecution of any case. When video evidence is present, additional steps must be taken to ensure that there will be no "surprises".

Impact on Prosecutors' Time -

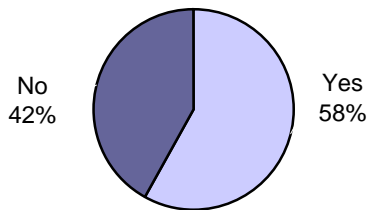
Recognizing that there are many demands on the prosecutors' time, they were questioned on the impact video evidence has on their time spent per case. Of the prosecutors responding, 42% experienced an increase in case preparation time, while 31% reported no significant impact in their time for case preparation. In contrast, 17% found that the use of video evidence actually decreases case preparation time.

Whether Defendants Are More Likely to Plea with Video Evidence



On rare occasions, due to the graphic or prejudicial nature of the events depicted on the video evidence, prosecutors will have to prepare a written transcript from the audio portion of the video evidence for presentation to a jury or trial judge. If this occurs, the process can be very time consuming.

Does Video Evidence Reduce Prosecutors' Trial Time



Regarding the time spent on the discovery process, 63 of the prosecutors responding reported there was no time lost due to the fact that the copying is managed by the local police agency. Prosecutors recommend all copies of video evidence released to the defense be coordinated through their office and at their direction.

The majority of the responding prosecutors (58%) reported that the use of video evidence has reduced the actual time that they spend in trial, whereas, 42% reported no impact on their actual trial time.

Impact on Cases Appealed – The study sought to determine if the prosecutors have experienced any change in the number of convictions appealed in cases involving video evidence. The majority of prosecutors (70%) reported no change, while a small number of prosecutors (10%) experienced a decrease in the number of cases appealed when video evidence was present. When a conviction involving video evidence is appealed to the higher courts, 64% of the time the appeals are unsuccessful for the defendant.

Impact on Prosecution of Criminal Cases - Of the 147 prosecutors, 122 (96%) reported that video evidence has improved their ability to prosecute cases. In every state visited, officers and troopers reported that some judicial jurisdictions were unwilling to present video evidence in court. In a majority of these jurisdictions, the court did not have the equipment or training necessary to use video evidence. In the state of Texas, where the Department of Public Safety and local police agencies most commonly use in-car cameras, there are still several political subdivisions that do not entertain the presentation of video evidence in court. Officers reported that in several cases it is not so much the lack of equipment as it is the misunderstanding of the value of the video evidence and lack of training within the office of the prosecutor that have prevented the effective use of video evidence in court.

As explained in the overview, since the introduction of video evidence the number of guilty pleas has increased. This time saved by prosecutors and police equates to a financial savings for the entire Criminal Justice System.

Challenges to Video Evidence – Through the survey, prosecutors were asked to share challenges they have faced when introducing video evidence. The following chart depicts their responses in order of frequency:

Challenges Raised by Defense When Presenting Video Evidence

Challenges	Percentage	Rank
Inadmissible statements	22%	1
Redaction of tape	20%	2
Miranda challenges	14%	3
Statements of prior convictions	11%	4
Statements of in-custody suspects	11%	4
Chain of custody challenges	9%	5
Admissibility of viewing field sobriety tests	4%	6
Privacy issues/Fourth Amendment challenges	4%	6
Sixth Amendment challenges ¹	4%	6
Notification of two-party recording	1%	7

¹ In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the Assistance of Counsel for his defense.

Summary – The availability of video evidence for criminal prosecutions is an effective tool and the majority of the surveyed prosecutors welcome its use. Video evidence, also referred to as the “silent witness”, if used properly by law enforcement, has the ability to present unbiased facts. Although the presence of video evidence often reduces the amount of time spent in court for law enforcement, it can also increase the trial preparation time for the prosecutor.

According to the prosecutors, the greatest value of video evidence is its ability to refresh the officer’s memory on the facts, circumstances and sequence of events. The video evidence also serves to verify the accuracy of written reports and statements surrounding the incident.

Garnered from the survey are some valuable lessons to be learned by law enforcement executives:

- 1 The quality of the equipment selected to capture video evidence is crucial. This equipment and recording medium must be adequate to ensure proper audio and visual are captured.
- 2 Law enforcement must ensure that policies and procedures are in place that will ensure the camera is operational and will specify its use.
- 3 To avoid chain of custody issues, law enforcement executives must ensure evidential policies and procedures are in place and followed.
- 4 In light of the issues surrounding redaction and audio/visual enhancement, police agencies should consider investing in more advanced video editing or forensic analysis equipment and training.
- 5 Law enforcement must ensure proper training is in place to educate officers in the proper use and operation of audio/visual recordings (in-car cameras).

It is apparent that there is a need to educate and train Prosecutors on the rapidly developing in-car camera technology. New challenges in evidence presentation (particularly with new digital media) are occurring daily. Prosecutors must be prepared for these challenges. The IACP, the International Association for Identification (IAI), and the Law Enforcement and Emergency Service Video Association (LEVA) all offer training in this technology. To assist both law enforcement and prosecutors, included in Appendix F is an overview of pertinent cases involving this new technology. *“Forensic Video Analysis and the Law”* was written by Jonathan Hak, a prosecutor and recognized expert in the presentation of video evidence in criminal trials. Information regarding training is available on the association websites.

**NAME OF THE POLICE DEPARTMENT
IN-CAR CAMERA TRACKING LOG**

TRACKING #	DIST. LOG#	VEHICLE	OFFICER:	ID	DATE IN:	DATE OUT:	OFFICER:	ID	DATE STORED:	REVIEWED BY:	ID:	COLOR CODE:	DATE COPIED:	REASON COPIED:
00000001	3	123	DAVID	123	9/30/2000	22/22/2000	SMITH	321	4/29/2002	ALEX	512			
00000002	3	345	TOM	222	9/30/2002	22/29/2002	JERRY	521	22/4/2002	GARY	C271			
00000003	3	567	FISHER	333	9/30/2000	22/22/2000	Henry	234	4/29/2002	BOB	512			
00000004	3	235	HAETHER	444	9/30/2000	9/29/2002	PETER	234	9/29/2002	MARY	C271			
00000005	3	1	CHARLES	555	9/30/2000	22/7/2002	LISA	455	22/29/2002	LINDA	C271			
00000006	3	32	RENE	666	9/30/2000	22/2/2000	JOE	654	4/29/2002	EMILY	512			
00000007	3	123	DAVID	123	9/30/2000	22/22/2000	SMITH	321	4/29/2002	ALEX	512			
00000008	3	345	TOM	222	9/30/2002	22/29/2002	JERRY	521	22/4/2002	GARY	C271			
00000009	3	567	FISHER	333	9/30/2000	22/22/2000	Henry	234	4/29/2002	BOB	C271	HOLD		Shooting
00000011	3	235	HAETHER	444	9/30/2000	9/29/2002	PETER	234	9/29/2002	MARY	1511			
00000012	3	1	CHARLES	555	9/30/2000	22/7/2002	LISA	455	22/29/2002	LINDA	2422			
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00000015	3	345	TOM	222	9/30/2002	22/29/2002	JERRY	521	22/4/2002	GARY	512			
00000016	3	567	FISHER	333	9/30/2000	22/22/2000	Henry	234	4/29/2002	BOB	C271			
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00000043	3	1	CHARLES	555	9/30/2000	22/7/2002	LISA	455	22/29/2002	LINDA	C271	HOLD	No Footage	no copy

COPIED CODES: A=Administration C=Court I=IAD L=Legal Affairs T=Training S=Segment



Suggested Guidelines:
Mobile Video System
Part 1: Vendor Bid Requirements
Part 2: Sample Bid Specifications

COPS ★

COMMUNITY ORIENTED POLICING SERVICES
U.S. DEPARTMENT OF JUSTICE

DRAFT

*International Association of Chiefs of Police In-Car Camera Project, May 2004
In Partnership with the U.S. Department of Justice Office of Community Oriented
Policing Services*

The IACP intends to identify minimum performance standards for police in-car cameras in the future under the auspices of our In-Car Camera Evaluation and Technical Assistance Project. These specifications will be created in collaboration with the COPS Office and the National Institute of Justice, Office of Science and Technology. In advance of the availability of these specifications, and to support the urgent need of local law enforcement agencies currently procuring camera and video recording equipment, we are distributing these draft in-car camera design guidelines. The information in these draft guidelines has been gleaned from our ongoing In-Car Camera Project, working with law enforcement agencies across the country that have purchased camera equipment for their vehicles. These guidelines are intended to support and inform the development of unique local bid specifications for any type of law enforcement agency. Importantly, each agency must arrive at a set of final bid specifications that reflects their own local needs.

This document has been arranged in two parts; general recommendations for minimum performance and features of in-car systems and a sample bid specification, which can be used as a model for agencies preparing proposal requests.

This project was supported by Cooperative Agreement number 2003-CK-WX-0261 awarded by the U.S. Department of Justice, Office of Community Oriented Policing. Points of view or opinions contained in this document are those of the IACP, and do not necessarily represent the official opinion or policies of the U.S. Department of Justice.

Suggested Guidelines: Mobile Video System

Part 1: Vendor Bid Requirements

When developing an in-car video initiative, it is important to remember that the recording system is just one component of the program. A successful strategy must include careful consideration of tape or media storage and handling; playback and duplication capabilities; forensic video analysis; and budgeting, acquisition and maintenance of supplies such as batteries, replacement media, labels, etc. Even more important, though not specifically addressed in this document, is the development, review and implementation of policies and procedures, backed up with documented training of officers who will be using the equipment. It is highly recommended that additional training be provided to supervisors and administrators.

General System Requirements

The mobile video system (in-car camera) selected should have a proven, reliable record in actual patrol car use under a variety of conditions. Have the vendor supply your agency with several systems for testing under various conditions. Vendors should be willing to provide names and contacts at other agencies that use their equipment. Contact these agencies and ask what problems they have encountered, their level of satisfaction with a vendor's technical support, and what improvements could be made. Many vendors, especially those who actually manufacture the equipment, will be willing to include custom features or modifications to meet your agency's specific needs. For that reason, the IACP recommends that the vendor should have experience in manufacturing and supporting such systems and include provisions for parts and service as needed. Be sure a reasonable warranty and repair policy is a requirement of the proposal.

Performance Testing and Evaluation

Field-testing should take place within the jurisdiction the equipment will be employed to verify its acceptable level of performance and conformity to specifications under the conditions in which it will be used. For instance:

- Does frequent use on rough terrain affect the adjustment of the camera or recording quality?
- For analog recording systems, does high humidity result in condensation on tapes and recording components, causing the recorder to stop functioning (a condition known as "dew lock")?
- Does the system capture reliable and accurate images under difficult lighting or poor weather conditions?

Performance might also be affected by electromagnetic interference from high-powered television stations or other radio frequency interference (including UHF, VHF and HF transmitters); automobile alternator, ignition, and electrical systems,

emergency lights, siren, mobile data computers, speed measuring devices, high voltage power lines, traffic signals, neon signs, etc. Expose the system to a wide range of conditions throughout the jurisdiction.

During field-testing, attention should be paid to occupant safety factors as well. Be sure the installed equipment does not obstruct the driver's vision or interfere with any safety or operational devices (airbags, rear-view mirrors, etc.) Be sure the driver or other occupant has a reasonable amount of room to move without interference, especially entering and exiting the vehicle.

System Components

A typical mobile video system consists of a windshield mounted camera, trunk mounted vault containing the recording mechanism, control center, compact monitor, wireless microphone/transmitter system to capture audio outside the vehicle for traffic stops and a hard wired microphone to capture audio from inside the police vehicle. The entire system should operate on the vehicle's 12-volt power system.

Camera

Usually mounted on the dash or windshield, the camera must be able to withstand extreme heat and cold conditions. It is important that the camera is mounted in a position that minimizes obstruction of the driver's view through the windshield, but still captures a clear view of a vehicle in front of the patrol car, including the occupants of the vehicle and the license plate. The camera should be mounted in a manner that will securely hold the camera's position under all driving conditions, including the event of accident, while allowing easy repositioning of the camera without tools. Special attention should be given to testing the system's ability to recover a license plate image at night when the police vehicle's high beam and emergency lights are reflected off the rear of the target vehicle. A field of view 16 feet wide at a distance of 20 feet from the camera is recommended. Camera function controls should be located for easy access by the operator, and backlit for easy nighttime operation. Any system selected should include a camera with automatic and manual focus, automatic white balance (color adjustment) and automatic exposure. Cameras with low-light and backlight compensation capabilities may provide better images in dark or otherwise difficult lighting conditions. A resolution of at least 450 horizontal lines is recommended.

Video Monitor

A high-quality color LCD video monitor should be installed to monitor live audio and video and playback of recorded images and sound. It is important that the

operator has the ability to independently turn off the sound and video display if necessary (for instance, if a suspect is in the vehicle while another is being interviewed outside the car it is advisable to turn off at least the audio playback so the suspect in the rear of the vehicle cannot hear the conversation). The monitor should display all video and text (time stamp, brake or emergency light indicator, etc.) that is being recorded. The location of the monitor should be carefully considered for ease of use, visibility, and safety, and may vary depending on the type of vehicle in which it is installed.

Microphone

Microphones are often overlooked or an inferior model is chosen as a cost-saving measure. However, they are critical components of any in-car video system, and compromises could negatively impact the effectiveness of the in-car camera strategy. The IACP recommends, at a minimum, a wireless microphone operating on the 900 MHz digital spectrum with a rechargeable (lithium) power source capable of 8-10 hours use before charging, and an effective range of 1000 feet.

Analog microphones, though generally less expensive than digital, are more prone to interference and have fewer frequencies available, which can lead to cross talk from other units. Many microphones use thin cables that connect the microphone to a transmitter clipped to the user's belt or uniform. Often, these fragile wires also serve as transmission antennas and can break if stressed or bent sharply. A wireless system that includes a secondary microphone built in to the transmitter unit that is automatically activated if the primary microphone is separated from the transmitter is recommended.

If a system requiring batteries is used, it is necessary to maintain an adequate stock of fresh batteries, including at least one spare set in each video-equipped patrol vehicle at all times. This can be a significant expense that will have to be considered in the agency operating budget. Consideration should be given to systems that have microphones with built-in batteries that can be recharged by chargers located in the vehicle.

A second, hard-wired microphone should be located inside the patrol vehicle, with the audio recorded on a separate channel from the wireless microphone where possible.

Control Panel

An ergonomically designed control panel should be installed in each video-equipped vehicle in a convenient location for operation by the vehicle's driver. The panel should include, at a minimum, controls for recorder operation (record, play, fast forward, rewind, etc.), and indicators informing the operator of system

status (power on, microphone on, tape inserted, record, warning alarms, etc). Controls should be illuminated to facilitate use at night.

Recorder

Typically, in-car camera systems in use by the majority of police agencies in the U.S. use VHS or Hi-8 tapes. These analog recording systems generally provide good image quality and have a long, proven history with law enforcement agencies, prosecutors, and the courts. However, handling and storage of large numbers of videotapes can require the dedication of significant resources in both employee time and physical space within a facility.

Digital recorders are now widely available, and offer a number of attractive features not available in analog devices. For instance, digital recording systems can utilize buffers that collect video for a period of time before the recorder is activated, often capturing the underlying infraction that leads to a traffic stop or other event. Digital storage might appear to be a desirable alternative to costly and cumbersome videotapes, but an agency may need to purchase expensive servers and digital asset management software to handle the exceedingly large digital video files. Compression of digital video files reduces the storage space requirements, but can also severely diminish the quality and reliability of the recorded images.

An agency must carefully weigh the advantages and disadvantages of digital and analog recording systems to choose the equipment most closely suited to the agency's needs and performance expectations.

Court admissibility of visual exhibits produced from a mobile in-car video system must be an agency's first consideration prior to a purchase commitment. Analog systems have long been accepted by the courts as reliable scientific exhibits, most recently upheld in ***Commonwealth of Pennsylvania v. Antone Wilson (2004)***. However, digital systems have not yet undergone the rigorous scientific tests the courts may demand. Courts consider video exhibits as scientific evidence, which may be subject to legal challenges under a ***Daubert***¹ or ***Frye***² hearing.

The courts may need to consider whether the digital video recording system accurately and reliably reproduces the original image as witnessed by the camera; specifically:

1. Has the recording process been subject to peer review?
2. Does the recording process adhere to a recognized scientific standard?

¹ *Daubert v. Merrell Dow Pharmaceuticals (92-102)*, 509 U.S. 579 (1993)

² *Frye v. United States*, 293 F. 1013 (DC Cir. 1923)

3. Is the recording process generally accepted by the relevant scientific community (i.e., forensic video analysts from the Law Enforcement & Emergency Services Video Association, or the International Association for Identification)?

Vendors must be able to provide a White Paper which establishes that its technology has undergone rigorous field-testing by an independent and relevant scientific body. The White Paper would form the basis of a defense to any scientific challenge mounted under Frye or Daubert.

The standard for these tests is high and agencies investing in digital video recorders should demand that vendors provide supportive documentation for the admittance of the technology in court.

Failure to survive a Frye or Daubert test could result in the exclusion of any evidence produced through the in-car video system, rendering recordings made by any or all of the agency's similar systems inadmissible in future trials within that jurisdiction.

The IACP will continue to monitor the issues and case law regarding digital video evidence and disseminate the information to law enforcement agencies.

What to Look for in an In-Car Video System

General system requirements

- Rugged, reliable construction
- Compatible with 12-volt power system
- Customizable to agency's needs
- Vendor provides units for field testing
- Warranty, service support

Camera

- Mounted without obstruction of driver's vision
- Captures complete view of vehicle ahead
- Automatic focus, exposure, color
- Capable of low-light imaging
- High image resolution

Monitor

- High image quality, brightness
- Sound can be turned on/off
- Displays all video and text information
- Mounted for convenient viewing without obstruction

Microphone

- Digital 900 MHz Wireless, worn by officer
- 8-10 hours use on single charge
- 1000' range
- Backup built-in microphone in case primary is defective
- Hard-wired microphone in vehicle

Control Panel

- Ergonomic design
- Convenient placement in vehicle
- Full camera, recorder controls and indicators
- Controls are visible at night

Recorders

- VHS, Hi-8 or a scientifically reliable digital recording format
- Capable of recording 8 uninterrupted hours
- Mounts in secure, climate controlled vault in vehicle
- Recording starts automatically with lights and siren
- Time, date, lights, braking and other data recorded with video
- Audio track recorded simultaneously with video
- Alarm indicating dew or dust conditions
- Backup power to maintain time/date in power loss
- Automatic daylight/standard time adjustments



Suggested Guidelines:
Mobile Video System
Part 2: Sample Bid Specifications

COPS ★

COMMUNITY ORIENTED POLICING SERVICES
U.S. DEPARTMENT OF JUSTICE

The sample bid specifications on the following pages are for demonstration purposes only. This document is intended as a guide to assist agencies in the preparation of bid proposal requests. Pending the publication of performance standards by the IACP, the specifications listed herein generally reflect the recommended minimum performance guidelines of the IACP. Agencies seeking proposals for in-car video systems should review the specific requirements of their agency to determine the equipment specifications appropriate for their organization.

Suggested Guidelines: Mobile Video System

Part 2: Sample Bid Specifications

The mobile video system (in-car camera) selected must have a proven, reliable record in actual patrol car use under a variety of conditions.

The vendor must have experience in manufacturing and supporting such systems to include provisions for parts and service as needed.

The vendor shall provide documentation proving a minimum of ___ years experience in the active marketing, production, and sale of video systems.

1. Vendors that do not manufacture the components comprising the video system shall be authorized by the original component manufacturer to resell such components. A copy of a factory authorized dealer certificate shall be provided.
2. The basic design of all equipment shall be in full production, no prototype models will be considered.
3. All components of the system must comply with Federal Communications Commission (FCC) standards.
4. To document vendors' experience in the manufacture, sales, and support of mobile video systems, the vendor shall list agencies to which mobile video systems were sold. Letters of reference for verification should be included.

Sample and Demonstration:

Prior to award, the agency reserves the right to require any bidder to provide complete video systems of the exact configuration offered for the purposes of evaluation to determine compliance with the specification requirements. The bidder will provide the mobile video systems within two weeks of the request.

Performance Testing and Evaluation:

Any mobile video system may be field and laboratory tested by state or independent laboratories to verify its acceptable level of performance and conformity to specifications.

1. Emphasis will be placed on the video system's ability to maintain consistent audio/visual recording quality, while subject to interference from the following sources:
 - a. High-powered television stations
 - b. Other radio frequency interference (including UHF, VHF and HF transmitters.)
 - c. Automobile alternator, ignition, and electrical systems
 - d. Automobile heaters / air conditioner fan motors

- e. Other patrol vehicle electrical systems to include radios, emergency lights, siren, mobile data computers, and speed measuring devices
 - f. High voltage power lines, traffic signals, neon signs, etc.
2. When in operation, the mobile video system must not generate electromagnetic or radiation that interferes with communications or other electronic equipment found within a police vehicle.

Occupant Safety:

The mobile video system must be designed to minimize any and all protruding connections or edges that may cause physical injury to vehicle occupants in the event of an accident.

1. The camera and any other component shall be mounted in a manner as not to interfere with the effective operation of the airbag or any other safety device.
2. The camera and any other component shall be mounted in a manner as not to interfere with any vehicle control mechanism or obstruct the vehicle operator's view.
3. The system must be properly fused and protected to prevent overheating in case of a system malfunction.

Applicable Standards:

All mobile video systems and related audio equipment must conform to the minimum standards as set by:

1. Electronic Industries Association (EIA)
2. National Television System Committee (NTSC)
3. Federal Communications Commission rules and regulations (FCC)
4. Vendors must be able to provide a White Paper establishing its technology has undergone rigorous field testing by an independent and relevant scientific body. The White Paper would form the basis of a defense to any scientific challenge mounted under *Frye* or *Daubert*.

All mobile video systems shall be of industrial/commercial grade. No prototype models will be considered.

Warranty:

1. All camera, recorder, environmental control components, wireless microphones and transmitters, receiver, monitor, and control circuit components, shall be warranted to ensure they are fit for their intended purpose for a minimum of one year.
2. All defective equipment shall be repaired or replaced within 10 working days.

3. For warranty purposes, the warranty time begins with initial installation of said equipment in the desired vehicle.

General Mobile Video System Specifications:

The mobile video system shall consist of a windshield mounted camera, trunk-mounted vault with record mechanism, control center, compact monitor, wireless microphone/transmitter system to capture audio outside the vehicle for traffic stops and a hard-wired microphone to capture audio from inside the police vehicle.

1. Camera:

- a. Camera dimensions shall not exceed 7" in length and 2.75" in width.
- b. The camera shall operate in extreme hot/cold weather conditions and shall be mounted on the windshield.
- c. The camera shall be a single unit including power lens.
- d. Lens will be equipped with automatic focus, automatic iris, and automatic white balance.
- e. It is preferred that the camera have a backlight setting which reduces glare and bleed over from outside lighting.
- f. The camera shall be a solid state, CCD imaging system that shall not be subject to burn in, or interference by magnetic fields.
- g. The camera shall have minimum color resolution of 450 horizontal lines.
- h. The CCD color camera shall prevent glare and light blooming during operation.
- i. The camera shall be capable of being rotated 180 degrees in either direction on its mount without having to loosen any screws or knobs.
- j. The camera should have a control for enhanced low light recording.
- k. The camera shall have adjustments for shutter speed to compensate for all commonly experienced lighting situations
- l. The camera shall be capable of providing a clear image with the minimum illumination of 1 lux/.3 lux preferred (the lower the lux, the better the night vision).
- m. The camera shall operate on a power source that is filtered, regulated, and short circuit protected. The voltage supplied to the camera shall meet the camera manufacturer's specifications and shall not vary with fluctuations of the system's electrical system voltage of between 9 and 18 volts.
- n. The camera shall be capable of withstanding temperatures from direct exposure to the sun as well as freezing temperatures that may be encountered during the winter (14 to 120 degrees Fahrenheit).
- o. The camera cover shall not warp or distort under normal conditions.

- p. The camera shall provide a horizontal field of view of at least 16 feet at a distance of 20 feet.
- q. The camera shall provide both automatic and manual focus capabilities, which are user selectable.
- r. The camera shall offer a signal-to-noise ratio of at least 46db.
- s. The camera shall be mounted with a heavy-duty adjustable mount and shall be attached to the windshield.
- t. The camera mount shall be easily adjusted without tools.
- u. The camera shall have an LED indicator light near the lens to indicate solid when video is being captured and flashing/pulsing when audio and video is recording.
- v. The camera shall be equipped with light control which turns backlight on and off so as not to illuminate the user in darkened conditions.

2. Video Monitor:

- a. The monitor must be a high-quality color LCD monitor of at least 3" (but not greater than 6") diagonally measured.
- b. The display shall be of the LCD Active Matrix type.
- c. The monitor shall operate between 32F degrees and 120F degrees Fahrenheit.
- d. The monitor shall display a live picture from the camera when the system is powered (even if recording is not in progress).
- e. The monitor shall include a system speaker to provide monitoring of live audio from portable transmitter microphone or from recorded sound during the playback mode.
- f. The monitor shall have a volume control which will allow the user to adjust audio level and turn off monitor sound if desired
- g. The monitor shall operate independently of the recording device, ensuring the system shall function even if the monitor is not displaying a picture.
- h. The monitor shall display at a minimum: date/time, user identification information, emergency light indication, braking indicator and microphone activation indicator.
- i. The monitor shall be a dash mounted unit, overhead console, independent floor mount or between the seats console mounted
- j. The monitor shall operate on a power source that is filtered, regulated, and short circuit protected. The voltage supplied to the monitor shall meet the monitor manufacturer's specifications and shall not vary with fluctuations of the system's electrical system voltage of between 9 and 18 volts.

3. Wireless Microphone:

- a. Wireless microphone transmitter shall operate in the 900 MHz band and utilize digital spread spectrum technology.
- b. Transmitter must be compact in size with dimensions not to exceed 2.5"x3.5"x .75" h-w-d.
- c. Transmitter microphone must come equipped with compact carry case or device, which attaches the system to the users utility belt and does not interfere with operational use.
- d. The microphone transmitter shall be equipped with an external microphone with a universal connection port for replacements microphones.
- e. The microphone transmitter shall be equipped with an internal antenna. It shall not utilize the microphone cord as an antenna.
- f. The microphone transmitter shall be equipped with an internal microphone, which will allow recording to continue even if the external microphone is disconnected.
- g. The microphone shall automatically turn on when the recording device is activated and off when the recording device is deactivated.
- h. The microphone transmitter shall operate on rechargeable (lithium) batteries.
- i. The transmitter microphone must be capable of working with any mobile video system of the same brand.
- j. The transmitter must be equipped with a backlit status display which informs the user of transmit status, battery strength and recorder status.
- k. The microphone transmitter shall be capable of 8-10 hours continuous use without recharging.
- l. The microphone transmitter shall have a minimum operating range of 1,000 feet.
- m. The microphone transmitter must be equipped with a linking device or station, which synchronizes the operating transmitter frequency to the mobile video system being used.
- n. Once synchronized to a recording device, the microphone transmitter will control that selected device only and no others in close proximity.

4. Control Panel:

- a. System controller shall be made of durable construction and compact in design to be mounted in the overhead console, dash, or console between the seats.
- b. Controller must be enclosed in an ergonomically designed case with rounded edges to prevent injury to the user in the even of a sudden impact.

- c. The system controller shall have controls or indicators that will be illuminated when activated as listed in section (f) below.
- d. The controller shall be equipped with an automatic brightness control in each of the indicator circuits.
- e. Primary controls shall be backlit for night operations.
- f. Controls:
 - 1) Power on/off
 - 2) Play
 - 3) Record start/stop
 - 4) Fast Forward
 - 5) Rewind
 - 6) Stop
 - Zoom Camera Controls (if not easily accessible on camera)
 - 1) Zoom in/out
 - 2) Auto Focus
 - 3) Selectable Shutter
 - 4) Backlight Control
- Indicators:
 - 1) Power on
 - 2) Microphone on
 - 3) Tape inserted and operational
 - 4) Recording
 - 5) Fast Forward
 - 6) Stop
 - 7) Time Counter
 - 8) Problem Indicator
- g. The record function may be initialized by all of the following modes:
 - 1) User pushes record button.
 - 2) User activates the emergency equipment.
 - 3) User activates the record button on the wireless microphone transmitter.
- h. Programming of the in-car recording system shall be restricted to authorized personnel only through the system controller.
- i. The recording device rewind/fast forward/record controls shall not be accessible and/or usable by the operator when the environmentally controlled enclosure is opened to replace the recording media.

5. Electronic Conditions

- a. All electronics shall have input voltage of 13.5 (+ - 20%) volts DC.
- b. The in-car recording system shall not interfere with the vehicle's electrical or electronic components, including the police radio system, mobile data terminals or computer data terminals, speed detection devices, through electromagnetic radiation or radio

- frequency interference produced by the camera, recording device, system controller or its components.
- c. The in-car recording system shall not be affected in any way by transmissions from the police communication packages in the vehicles.
 - d. The in-car recording system shall be protected from damage due to input of voltage, reverse polarity, and electrical transients that may be encountered.
 - e. All programmable parameters shall be contained in non-volatile memory. Loss of power to the system shall not result in the unit requiring reprogramming.

6. Security Features

- a. The in-car recording system shall have the capability to restrict access to the programming functions, including but not limited to time/date features, to authorized personnel.
- b. The recording device must have the capability of preventing the user from erasing and taping over previously recorded information from either inside the vehicle or at the recording device controls.
- c. The recording device shall contain a method to determine if the recording media has been tampered with after it was recorded.
- d. The trunk-mounted recording device shall be enclosed in an environmentally controlled metal case with locking capabilities.

7. Protective Enclosure/Vault:

- a. The vault enclosure shall be crash resistant and capable of providing security from any attempts to vandalize or remove the recording media without authorization.
- b. The vault must be sealed to prevent the introduction of dust or moisture that may harm or prevent functioning of the media recording device.
- c. The vault shall contain environmental controls and shall possess a self-contained heating and cooling system that is automatically controlled by internal electronic thermostatic unit. To accomplish the heating and cooling function, the vault shall not require vent hoses or modification of the vehicle.
- d. The environmental control system must be designed to keep the recording device and internal electronics and equipment within operating range specified by recorder manufacturer. During extreme conditions, the recording device should reach operational temperatures within ten minutes.
- e. The vault must be capable of being mounted either horizontally or vertically in the trunk of the patrol vehicle to maximize storage

space. *(In the event the vault is to be placed in the Ford Crown Victoria, the vault shall be capable of being placed on the left side upper decking, above the gas tank and secured with bolts as recommended by the vehicle manufacturer so not to violate the integrity of the gas tank).*

- f. The vault shall be capable of housing the receiver for the wireless microphone transmitter.
- g. All electronic controls and connectors shall be contained within the vault to provide additional protection from the elements for those components.

8. Recording Media

- a. The recording media may be VHS, Hi8, or digital format. If a digital format is chosen, it must accurately and reliably reproduce the original image as witnessed by the camera *(see comments about digital recording in **Recorder** section of Part 1 of this document).*
- b. The recording media shall be capable of recording events uninterrupted for the minimum of 8 hours.
- c. The recorder shall be capable of recording a minimum of one audio track simultaneously in conjunction with the video signal.
- d. The recorder shall have incorporated sensors that detect excessive moisture or dust.
- e. The recorder shall operate from 13.5 (+ - 20%) DC voltage source.
- f. The recording device shall be mounted in the trunk of the vehicle in an environmentally controlled enclosure (vault) to seal and protect the recorder from dust, humidity and temperature changes to ensure an operational climate.
- g. The recording system shall interface with the vehicle emergency equipment currently installed in the vehicle, having the minimum of (2) activation switches, and shall display on the recorded media and on the monitor, an indicator depicting when the emergency equipment was activated.
- h. The recorder shall generate to the recording media and the monitor the date/time, users identifiers, brake light indicator, emergency equipment indicator and audio indicator.
- i. The date and time generator shall be self-adjusting for daylight savings time and leap year variances.
- j. The date/time and users identifier shall be on battery backup to prevent loss information in the event the vehicle battery is disconnected for up to a minimum of (4) hours.
- k. The operating system must be computer based and controlled. It shall also be upgradeable and fully compatible with future technology applications



In-Car Camera Technical Assistance Project
Effective Use of Video in Law Enforcement
for Managers and Prosecutors

FORENSIC VIDEO ANALYSIS AND THE LAW

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FORENSIC VIDEO ANALYSIS AND THE LAW

by Jonathan W. Hak, Dipl., B.Sc., LL.B., LL.M.¹

Introduction

During a high profile murder trial, the prosecution's star witness takes the witness stand and is asked by the prosecutor "Can you identify the man you saw running from the 7-11 store?" The witness scans the courtroom, points at the defendant and says "That's him right there." From the jurors' perspective, the witness must be correct – after all, he was there.

Eyewitness evidence, though often powerful, is plagued by the frailties that accompany honest but mistaken witnesses. There are countless cases where honest witnesses have erred in their evidence, sometimes by saying "that's the man" only to be later proven wrong. Equally, there are many cases where witnesses cannot identify the perpetrator even though he is actually in the line-up or the prisoner's dock. Stress, sensory impairment, time and circumstance impact upon a witness' ability to accurately identify perpetrators of offences.

It is a fundamental tenet of our criminal justice system that we should prosecute criminal offences with vigor and ensure that only the guilty are convicted. Video evidence can be of significant value in identifying those who committed offences and those who did not. Video evidence is not subject to the same frailties that face humans. As noted by the Supreme Court of Canada in *R. v. Nikolovski*:²

The video camera on the other hand is never subject to stress. Through tumultuous events it continues to record accurately and dispassionately all that comes before it. Although silent, it remains a constant, unbiased witness with instant and total recall of all that it observed.

...So long as the videotape is of good quality and gives a clear picture of events and the perpetrator, it may provide the best evidence of the identity of the perpetrator. It is relevant and admissible evidence that can by itself be cogent and convincing evidence on the issue of identity. Indeed it may be the only evidence available. For example, in the course of a robbery, every eyewitness may be killed yet the video camera will steadfastly continue to impassively record the robbery and the actions of the robbers.

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² (1996), 111 C.C.C. (3d) 403, at p. 412

Advances in digital technology have led to the use of various scientific techniques in the analysis and presentation of video evidence to the courts. In some cases, this has allowed the courts to gain more valuable information from video evidence than would otherwise have been evident. In other cases, it makes the difference between admitting video evidence and excluding it.

It is important to understand the background of videotape evidence in our courts, how the law deals with the advent of new technology and how to effectively present such evidence in court. We will also examine the critical aspect of becoming qualified as an expert witness in court.

Both the United States and Canada are common law jurisdictions. As such, we have much to learn from each country in our examination of forensic video analysis. We will examine relevant case law from both the United States and Canada in order to gain a proper grounding of the law. We will also review relevant provisions in the United States *Federal Rules of Evidence* and the *Canada Evidence Act*.

Use of Videotape Evidence in Criminal Prosecutions

1. Types of Videotape Evidence Used in Criminal Prosecutions

Videotape evidence, as used in the criminal justice system, falls into one of three categories:

a) illustrative video

These are videos that show or illustrate certain things to the court that it would not otherwise be able to readily see. For example:

- crime scene video
- demonstrating that a weapon caused a certain injury where an in court demonstration is not practical
- demonstrating that a firearm is capable of modification to fully automatic firing where firing the weapon in court is not an option

b) staged video

These are videos that record events that are about to occur for the record such as the interview of a suspect or witness.

c) surveillance video

Surveillance videotaping is becoming pervasive in our society as a method of both preventing and detecting crime. It is estimated that in cities, we are captured on surveillance videotape 8-12 times per day.

It is this latter category of videotape that is the focus of this course.

2. Admissibility of Videotape Evidence

Videotapes are classified as a form of photographic evidence under *Federal Rule of Evidence* 1001 and parallel provisions in most states. In Canada, videotape evidence is classified as real evidence.

a) theories of admissibility

i) illustrative evidence theory (“pictorial communication”)

The traditional view of photographs and videotape is that they have no independent significance as they merely illustrate facts testified to by a witness.

This is referred to as the “graphic portrayal of real evidence”. Under this theory, photographs or videotape become admissible once a witness testifies that the photographs or videotape accurately depicts what was observed by the witness.

ii) silent witness theory

Once the videotape has been authenticated, the tape speaks for itself. No witness needs to have viewed what the camera recorded.

In *R. v. Taylor*,³ the Court admitted videotape evidence without eyewitness verification, stating:

The issue is whether these tapes are capable of being real and demonstrative evidence to prove the scenes they depict as distinct from evidence that merely illustrates the testimony of a sworn witness...If the tape is relevant, material, and reliable it has actual probative value.

The evidence is admissible upon proving the reliability of the process that produced the videotape.⁴

b) relevance

Admissibility is contingent, in part, upon the court being satisfied as to the relevance of the video evidence. There is no magic legal test for relevance. Relevance is determined on a case-by-case basis and depends on the issues raised in the prosecution in question.

The relevancy test applies to the videotape as a whole. If irrelevant images appear on the video, which is typically the case in a surveillance context, that does not render the entire videotape inadmissible. It is the images of interest that must be relevant.

The test for relevance is a practical one. If an eyewitness would be permitted to describe what is depicted on the videotape, then the relevancy requirement is met.⁵

c) authentication

In *State v. Molasky*,⁶ in admitting videotape evidence, the Court based its decision on the evidence of an expert who said that videotape “could not be

³ (1983), 10 W.C.B. 303 (Ontario Provincial Court)

⁴ *Hannewacker v. City of Jacksonville Beach*, 419 So.2d 308 (1982, Supreme Court of Florida); *Wagner v. State of Florida*, 707 So. 2d 827 (Fla. 1st DCA), review denied, 717 So. 2d 542 (1998, Florida)

⁵ *Simpson Timber Co. (Sask.) Ltd. v. Bonville*, [1986] 5 W.W.R. 180 (Saskatchewan Court of Queen's Bench)

⁶ 655 S.W.2d 663 (Mo. App. 1983), cert denied (1984) 464 U.S. 1049

undetectedly altered by any known editing method". While that may have been true in 1983, it is unlikely true today.

In order for the court to rule videotape evidence admissible and in order for the trier of fact to rely upon it, it must be established that the videotape evidence is reliable. This authentication requirement provides that the party tendering the videotape must establish that the video accurately depicts the scene and that it has not been altered or changed.⁷

Authentication focuses on these elements:

- location
- date
- time
- alteration of the image in whole or in part

Proving the location of the captured images is generally not difficult. In the monitored surveillance context, this will require the operator of the camera or someone present during the recording process to verify the location shown. In the static surveillance context, such as a store or other commercial establishment, this would typically be done by someone familiar with the camera location and field of view, such as the store owner, employee or security officer. In the case of a bank, either a bank employee or a representative from the company who installed and services the surveillance equipment will suffice.⁸

After proving location, the date and time of the images in question must be proven. Most surveillance cameras show the date and time and provided such information is accurate, this requirement will be easily met. Where the date and time shown are incorrect, such as failing to account for daylight savings time or failing to set the accurate time at all, the actual date and time must be proven. My practice is to call the person who is responsible for ensuring that the date and time code is correct, if there is such a person. Where no such witness exists, the date and time can usually be proven by establishing the known time other events on the video occurred, such as the arrival of the police. The bottom line is that in order for the videotape evidence to be admissible, it must be shown that what is depicted is the event in question.

In *R. v. Leaney and Rawlinson*,⁹ Harradence, J., in dissent (though not on this point), noted the following regarding authentication:

⁷ *Molina v. State of Alabama*, 533 So.2d 701 (Alabama Court of Appeals, 1988); cert. denied (1989) 489 US 1086 (silent witness theory); *English v. State of Georgia*, 422 S.E.2d 924 (Georgia Court of Appeals, 1992) (illustrative evidence theory)

⁸ *R. v. Schaffer* (1988), 44 C.C.C. (3d) 507 (Nova Scotia Court of Appeal)

⁹ (1987), 38 C.C.C. (3d) 263 (Alberta Court of Appeal)

The party seeking the admission of the video must prove that it is accurate and fair through the verification evidence of a witness or witnesses under oath. In most situations this will be easily done. An eyewitness can testify that the video accurately represents the event that took place. Where there is no such eyewitness, accuracy and fairness will need to be verified by more technical evidence. The United States Court of Appeals examined the possible components of such evidence in *United States v. Taylor*, 530 F.2d 639 (1976) (at pp. 641-2):

In the case before us it was, of course, impossible for any of the tellers to testify that the film accurately depicted the events as witnessed by them, since the camera was activated only after the bank personnel were locked in the vault. The only testimony offered as foundation for the introduction of the photographs was by government witnesses who were not present during the actual robbery. These witnesses, however, testified as to the manner in which the film was installed in the camera, how the camera was activated, the fact that the film was removed immediately after the robbery, the chain of its possession, and the fact that it was properly developed and contact prints made from it. Under the circumstances of this case, we find that such testimony furnished sufficient authentication for the admission of the contact prints into evidence. Admission of this type of photographic evidence is a matter largely within the discretion of the court, *Moore v. Louisville & Nashville R.R. Co.*, 223 F.2d 214, 216 (5th Cir. 1955), and it is clear that the district court did not abuse its discretion here.

These are the kinds of matters the trial judge may wish to consider in determining the accuracy and fairness of a video tape sought to be admitted into evidence where no eyewitness verification is possible.

For analog videotape, authentication can usually be accomplished by proving chain of custody of the original videotape. The same approach is required for digital video evidence, though some argue that chain of custody is not enough.

As Erik Berg noted:¹⁰

Until a digital image is either printed or displayed on a computer screen, it has no visual form. It is completely dependent upon a host computer for its existence as a visual record. The potential for alteration or corruption of a digital image is much greater than one might think. Electrical power surges can scramble the binary bits that define the image. Hardware failure can destroy the very media upon which the image is recorded. Computer viruses can seek out and destroy the image. Anyone with access to the computer can be a very serious threat to digital images and, thus, to authentication at trial. One or two errant commands can be enough to destroy precious image data.

Controlling access to the computer is, therefore, important. So too, is tracking and preserving the images. The original image should be preserved intact. Any "enhancement" applied to an image must take place on a copy of the original. If the original image is enhanced, there will be no way to reproduce the results. The original image serves the function of control, much the same as any control used in scientific analysis. Without effective controls, any conclusions drawn from the evidence will be suspect.

¹⁰ *The Legal Edge: Digital Imaging, A Legal Primer*, in *The FBI Associate Magazine*, January/February 2001, at pages 22-23.

Digital video is simply binary data recorded on tape or other media. As such, it is inherently susceptible to accidental or malicious tampering. That fact, coupled with the widespread availability of low cost digital video editing hardware and software, leaves digital evidence vulnerable to suppression on the grounds that it could have been modified.¹¹

Technical experts have been trying to create a method whereby image alteration can be detected and conversely shown not to have occurred. One method has been the use of watermarking which modifies the digital video content by superimposition of the watermark. A number of papers have shown that this is not a foolproof method of image authentication.¹²

Another method that is being studied is a method whereby digital signatures are generated in an authentication system and stored on a media separate from the digital video evidence that theoretically would provide a means of proving digital video authenticity and simultaneously preserving the digital video in an unaltered state.¹³ The need for such authentication is predicated on the argument that something untoward may have occurred to the evidence between the time of collection and the time of presentation in court. For a digital signature system to be most effective, the signatures would need to be created in real time as the digital video is recorded.

Another method involves the use of encryption to scramble the image information making it impossible to view the image without the encryption key. This might prevent image tampering but the encryption process itself alters the original image. In order to view the encrypted image, it must be reconstructed. Once encrypted, the original image is not retained. This alone poses authentication problems.¹⁴

There is another method of establishing the authentication of analog and digital video evidence – the integrity and reputation of the expert. This more basic method may not always carry the day, hence the desire to prove authentication objectively. Indeed, where the credibility of the authentication witnesses is suspect, such a finding will impact upon an admissibility ruling.¹⁵

There are a number of legislative provisions that deal, directly or indirectly, with authentication related issues.

U.S. *Federal Rule of Evidence* 1002 states that the original of a writing, recording or photograph is required to prove the content of the writing, recording or

¹¹ *Authentication of Digital Video Evidence*, by Beser, Duerr and Staisiunas of the Johns Hopkins University Applied Physics Laboratory and the United States Postal Inspection Service, Forensic and Technical Services Division

¹² See note 10.

¹³ See *Authentication of Digital Video Evidence*, note 11, for details.

¹⁴ See note 10.

¹⁵ *R. v. Penney*, [2002] N.J. 70 (Nfld. C.A.)

photograph. FRE 1001(2) defines “photograph” as including still photographs, x-ray films, videotapes and motion pictures. FRE 1001(3) provides that:

If data are stored in a computer or similar device, any printout or other output readable by sight, shown to reflect the data accurately, is an ‘original’.

Thus, in respect of digital images, there is no true original as defined in the *Federal Rules of Evidence*.

A “duplicate” is defined in FRE 1001(4) as being:

A “duplicate” is a counterpart produced by the same impression as the original, or from the same matrix, or by means of photography, including enlargements or miniatures, or by mechanical or electronic re-recording, or by chemical reproduction, or by other equivalent techniques which accurately reproduces the original.

According to FRE 1003:

A duplicate is admissible to the same extent as an original unless (1) a genuine question is raised as to the authenticity of the original or (2) in the circumstances it would be unfair to admit the duplicate in lieu of the original.

To a certain extent, this is simply an application of the best evidence rule.

The *Canada Evidence Act* was amended in 2000 to deal with the reality of “electronic documents”. The amendments provide as follows:

31.1 Any person seeking to admit an electronic document as evidence has the burden of proving its authenticity by evidence capable of supporting a finding that the electronic document is that which it is purported to be.

31.2 (1) The best evidence rule in respect of an electronic document is satisfied

(a) on proof of the integrity of the electronic documents system by or in which the electronic document was recorded or stored; or

(b) if an evidentiary presumption established under section 31.4 applies.

(2) Despite subsection (1), in the absence of evidence to the contrary, an electronic document in the form of a printout satisfies the best evidence rule if the printout has been manifestly or consistently acted on, relied on or used as a record of the information recorded or stored in the printout.

31.3 For the purposes of subsection 31.2(1), in the absence of evidence to the contrary, the integrity of an electronic documents system by or in which an electronic document is recorded or stored is proven

(a) by evidence capable of supporting a finding that at all material times the computer system or other similar device used by the electronic documents system was operating properly or, if it was not, the fact of its not operating properly did not affect

the integrity of the electronic document and there are no other reasonable grounds to doubt the integrity of the electronic documents system;

(b) if it is established that the electronic document was recorded or stored by a party who is adverse in interest to the party seeking to introduce it; or

(c) if it is established that the electronic document was recorded or stored in the usual and ordinary course of business by a person who is not a party and who did not record or store it under the control of the party seeking to introduce it.

31.4 The Governor in Council may make regulations establishing evidentiary presumptions in relation to electronic documents signed with secure electronic signatures, including regulations respecting

(a) the association of secure electronic signatures with persons; and

(b) the integrity of information contained in electronic documents signed with secure electronic signatures.

31.5 For the purpose of determining under any rule of law whether an electronic document is admissible, evidence may be presented in respect of any standard, procedure, usage or practice concerning the manner in which electronic documents are to be recorded or stored, having regard to the type of business, enterprise or endeavour that used, recorded or stored the electronic document and the nature and purpose of the electronic document.

31.7 Sections 31.1 to 31.4 do not affect any rule of law relating to the admissibility of evidence, except the rules relating to authentication and best evidence.

31.8 The definitions in this section apply in sections 31.1 to 31.6.

"computer system" means a device that, or a group of interconnected or related devices one or more of which,

(a) contains computer programs or other data; and

(b) pursuant to computer programs, performs logic and control, and may perform any other function.

"data" means representations of information or of concepts, in any form.

"electronic document" means data that is recorded or stored on any medium in or by a computer system or other similar device and that can be read or perceived by a person or a computer system or other similar device. It includes a display, printout or other output of that data.

"electronic documents system" includes a computer system or other similar device by or in which data is recorded or stored and any procedures related to the recording or storage of electronic documents.

"secure electronic signature" means a secure electronic signature as defined in subsection 31(1) of the *Personal Information Protection and Electronic Documents Act*.¹⁶

By virtue of the definition of "electronic document" and "data", these amendments apply to video images that are recorded or stored on any medium in or by a computer or other similar device. Practically, this would include the following:

- images recorded by a digital CCTV system
- digital video that is downloaded onto a computer system
- analog video that has been digitized for use in court

These amendments do not change what the common law already required. Section 31.7 makes it clear that these amendments do not affect any existing rule of law relating to the admissibility of evidence. Rather, they accentuate the present rules relating to authentication and best evidence.

It remains the obligation of the party introducing an "electronic document" to authenticate the images contained within that document. Translated, digital images must be proven to be authentic, accurate representations of what was originally recorded.

Parliament has specifically required under s. 31.2(1)(a) that the best evidence rule in respect of "electronic documents" requires proof of the integrity of the "electronic documents system" that recorded or stored the "electronic document". Thus, in the context of forensic video analysis, the competency of the analyst is not the only issue. The competency and integrity of the computer system used by the analyst is also at issue. Section 31.3(a) requires evidence that proves proper operation of the computer system in question.

These provisions do not mandate the use of "secure electronic signatures" as part of an authentication scheme. Section 31.4 allows the Governor in Council to make regulations establishing evidentiary presumptions in respect of such an authentication scheme. As of March 2004, so such regulations have been enacted.

The only reported decision thus far regarding the amendments to the *Canada Evidence Act* is ***R. v. Morgan***.¹⁷ This case dealt with fishing licenses that existed in a computer database. In discussing these amendments, Flynn, J. said:¹⁸

¹⁶ Under s. 31(1) of the *Personal Information Protection and Electronic Documents Act*, "secure electronic signature" means a signature that results from the application of a technology or process prescribed by regulations made under s. 48(1) of the Act. As of March 2004, no regulations have been enacted under s. 48(1).

¹⁷ [2002] N.J. 15 (Nfld. and Lab. P.C.)

¹⁸ At page 7

[20]...These sections must work in conjunction with either some common law general rule of admissibility of documents or some other statutory provision. These sections themselves do not authorize the admissibility of the documentary evidence it describes. Rather, what the sections do is to clothe electronically stored and produced documents with the status of "best evidence" provided they meet certain criteria for their admissibility. For example, the documents in this case must first be proven to be business documents or official or public documents which are admissible of themselves as documentary evidence and as exceptions to the hearsay rule. If they are admissible under these other criteria, then Sections 31.1 and 31.2 operate to make them the best evidence available for that purpose.

[21] Enacted in the year 2000, the general purpose of section 31.1 and Section 31.2 as gleaned from the statutory provisions themselves is to allow the use of computerized information as either business, public documents or other types of documents provided the reliability of such documents can be established. It is a legislative attempt to grapple with the realities of modern business practice.

These comments reflect the likely intention of Parliament in enacting these provisions, namely the use of business documents that exist on computer databases, networks and hard drives. However, the broad definitions of "electronic document" and "data" clearly envelop digital images as well, whether so intended or not.

This does not change the way digital images should be approached. If anything, it simply formalizes what the common law and proper practice already requires. Integrity and reliability remain the watchwords.

d) editing

One of the concerns with videotape evidence (both analog and digital) is that the images have been edited in such a way as to present a false picture of what really happened. This is different from concerns of authentication. Editing in this context applies to both video and audio editing.

Editing a videotape will not necessarily render the video evidence inadmissible. The person tendering the video evidence, whether the forensic video analyst or another witness, must thoroughly explain any editing in such a fashion as to instill confidence in the evidence led in court.

Editing is quite legitimate. For example, if the original videotape records seven days of images and the robbery in question lasted three minutes, editing out the balance of the images is appropriate because they are irrelevant. A forensic video analyst must be careful to ensure that there is nothing else relevant on the tape such as an earlier or later appearance by the suspect (or victim as the case may be).

In general, editing goes to weight, not admissibility.¹⁹ However, edited videotapes will likely be excluded where the editing causes a disruption in the chronology or continuity of the event, or otherwise causes confusion. Inadmissibility on this basis results from the fact that the tendered images do not accurately establish and depict the events in question.²⁰ Further, where the probative value of the remaining images is outweighed by the prejudicial effect, the evidence can be excluded. More on this latter test will be discussed further in this paper.

The use of time-lapse surveillance video and multiplex cameras, though they involved forced editing by the cameras, is permissible provided the time-lapse operation or multiplex function is adequately explained to the court.

e) accuracy of the images

Accuracy of the images, while related to authentication, is a separate issue. The accuracy of the images portrayed on the videotape can affect both admissibility and weight. The overriding test to be applied is that the tape must be a consistent, true reflection of reality. The primary objects in the videotape as well as the secondary or surrounding elements must all be accurately shown. Distortion of material elements of the videotape may affect the admissibility of the evidence. Distortion of non-material elements will likely only affect the weight of the evidence.

A forensic video analyst must ensure that the proper aspect ratio is used so as to ensure that accurately proportioned images are shown.

Digital surveillance equipment is being marketed as the solution to almost any commercial (and private) surveillance security concern. On its face, there is an attraction to a digital video security system. No videotapes to handle or store. Many hours of surveillance can be recorded and erased. Some systems are quite inexpensive. One of the concerns that affect the admissibility of images from these systems is compression. If the images are compressed such as to produce ghosting or artifacts, then the images are not accurate and will not likely be admitted.

f) chain of custody

A forensic video analyst must have confidence that the chain of custody of the video evidence is intact. This is not just a concern for the prosecutor. The analyst should be satisfied that he/she is working on the original evidence and that the integrity of that evidence is intact. It follows that the forensic video

¹⁹ *Pease Co. v. Local Union 1787*, 393 N.E.2d 504 (Ohio Court of Appeal, 1978); *Pritchard v. Downie*, 326 F.2d 323 (Criminal Court of Appeal, 8th Circuit, 1964); *R. v. Ramos* (1997), 101 O.A.C. 211 (Ontario Court of Appeal)

²⁰ *R. v. Penney*, [2002] N.J. 70 (Nfld. C.A.)

analyst must also account for the chain of custody of the video evidence while in his/her possession.

Standard Operating Procedures (SOPs) should adequately address these issues.

g) probative value v. prejudicial effect

A final, overriding consideration for the admissibility of any evidence is whether the probative value of the evidence outweighs the prejudicial effect. The “prejudice” referred to in the term “prejudicial effect” does not refer to the increased likelihood of conviction. Rather, it refers to evidence which operates unfairly against the accused - evidence that may be used improperly by the trier of fact.

In the context of video evidence, if as a result of editing, the videotape is found to operate unfairly to the accused, it may be ruled inadmissible on the basis that the probative value of the evidence is outweighed by its prejudicial effect. For example, in ***Toronto (City) v. Debono***,²¹ the court refused to admit television news video that had been edited for television purposes because the edited version was inflammatory and unfair.

This is a common law principle.

This principle is codified in *Federal Rule of Evidence* 403, which provides:

Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence.

In ***Ballou v. Henri Studios***,²² the Court stated:

[U]nfair prejudice as used in Rule 403 is not to be equated with testimony simply adverse to the opposing party. Virtually all evidence is prejudicial or it isn't material. Unfair prejudice within the context of Rule 403 means an undue tendency to suggest a decision on an improper basis, commonly, though not necessarily, an emotional one.

Forensic video analysis itself is unlikely to violate this principle but it is an important principle to keep in mind.

²¹ Unreported, June 1, 1990, Ontario High Court of Justice

²² 656 F.2d 1147 (5th Circuit, 1981)

Videotapes as Evidence of Identification

One of the most useful applications for videotape evidence is to establish the identity of the perpetrator(s) of an offence. This is especially important given the frailties that are associated with eyewitness identification evidence.

There are two key cases from the Supreme Court of Canada that have embraced the use of videotape evidence as evidence of identification and have placed logical restrictions on the use of such evidence.

The first is ***R. v. Leaney and Rawlinson***,²³ where the Supreme Court of Canada dealt with a case involving two accused that were prosecuted for a number of offences, including a break and enter that was captured by a surveillance camera. The main evidence against Leaney was the videotape evidence. To bolster the weight given to the videotape evidence, the prosecution called five police officers to testify regarding the issue of identification. Four of the police officers had no previous acquaintance with Leaney. The fifth one had known him since childhood and had spent time with him shortly before the offence was committed.

The issue was whether the police officers were allowed to express an opinion on identification of the person shown in the videotape. The Court held that the four police officers that did not know the accused were not permitted to express such an opinion because they were in no better position than the trial judge to make such an assessment. The evidence of the fifth police officer was clearly admissible due his past familiarity and association with the accused. Further, the trial judge was entitled to make his own assessment as to the identification of the person shown in the videotape.

Numerous American decisions have reached the same conclusion.²⁴

The value of surveillance video in the prosecution context received another endorsement from the Supreme Court of Canada in ***R. v. Nikolovski***.²⁵ Nikolovski robbed a Mac's store but at trial, the clerk was unable to identify the accused as the perpetrator and in fact thought that another man shown in a photo line-up was the robber but even then he was only 25-30% sure. The prosecution tendered the surveillance videotape as evidence in the trial. The videotape clearly showed that the accused was the robber. After the clerk viewed the videotape in court, he was then asked if the man who robbed him was in court. The clerk did not think so. This is a good illustration of the frailty of eyewitness identification evidence.

²³ (1989), 50 C.C.C. (3d) 289

²⁴ See for example, ***United States v. Pierce***, 136 F.3d 770 (11th Circuit), cert. denied 119 S.Ct. 430 (1998); ***Nooner v. State of Arkansas***, 907 S.W.2d 677 (Arkansas Supreme Court, 1995)

²⁵ See note 2

The trial judge studied the videotape very carefully and concluded that Nikolovski was indeed the robber and convicted him on the strength of the surveillance video evidence alone. The matter was ultimately appealed to the Supreme Court of Canada.

The Court stated something that is rather obvious but is often forgotten in our courts:

“The ultimate aim of any trial, criminal or civil, must be to seek and to ascertain the truth.”²⁶

Referring to the value of video evidence, the Supreme Court of Canada noted in **R. v. KGB**²⁷ that video evidence is a “milestone” contributing to the “triumph of a principled analysis over a set of ossified judicially created categories.”

In **R. v. DOL**,²⁸ the Supreme Court of Canada noted that the modern trend is to admit all relevant and probative evidence and allow the trier of fact to determine the weight to be given to such evidence in order to arrive at a just result. Madam Justice L’Heureux-Dube stated that it would be wrong “to disallow evidence available through technological advances such as videotaping, that may benefit the truth seeking process.”

In **Nikolovski**, after commenting on the frailty of eyewitness identification evidence, the Court made these comments about video evidence:²⁹

The video camera on the other hand is never subject to stress. Through tumultuous events it continues to record accurately and dispassionately all that comes before it. Although silent, it remains a constant, unbiased witness with instant and total recall of all that it observed.

...So long as the videotape is of good quality and gives a clear picture of events and the perpetrator, it may provide the best evidence of the identity of the perpetrator. It is relevant and admissible evidence that can by itself be cogent and convincing evidence on the issue of identity. Indeed it may be the only evidence available. For example, in the course of a robbery, every eyewitness may be killed yet the video camera will steadfastly continue to impassively record the robbery and the actions of the robbers.

It is because video evidence can provide such clear and convincing evidence of identification that the trier of fact can use such evidence as the sole basis of determining identification.

The inherent value of quality video images is illustrated in a double robbery case wherein the trial judge convicted the accused of the robbery where there was

²⁶ At p. 409

²⁷ (1993), 79 C.C.C. (3d) 257

²⁸ (1993), 85 C.C.C. (3d) 289

²⁹ Supra, at note 2

only videotape evidence and no eyewitness evidence but acquitted where there was an excellent eyewitness but no video evidence.³⁰

In ***Nikolovski***, the Court put forth these procedural guidelines:

- once it is established that the videotape has not been altered or changed and that it depicts the crime scene, it is relevant and admissible evidence
- the clarity and quality of the images and to a lesser extent, the duration of the images, will impact upon the weight to be given to the video evidence
- frame by frame analysis is permitted

Finally, the Court cautioned that the trier of fact must exercise care in reaching conclusions based solely on video evidence.

³⁰ ***R. v. Geddes and Ledesma*** (unreported, 1998, Alberta Court of Queen's Bench)

Forensic Video Analysis

1. Introduction

Some video evidence is so clear and convincing that the original untouched tape (or a copy made to preserve the integrity of the original) need only be played in court after the video evidence has been authenticated. However, for video evidence that is less than stand-alone clear and convincing, where objective corroboration is advisable or where additional analysis is beneficial, forensic video analysis is essential.

Forensic video analysis is defined as “the scientific examination, comparison and evaluation of video in legal matters.” A typical case begins with an offence being committed. Police investigators will then search for surveillance video evidence that shows the commission of the offence itself or that shows the suspects (or other persons of interest) in another location either before or after the commission of the offence. Once that video evidence is obtained,³¹ it will be digitized so as to preserve the integrity of the original evidence and to allow for digital clarification. Known images will be obtained of the suspect, once identified. Similarly, clothing or other objects that were seized in connection with the offence or the arrest of the suspect will be photographed or videotaped. These known items are then videotaped in the same location where the suspect was caught on surveillance video using the surveillance equipment from that establishment. These are referred to as exhibit placement images. Then the forensic analysis begins.

The purpose of the analysis is to determine whether the defendant is the person depicted in the surveillance video and whether the known clothing and other objects that were seized match those seen in the surveillance video. This is done by comparing clarified images from the surveillance video with known images of the defendant, clothing and other objects. A further comparison is performed between the known images and the exhibit placement images.

A thorough analysis may take many hours. Presentation of the evidence in court may take several hours, even though the original surveillance videotape images only lasted a couple of minutes.

2. Court Acceptance of New Technology

Leading new types of scientific evidence in court can be an arduous task. Not all judges (and lawyers) are young and wise in the ways of new technology. It is the

³¹ Either by consent or search warrant

role of the prosecutor and the expert witness to lay a proper foundation for such evidence that will convince the court to admit and rely on the evidence.

The Supreme Court of Canada, in **Nikolovski**,³² said:

With the progress of scientific studies and advances in technology, evidence put forward particularly as to identification has changed over the years. The admission of new types of evidence is often resisted at first and yet, later accepted as commonplace and essential to the task of truth finding. Fingerprint evidence may be the first example of scientific evidence leading to identification. Similarly, blood typing with its ever increasing refinements can be extremely helpful in identification. DNA testing is yet another example. It must never be forgotten that evidence of this type can serve to establish innocence just as surely and effectively as it may establish guilt.

The Court held that expert evidence which advances a novel scientific theory or technique is subjected to special scrutiny to determine whether it meets the basic threshold of reliability and whether such evidence is essential in enabling the trier of fact to reach a proper conclusion. Once ruled admissible, it remains a question of what weight should be attached to the evidence.

What then is the test that is applied when considering novel scientific evidence?

a) the American approach

One approach that sets out the threshold test on admissibility of novel scientific evidence that is followed in many American jurisdictions is the test enunciated in **Frye v. United States**.³³ The **Frye** test provides as follows:

Just when a scientific principle or discovery crosses the line between the experimental and the demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from well recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.

Some commentators view **Frye** as being too conservative in restricting admissibility to evidence that has gained “general acceptance.” Others view its wording as being too vague to be of real help to trial courts. Some of this controversy has led to contradictory rulings in different jurisdictions on the same types of scientific evidence.³⁴

An example of the application of the **Frye** test in a case involving digital imaging is **State of Washington v. Hayden**.³⁵ In **Hayden**, the defendant had been convicted of felony first degree murder. It was alleged that he had raped and

³² Supra, note 2, at p. 409-410

³³ 293 F. 1013 (D.C. Cir., 1923)

³⁴ *Frye, Frye, Again: The Past, Present and Future of the General Acceptance Test*, David E. Bernstein, 2001

³⁵ 950 P.2d 1024 (Washington Court of Appeals, 1998)

murdered a woman in her apartment. Fingerprint evidence obtained at the scene was of insufficient quality to allow the latent print examiner to make a proper comparison. The examiner took the questioned exhibits to Erik Berg, a Tacoma Police Department expert in enhanced digital imaging. Mr. Berg produced digital images of the fingerprints, removed certain background fabric patterns and enhanced the fingerprints so that the prints became more visible. This allowed the latent print examiner to conclude that the prints belonged to Hayden. Hayden argued that the fingerprint evidence ought not to have been admitted.

Following the practice in Washington State, a **Frye** hearing was conducted. The trial court found that enhanced digital imaging is not novel scientific evidence to which the **Frye** test applies. In any event, the trial court found that the process passed the **Frye** test.

The Washington Court of Appeals examined enhanced digital imaging for the first time and applied the **Frye** test. Noting the evidence led in the trial and the absence of any defense evidence to the contrary, the Court ruled that enhanced digital imaging is generally accepted in the relevant scientific community. Accordingly, the appeal was dismissed and the conviction affirmed.

In 1993, the United States Supreme Court, in **Daubert v. Merrell Dow Pharmaceuticals Inc.**,³⁶ articulated the definitive threshold standard governing the admissibility of expert evidence in federal prosecutions. The Court held that the proper standard for determining admissibility is governed by the *Federal Rules of Evidence* rather than **Frye**. In order for expert evidence to be admitted, the method of analysis used by the expert need not necessarily have gained general acceptance as is required under the **Frye** test.

Prior to **Daubert**, most federal and state court judges had been relying on two standards to determine the admissibility of expert testimony - relevance and the **Frye** test. Critics of **Frye** argued that this approach often excluded new but legitimate science that had not yet gained a consensus within the scientific community. They also argued that science was not a “majority rules” proposition. Yet, there was a legitimate concern that “junk science” not be admitted into legal proceedings. The United States Supreme Court sought to clarify these standards in **Daubert**.

The Court directed judges to act as gatekeepers and instructed them to examine the scientific method underlying expert evidence and to admit only evidence that was both relevant and reliable. **Daubert** set out a two-part test that must be met in order for expert evidence to be admitted under the FRE:

- the expert evidence must consist of “scientific knowledge” – that is, it must be supported by appropriate validation

³⁶ 113 S. Ct. 2786

- the evidence must assist the trier of fact in understanding the evidence or in determining a fact in issue

In deciding the first issue, the court will consider a number of factors:

- is the evidence based on a testable theory or technique?
- has the theory or technique been subjected to peer review and publication?
- does the technique have a known error rate and standards controlling the technique's operation?
- is the underlying science generally accepted in the scientific community?

The Court cautioned that this was not a closed list and that judges could employ additional criteria. FRE 403 (probative value v. prejudicial effect) must also be considered.

In practice, other factors will be considered when determining the admissibility of scientific evidence:

- whether there are analogous relationships with other types of scientific techniques that are routinely admitted into evidence
- the expert's qualifications
- the existence of specialized literature in the area
- the nature and breadth of the inference sought to be adduced from the evidence
- the clarity with which the technique may be explained
- the extent to which basic data may be verified by the court and jury
- the availability of other experts to evaluate the technique
- the probative significance of the evidence

The essential question is not whether the technique is infallible but whether the scientific technique exhibits a level of reliability to warrant its use in the courtroom. The court must also be aware of the potential for the jury to be awed by notions of "mystic infallibility".

In the aftermath of ***Daubert***, some courts, particularly in civil litigation, are arguably misinterpreting and broadening the intended reach of ***Daubert***, thereby excluding scientific evidence that ought not to have been excluded.³⁷

The ***Daubert*** case is alive and well and has been followed and applied in numerous subsequent U.S.S.C. cases.³⁸

³⁷ *Daubert: The Most Influential Supreme Court Ruling You've Never Heard Of*, June 2003, Tellus Institute

At the federal level, **Daubert** is the governing test. At the state level, each state's courts have decided and continue to decide which approach to follow. At the state level, **Daubert** and the Federal Rules of Evidence approach is followed in Alaska, Arkansas, Delaware, Idaho, Indiana, Iowa, Kentucky, Louisiana, Maine, Massachusetts, Montana, Nevada, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Texas, Utah, Vermont, West Virginia, Wisconsin, Wyoming (a total of 26 states).³⁹

Frye remains the test at the state level in Arizona, California, Colorado, the District of Columbia, Florida, Illinois, Kansas, Maryland, Michigan, Minnesota, Mississippi, Nebraska, New Jersey, New York, Pennsylvania, and Washington.⁴⁰ It should be noted that some of the case law under **Frye** is showing a convergence with **Daubert**.

Some states follow neither **Daubert** nor **Frye** and instead use more liberal admissibility tests.⁴¹

It has been argued that **Frye** jurisdictions should adopt amended FRE 702, which incorporates the holdings of the Supreme Court's expert evidence trilogy.⁴² This approach is argued to be the most sound and consistent method of assessing the admissibility of scientific evidence.

b) the Canadian approach

In **R. v. Beland and Phillips**,⁴³ a case dealing with the admissibility of polygraph evidence, Wilson, J., in dissent (though not on this point), was critical of the **Frye** test. Wilson, J. preferred a more expansive admissibility standard, that of relevancy and helpfulness. If relevancy and helpfulness are shown, then cross-examination on the expert evidence and opposing expert witnesses go to the weight of the evidence rather than its admissibility.

Sopinka, J., in **R. v. Mohan**,⁴⁴ stated:

In summary, therefore, it appears from the foregoing that expert evidence which advances a scientific theory or technique is subjected to special scrutiny to determine whether it meets a basic threshold of reliability and whether it is essential in the sense

³⁸ For an example of the application of **Daubert**, see **U.S. v. Dorsey**, 45 F.3d 809 (U.S. Court of Appeals, Fourth Circuit).

³⁹ *State Standards for Admitting Scientific Evidence*, National Traffic Law Center, Alexandria, Virginia

⁴⁰ *Frye, Frye, Again: The Past, Present and Future of the General Acceptance Test*, David E. Bernstein, 2001

⁴¹ *Ibid.*

⁴² **Daubert, Joiner, Kumho Tire** – see *Frye, Frye, Again: The Past, Present and Future of the General Acceptance Test*, David E. Bernstein, 2001

⁴³ (1987), 36 C.C.C. (3d) 481 (Supreme Court of Canada)

⁴⁴ (1994), 89 C.C.C. (3d) 402 (Supreme Court of Canada)

that the trier of fact will be unable to come to a satisfactory conclusion without the assistance of an expert. The closer the evidence approaches an opinion on an ultimate issue, the stricter the application of this principle.

The Court in *Mohan* kept the door open to novel science, rejecting the “general acceptance” test formulated in *Frye* and preferring instead the “reliable foundation” test laid down in *Daubert*.

The Supreme Court of Canada, in *R. v. J-L. J.*,⁴⁵ noted that expert witnesses have an essential role to play in criminal courts. However, the Court noted that the dramatic growth in the frequency with which experts have been called had led to ongoing debate about suitable controls on their participation, precautions to exclude “junk science” and the need to preserve and protect the role of the trier of fact. The trial judge is the “gatekeeper” and must take that role seriously.

Citing *Daubert*, the Supreme Court of Canada listed a number of factors that could be helpful in evaluating the soundness of novel science:

- whether the theory or technique can be and has been tested – scientific methodology is based on generating hypotheses and testing them to see if they can be falsified – it is this methodology that distinguishes science from other fields of human inquiry
- whether the theory or technique has been subjected to peer review and publication – submission to the scrutiny of the scientific community is a component of “good science” because it increases the likelihood that substantive flaws in methodology will be detected
- the known or potential rate of error
- the existence of standards
- whether the theory or technique has been generally accepted – widespread acceptance can be an important factor in ruling scientific evidence admissible whereas a theory or technique that has only attracted minimal support within the community may properly be viewed with skepticism

Therefore, in Canada, the Supreme Court of Canada has adopted a test akin to *Daubert* as the appropriate method to assess novel scientific evidence. Once the scientific evidence meets this test, it becomes a question of weight.

3. Court Reception of Forensic Video Analysis

Although forensic video analysis has been used in many criminal and civil cases over the past decade in the United States, Canada and the United Kingdom, relatively few of these cases have been reported. It is often the case that forensic video analysis constitutes extremely powerful evidence and may be

⁴⁵ [2000] 2 S.C.R. 600

decisive in a given case, yet unless that evidence is challenged in a meaningful way, the decision of the trial judge may not be reported. The reported cases that currently exist must therefore be taken as being only a small percentage of the cases where forensic video analysis has been used.

a) United States cases

The following are reported United States cases that have used forensic video analysis as part of the evidence being considered by the court. In some of the cases, the level of forensic analysis is basic while in some cases, the analysis is quite advanced.

English v. State of Georgia⁴⁶

An undercover agent videotaped a cocaine sale. The videotape was digitized and images of the defendant were subjected to “computer enhancement” and printed as single images. A copy of the original videotape was entered as an exhibit at trial as well as a copy of the single computer enhanced image of the defendant seller.

At issue was whether the trial judge erred in admitting the computer enhanced images. The appeal court ruled that since the technician who produced the computer enhanced images testified as to the process used and established that the images were a fair and accurate representation of what appeared in the videotape, the computer enhanced images were admissible. The conviction was upheld.

United States v. Mosley⁴⁷

Mosley was charged with six counts of bank robbery. An FBI Agent testified that he subjected surveillance video from one of the banks to digital image processing. This procedure sharpened the images. He further testified that he was then able to detect a mark on the face of the robber. He then compared this mark with a mark on Mosley’s face that was visible in a booking photograph and described the similarities noted. The defense argued that the trial court erred in admitting this evidence.

At issue was whether the trial judge erred in admitting this digital analysis evidence. In a very brief ruling, the appeal court concluded that the trial court reasonably concluded that this evidence would assist the jury and that it was properly admitted.

State of Minnesota v. Newman⁴⁸

⁴⁶ 422 S.E.2d 924 (1992, Court of Appeals of Georgia)

⁴⁷ 1994 U.S. App. LEXIS 23969 (United States Court of Appeals for the Ninth Circuit)

⁴⁸ 1994 Minn. App. LEXIS 1246 (1994, Court of Appeals of Minnesota)

Newman was charged with the theft of \$474 worth of baseball cards from a store. At trial, the evidence against Newman consisted of the testimony of the cashier and a surveillance videotape which showed two men leaving the store with the baseball cards.

Following the verdict of guilt, Newman moved for a new trial alleging a prosecution discovery violation. As part of this post-trial process, the trial court viewed “computer-enhanced” still images from the videotape. It heard evidence from a defense witness, a digital imaging technician. The technician testified that the computer enhanced images showed a mark on the suspect’s left cheek whereas the defendant had a mark on his right cheek. The trial court disagreed with this finding and denied a new trial.

At issue was whether the trial court erred in denying the motion for a new trial. The appeal court ruled that the trial court did not err in denying the motion for a new trial. The post-trial computer enhanced images were inconclusive on the issue of identification but the cashier’s evidence was strong, coupled with the fact that the cashier had dealt with Newman on several occasions.

Though not stated, implicit in the ruling of both the trial court and the Court of Appeals of Minnesota is the acceptance of the digital imaging evidence that was presented by the defense.

Nooner v. State of Arkansas⁴⁹

This was a capital murder case where portions of the incident were captured on videotape. The defendant contended that stills taken from the videotape should not have been admitted as they had been manipulated and that therefore the silent witness theory did not apply.

The following technical process occurred:

- the original videotape was slowed down by making an exact duplicate of it in Betacam format and then freezing each frame for several seconds
- still frames were then taken from the duplicate video and digitized
- pixels on the suspect’s face were softened to remove graininess
- no features were added or subtracted to/from the original, except to mosaic out the face of the victim
- still photographs were prepared from the digitized images
- in producing the still photographs, the number of pixels per square inch were increased to improve the contrast, and the brightness was also adjusted

⁴⁹ 907 S.W.2d 677 (1995, Supreme Court of Arkansas)

- no alteration was made of the original images

At issue was whether the digitally created stills were admissible.

The Court noted at page 686:

Reliability must be the watchword in determining the admissibility of enhanced videotape and photographs, whether by computer or otherwise.

The Court ruled that computer generated stills are admissible if they are verified as being reliable representations of images recorded on the original videotape. Further, the original videotape should be entered as an exhibit for the trier of fact to view. As each of these requirements was met in this case, the defendant's argument failed.

State of Arizona v. Paxton⁵⁰

Paxton was convicted of first degree murder and appealed his conviction. The victim was the driver of the car in which Paxton was a rear seat passenger and Smaulding was the front seat passenger. While the vehicle was moving, Paxton shot the victim through the driver's seat back. He then reached between the two front bucket seats and fired five more times into the victim's right side. Once Paxton stopped the car, he and Smaulding pulled the victim out of the car and put him in the rear hatchback. The victim's body was later dumped in a ditch. Once it became apparent that the police were focusing on Paxton and Smaulding, Smaulding burned the car. Smaulding eventually led police to the victim's body.

At trial, Paxton testified that in fact Smaulding was the killer, not Paxton. He testified that the three of them had driven to a secluded spot where they smoked marijuana. The seating arrangement was the same. Paxton said that Smaulding pulled a gun and shot the victim five times in his right side and when the victim tried to escape out the driver's door, Smaulding shot him in the back. Paxton said that Smaulding then dragged the victim from the car and dumped his body in a ditch.

A blood-stained seat cover was found with the victim's body. At issue at trial was whether the seat cover had been on the driver's seat when the victim was shot. If it had, Smaulding's evidence that Paxton shot the victim through the driver's seat would have been impossible because there was no bullet hole in the seat cover. The State contended that the victim had removed the seat cover earlier because the straps were broken and that he was storing it in the hatchback where it became bloodstained when his body was placed there after being shot.

⁵⁰ 925 P.2d 721 (1996, Court of Appeals of Arizona)

The victim's mother testified that the driver's seat cover was not on the seat two days before the murder. A friend of the victim also testified that he rode in the victim's car the day before the murder and did not recall the seat cover being on the driver's seat. Further, he said that it had been "floating around" in the back seat and hatch in the months prior to the murder due to the straps being broken. The victim's girlfriend testified that she knew that the passenger seat had a cover but was unsure if the driver's seat did. The state tendered photographs of the car that the girlfriend had taken within three months of the murder. The photographs appeared to show that only the passenger seat had a seat cover on it.

Mark Little was qualified as an expert witness. He digitized, clarified and analyzed the photographs of the victim's car. He testified that there was a difference in the colors of the front seats, thereby allowing the court to draw the inference that the driver's seat cover was not in place at the time the photographs were taken.

Amongst other issues, Paxton argued that the evidence of Mark Little was irrelevant because it was based on photographs taken too remote in time from the murder.

The Court ruled that the expert evidence was relevant and admissible because if the seat cover was off the driver's seat up to three months before the murder, it was likely off at the time of the murder, especially given the fact that the straps were broken. The Court expressed no concern with the admissibility of the forensic digital analysis of the photographs. The conviction was upheld.

Commonwealth of Pennsylvania v. Auken⁵¹

Auken was convicted of the first degree murder and kidnapping of his former wife. The body of the victim was discovered on a hot June day by a young woman who was walking down a rural dirt road. She smelled an odor, investigated and found the badly decomposed body of the victim clad in a jacket, jeans and sneakers. The Coroner observed holes in the victim's jacket that continued through the sweater underneath, which were consistent with between 7-10 stab wounds in the back and chest area. He concluded that the wounds would have impacted the vital organs. However, since the body was essentially skeletonized, no organs were present as they had disappeared from both decomposition and insect activity.

An entomologist testified that the presence and relative maturity of insects in and around the body allowed him to estimate the approximate date of death, that being 19-25 days prior to discovery.

⁵¹ 681 A.2d 1305 (1996, Supreme Court of Pennsylvania)

It was determined that the victim had been missing for 19 days and was last seen wearing clothing similar to that found on the body.

The evidence established that the victim was afraid that the defendant would hurt her and take away their child, that he was following her and that the victim and the defendant were involved in a bitter divorce and custody battle.

Amongst other evidence, the Commonwealth led evidence of videotape from an ATM at a local bank located just outside the entrance to the victim's workplace. The ATM camera photographed the location directly in front of it at ten second intervals. At 15:47:24, the camera recorded a woman wearing clothing similar to that worn by the victim walking from the area where the victim's car was found toward the mall where the victim worked. The next frame, taken at 15:47:34 showed the same woman leaning into an open front passenger door of a vehicle that had pulled across her path and was stopped with its brake lights on in the wrong lane of travel. No other images of the woman or the car were found. This video was shot on the day that the victim was last seen alive.

The incident was reenacted using the bank's ATM camera. A Chevrolet Celebrity, the same vehicle Auker was using on the day the ATM images were captured, was placed in an identical position and captured on video. Digital image enhancement was used to clarify the images taken from the ATM video. The original video was of poor quality and contrast and lightening effects were applied to gain a more usable image.

The original video frames were compared to the reenactment frames in both the enhanced and unenhanced format. A Chevrolet representative testified that the vehicles depicted in both the original and reenactment video appeared to be Chevrolet Celebrities within certain production years including that of the car Auker was proven to have been driving. It does not appear that anyone testified regarding a comparison of the woman or her clothing to that of the victim.

This motor vehicle identification evidence was important because forensic evidence had been found in Auker's parents' Celebrity, which Auker had used without their permission on the day the ATM images were captured.

Amongst other issues, Auker argued that the comparison evidence of the video images should not have been admitted.

The Court noted that expert testimony is permitted as an aid to the jury when the subject matter is distinctly related to a science, skill or occupation beyond the knowledge or experience of the average lay person. Where a witness has a reasonable pretension to specialized knowledge on a subject in issue, the witness may testify and the jury will assign the appropriate weight to that evidence. Expertise, whether gathered from formal education or by experience, is expertise. Here, the Chevrolet representative had specialized knowledge and

was properly permitted to express an opinion as to the make and year of the car depicted in the video.

The Court expressed no concern with the admissibility of the digital image enhancement evidence.

United States v. Beeler⁵²

The defendant was charged with blowing up a car by means of a pipe bomb. Surveillance video from a nearby Mobil Mini-Mart captured the defendant in the store shortly before the explosion when he asked for incriminating directions from the clerk. The clerk was unable to identify the defendant in a photo line-up. The surveillance video was critical in proving the case.

An ATF audiovisual enhancement expert digitized relevant images from the original tape using Image Lab. He then enhanced the quality of the images by adjusting the contrast and brightness of those images and enlarging portions of the images that depicted the subject. He did not modify the original images – rather, he made them easier to see. The ATF expert testified that he recorded each step he undertook in this process.

The defendant argued that the enhanced images were inadmissible pursuant to the best evidence rule and that they were untrustworthy because they are susceptible to tampering and subsequent modification through enhancement.

The prosecution must establish that the enhanced images are accurate, authentic and trustworthy. The Court was satisfied on each point in this case.

The enhanced version is different only in that extraneous frames are no longer present and the images are larger, clearer and easier to view...The edited and enhanced versions of the Mobil Mini-Mart surveillance videotape are admissible because they have been proven accurate and serve to present the substance of the original videotape in a more easily understood form which is in accord with the spirit of the best evidence rule. (para. 13-14)

Dolan v. State of Florida⁵³

Dolan was charged with multiple offences arising out of the sexual battery of a store clerk in a lingerie shop. The event and the perpetrator were captured on store surveillance video equipment. The shop owner testified as to the placement of the cameras, their operation and the loading of the tape. The police seized the tape immediately after the incident and established proper continuity. While the tape quality was poor, the perpetrator's physical characteristics were discernable.

⁵² 62 F. Supp.2d 136 (1999, United States District Court, D. Maine)

⁵³ 743 So.2d 544 (1999, Court of Appeal of Florida, Fourth District)

Fort Lauderdale Police sent the video to an expert for forensic video analysis. At trial, the analyst testified that she digitized the images and then enhanced the digitized images to clarify and focus the images of the perpetrator. The result was a computer enhanced image that was “bigger, brighter and better.” Still prints were then made for court purposes. Both the prints and the original video were entered at trial. The forensic video analyst testified that the still prints were fair and accurate representations of what appeared on the original videotape. She testified that she did not edit the images.

The defense argued that the State failed to prove that the prints were fair and accurate representations of the incident. At issue was whether the computer generated stills were properly verified as reliable representations of images recorded on the original videotape.

The Court held that the original videotape was properly admitted under the silent witness theory. As to the computer generated digitized stills, they were admissible providing the following requirements were met:

- evidence is required as to the location and operation of the surveillance equipment
- it must be shown that the original videotape accurately reflected the location shown in the videotape
- continuity of the tape must be established
- it must be shown that the computer generated stills did not alter or distort the images on the original videotape
- the original videotape must be available to the trier of fact for review

The Court stated that:

Once the tape is authenticated and the forensic analyst explains the computer enhancement process and establishes that the images were not altered or edited, then the computer enhancements become admissible as a fair and accurate replicate of what is on the tape, provided the original tape is in evidence for comparison.

The Court admitted the forensic video analysis evidence because each of the above requirements had been met.

State of Ohio v. Jones⁵⁴

Jones was a hotel worker at an Embassy Suites Hotel in Blue Ash, Ohio. It was alleged that he had illegally entered a guest room and then robbed and murdered an elderly guest. The victim died of multiple trauma to the head and trunk. During the investigation, police sent a walkie-talkie that was used by hotel employees to the FBI. A forensic pathologist used digital image processing to compare autopsy photographs of the victim’s wound patterns to the patterns on

⁵⁴ 739 N.E.2d 300 (2000, Supreme Court of Ohio)

the walkie-talkie and the door chains seized from Jones' car and found them to be consistent. An FBI specialist in forensic photography compared autopsy photographs to the walkie-talkie and also found the wound patterns consistent with the metal rivets and snaps on the walkie-talkie's leather case.

Following a trial, the defendant was convicted of capital murder and sentenced to death. He appealed initially to the Court of Appeals of Ohio, First Appellate District. Amongst other issues, the defendant argued that the trial court erred in admitting the digital comparison evidence of the forensic pathologist and the FBI Agent.

The Court of Appeals of Ohio ruled that the digital imaging comparison evidence was reliable and admissible. This ruling was appealed to the Supreme Court of Ohio.

The Supreme Court of Ohio noted that both the forensic pathologist and the FBI Agent were presented as expert witnesses. Accordingly, Evid. R. 702 applies. The Court held that the evidence of the FBI Agent was admissible as the comparison evidence given was similar to the techniques used to compare fingerprints and shoeprints. The evidence was therefore admissible and the jury could assign whatever weight to the evidence it chose. The conviction and death sentence were affirmed.

In Re: The Disciplinary Action of Patrick J. Gianforte⁵⁵

The Grand Victoria Riverboat Casino had a give-away game promotion that required that tickets be drawn from a drum to select a winner. Gianforte was the Executive Host and was to make the drawings. The drawings were videotaped. On the draw in question, Gianforte placed his right hand into his right jacket pocket, removed it, placed it in the drum, swished the entries around and purported to pull out the winning ticket. It was alleged that Gianforte rigged the drawing.

None of the witnesses to the drawing noticed anything amiss. Jim Wood, a forensic video analyst from the Louisville, Kentucky Police Department, conducted a full forensic video analysis, including a PowerPoint™ presentation, of the videotape. He was able to show that from the time Gianforte removed his right hand from his right jacket pocket, to the time his hand entered the drum, there was a white object, which appeared to be a white slip of paper resembling an entry ticket, slightly emanating from the bottom of his hand.

At issue was whether the Gaming Board should rely on the forensic video analysis in determining whether Gianforte was guilty of misconduct.

⁵⁵ unreported, November 7, 2001, State of Illinois, Department of Revenue, Illinois Gaming Board, Administrative Hearing Division

The Judge found that Jim Wood was qualified to give expert evidence. His evidence was of assistance to the trier of fact in understanding the videotape evidence. The opinions of Jim Wood were supported by an adequate factual foundation. The Judge ruled that Gianforte's occupational license be revoked.

Commonwealth of Pennsylvania v. Antone Wilson⁵⁶

Wilson was charged with the murder of Tanya Taras. It is alleged that he murdered her and disposed of her body. Her body has yet to be found. Part of the evidence tendered by the prosecution was the expert forensic video analysis evidence of Grant Fredericks. The tenor of this evidence is that a drive-thru ATM camera captured images of the defendant driving Taras' vehicle and it is the theory of the prosecution that these images were captured after the murder of Taras.

The defendant argued that forensic video analysis as used in this case is not accepted as reliable within the scientific community. He asked the Court to exclude this evidence or alternatively, to conduct a **Frye** hearing to determine the scientific reliability of forensic video analysis.

Pennsylvania *Rule of Evidence* 702 controls the admissibility of expert testimony on areas of scientific knowledge. Rule 702 provides as follows:

Rule 702. Testimony by Experts

If scientific, technical or other specialized knowledge beyond that possessed by a layperson will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education may testify thereto in the form of an opinion or otherwise.

The Court noted that the **Frye** test was adopted in Pennsylvania in ***Commonwealth of Pennsylvania v. Topa***⁵⁷ and is part of Rule 702. As stated in **Frye**, novel scientific evidence is admissible if the methodology that underlies the evidence has gained general acceptance in the relevant scientific community. But it only applies when a party seeks to introduce novel scientific evidence. It does not apply every time science enters the courtroom.

In ***Commonwealth of Pennsylvania v. Dengler***⁵⁸, with regard to scientific evidence, the Court said that "novel" means new, original, striking, unusual, strange, etc. In applying this test, the Court in ***Wilson*** held that.⁵⁹

We find the technology used to clarify the ATM video in this case does not constitute novel scientific evidence, an issue previously addressed by our Superior Court in

⁵⁶ Unreported, March 22, 2004, No. 2003-11167 (The Court of Common Pleas of Lebanon County, Pennsylvania)

⁵⁷ 369 A.2d 1277 (Pennsylvania, 1977)

⁵⁸ 2004 WL 318518 (Pennsylvania Superior Court, 2004)

⁵⁹ at p. 29-30

Commonwealth v. Auker, 681 A.2d 1305 (Pa. 1996). In the **Auker** case, digital image enhancement was used to clarify a picture from an ATM machine depicting a vehicle. In a footnote, the Pennsylvania Supreme Court noted how the enhancement did not add or take away from the subject matter of the picture; rather it lightened or darkened the field of the picture. *Id.* at 1313, fn.2. Likewise, in the present case, Grant Fredericks testified at the Pre-Trial Hearing how the technology he used to clarify the ATM video did not add or take away from the information on the video. (N.T. 11/24/03, at 15, 21, 30-31, 32, 76-77, 84). Based on the foregoing, it is evident video clarification and/or enhancement technology has been used and accepted by the courts for a number of years. It is, therefore, not considered novel scientific evidence. Because we find the technology used in this case does not constitute novel scientific evidence, it is not necessary to conduct a **Frye** analysis. Accordingly, Wilson's Motion with regard to this issue is denied. Grant Fredericks' testimony is, therefore, admissible.

This is a significant ruling as it appears to be the first decision on the issue of whether forensic video analysis constitutes novel scientific evidence and whether it therefore requires a **Frye** or **Daubert** hearing.

b) Canadian cases

R. v. Cooper⁶⁰

Cooper was charged with the robbery of a bank. The only issue before the Court was the identification of the robber. The prosecution led three types of evidence to prove this issue. First, the videotape itself. Second, recognition evidence by several corrections officers and a parole officer who were familiar with the defendant. Third, forensic video analysis led by Cst. Grant Fredericks, then of the Vancouver Police Forensic Video Unit.

The camera system in the bank consisted of five cameras that recorded sequentially to one video recorder.

The Court summarized the evidence of Grant Fredericks as follows:

[55] Constable Fredericks said that the digitization of videos involves transferring images on the video into the realm of computers. He assists investigations by protecting the evidence and securing it. Once the digitized elements are transferred into the computer, the video tape is returned to the investigators. The digitization does not change the original images in the video tape. The reason it is done is because it enables the investigators to receive the tape and play it only once. This avoids damaging or [sic] stretching the tape caused by frequent playing. Further, once the images are in the computer the investigators can examine them as long as they like. They can be distributed to the crown, to the defence, and shown in Court. Digital images never change, while tapes can be damaged. Images are not damaged or altered by the process.

[56] The process enables its user to digitize a specific frame of a video, and then take one copy and isolate a specific area, and then blow it up, which may be of some value to the Court. Exhibit #9, which is four pages of stills or prints taken by Constable Fredericks

⁶⁰ [2000] B.C.J. 446 (British Columbia Supreme Court)

from the Bank video tape, is an example of this. On the left side of each page there is a normal still. On the right side, a part of each still has been isolated and blown-up. The process also enables its user to lighten dark pictures or darken light pictures, so that there is a better contrast to be seen. I observe here that the blown-up images in Exhibit #9 do make it easier to see the distinguishing features of the robber's face.

[57] Constable Fredericks also prepared a number of video slides which I carefully perused. They contained three known photographs of the Accused, one of which is the photograph used in the photograph line-up. The other two are more up-to-date, the first being taken on May 8, 1999, about 20 days before the robbery, and the second on August 3, 1999, about three months after the robbery. The video also contains slides of stills he took from the Bank video tape. The purpose of the slides is to enable the Court to compare the blown-up known photographs of the Accused's face, to the blown-up stills of the [sic] suspect's face, which he selected from the video tape; also to compare the latter to the Accused in the Courtroom. When I did so the similarity between the stills and the Accused's face generally, but more particularly, with regard to his eyes, cheek bones, cheek lines, nose and mouth, were even more remarkable. The comparison simply bolstered my previous conclusions. The eyebrows, the eyes, the cheek bones, cheek lines, nose and mouth of the two faces were, in my view, identical.

[58] On cross-examination Constable Fredericks acknowledged that when digitizing the analogue images he is simply transferring them into a format that can be read and processed by the computer. A software tool is used to "crop", that is to blow up certain portions of an image taken from the video tape. The contrast in the stills can be changed, which the witness described as "more akin to changing the lighting in a room". He agreed that the VCR itself was not capable of cropping, nor could it alter the black and white level of the picture elements.

[59] It was put to him that in effect he was adjusting the image on the video tape. He did not agree. He noted that all of the images on the left side of Exhibit #9 are untouched copies of the video images; that those on the right are simply blown-up copies of those images. He did acknowledge that one of the purposes of digitization was to improve the quality of the image coming out of the video tape. However, in my view, his evidence on cross-examination in no way suggested that the process changed the images, which appeared to be the thrust of the cross-examination.

At issue was whether the process of forensic video analysis changes the images as recorded to the original videotape such that they are no longer reliable images.

The Court stated that:

In my opinion the digitization, blowing up, and lightening of the images on the videotape does no more than enhance or clarify the images. They are not changed. The digitized images are the same images seen on the videotape. One need only compare the faces to see that the images have not been changed in the manner contemplated by *Nikolovski*. Digitization is clearly a useful tool to assist the court in viewing and comparing the videotape images. Accordingly I find that Constable Fredericks' video slides and other work product are admissible into evidence. (p. 11)

And at p. 13-14, the Court stated:

[90] **Leaney** and **Nikolovski** make it clear that a Trial Judge may on his own observations of a video tape, and of his comparisons of the tape to the Accused in the stand, conclude beyond a reasonable doubt that the person seen in the video is the Accused. In **Nikolovski**, Cory, J., speaking for the majority, reviewed the evolution of the use of audio tapes, photographs, and video tapes as evidence in Canada. At pg. 411 he pointed out that in **R. v. B.(K.G.)** (1993), 1 S.C.R. 740, the Supreme Court of Canada praised the evidence obtained from video tapes as a "milestone" contributing to the "triumph of a principled analysis over a set of ossified judicially created categories". And after referring to the majority decision of McLachlin, J., as she then was, in **Leaney**, he had this to say:

Similarly, in **R.v. L.(D.O.)** (1993) 4 S.C.R. 419, 85 C.C.C. (3d) 289 (S.C.C.) L'Heureux-Dube, J., in concurring reasons, noted that the modern trend has been to admit all relevant and probative evidence and allow the Trier of Fact to determine the weight which should be given to the evidence in order to arrive at a just result. She observed that this is most likely to be achieved when the decision-makers have all the relevant probative information before them. She wrote at pg. 455 that:

"It would seem contrary to the judgments of our Court, (**Seaboyer v. B.(K.G.)** ...) to disallow evidence available through technological advances such as video taping, that may benefit the truth seeking process".

In my opinion the forensic video evidence of Constable Fredericks did not alter or tamper with the images on the video tape in the case at Bar. His digitization and video analysis was a most useful tool in the performance of my task. It is in my view the type of evidence referred to by Mr. Justice Cory in **Nikolovski**, and by L'Heureux-Dube, J., in **R. v. L. (D.O.)**, being at most an extension of the video taping evidence.

Trans North Turbo Air Ltd. v. North 60 Petro Ltd.⁶¹

This is a civil case wherein the plaintiff alleged that the employees of the defendant negligently set fire to an airport hangar. A significant part of the plaintiff's evidence was the forensic video analysis of an airport security camera system. By isolating and stabilizing relevant images, and using reverse projection to isolate light sources, Forensic Video Analyst Grant Fredericks was able to identify where the fire started. A defense expert questioned the conclusions reached by Mr. Fredericks. No challenge was made to the scientific validity of the forensic video analysis, rather the challenge was to the interpretation of the results. The court preferred the evidence of Mr. Fredericks over that of the defense expert and together with the other evidence tendered by the plaintiff, ruled in favor of the plaintiff.

R. v. Olivera⁶²

Olivera was charged with the robbery of a Mac's store. The sole issue was the identification of the robber. A forensic video analyst digitized the surveillance

⁶¹ [2003] Y.J. 47 (Yukon Territory Supreme Court)

⁶² [2002] B.C.J 2157 (British Columbia Provincial Court)

videotape and isolated certain frames that showed the robber. He eliminated certain background details thus allowing the images of the robber to be seen more clearly. Still photographs were then generated for investigative and court purposes. Together with the opinion evidence of other witnesses, the court concluded that Olivera was the robber depicted in the videotape and convicted him accordingly. The forensic video evidence was the basis for the conviction.

R. v. Pettman⁶³

Pettman was charged with bank robbery. A forensic video analyst digitized video images from the bank's surveillance cameras. She then forensically compared the digitized images with known images of the suspect and items of clothing. This comparison was presented in the form of a PowerPoint™ presentation. This analysis allowed the court to conclude that Pettman was indeed the robber shown in the surveillance video.

4. Becoming Qualified as an Expert Witness

Before expert evidence can be admitted at trial, the court must be satisfied that four requirements have been met:⁶⁴

- the evidence must be relevant to issues that are before the court
- the trier of fact must require the assistance of an expert in order to form a correct judgment
- the evidence cannot be the subject of an exclusionary rule
- the proposed expert must be appropriately qualified

Further, FRE 702 provides as follows:

If scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if

- (1) the testimony is based upon sufficient facts or data
- (2) the testimony is the product of reliable principles and methods, and
- (3) the witness has applied the principles and methods reliably to the facts of the case.

When seeking to be qualified as an expert in forensic video analysis for the first time, the responsibility of the prosecutor and the proposed expert is substantial. The ability to convince the court that forensic video analysis evidence is reliable and worthy of consideration and that the proposed expert is worthy of an expert witness designation is dependent on three things:

⁶³ [2003] A.J. 1451 (Alberta Provincial Court)

⁶⁴ ***R. v. Mohan*** (1994), 89 C.C.C. (3d) 402 (Supreme Court of Canada)

- the ability of the expert witness to effectively communicate the evidence to the court
- the knowledge and skill of the prosecutor in leading and defending such evidence
- the quality of the forensic video analysis itself

Before a proposed witness can present forensic video analysis evidence, he/she must first be qualified as an expert witness. This begins with direct examination by the prosecutor, followed by cross-examination by defense counsel and sometimes questions from the judge.

In the qualification phase, the following topics must be covered:

- the field of expertise that is sought to be tendered to the court (in this case, forensic video analysis)
- the curriculum vitae of the witness
- an explanation of what forensic video analysis is [the scientific examination, comparison and evaluation of video in legal matters] and some examples of how it may (and has been) used
- discuss the digitization process
- be prepared to discuss the topic of improper image manipulation
- explain what clarification means
- the present professional position of the witness
- the witness' education
- specialized education and training in the field of forensic video analysis
- relevant literature that is consulted in this and related fields
- any instruction or presentations conducted by the witness in the field of forensic video analysis
- the number of cases the witness has worked on including the known disposition of those cases
- how many times the witness has given expert evidence in the past
- whether the witness has ever been tendered as an expert witness and not qualified by the court
- discuss previous cases that led to guilty pleas or previous cases in which the witness gave expert evidence in court
- list the courts in which the witness has been qualified as an expert witness
- whether the work of the witness has been peer reviewed
- whether the analysis in question is reproducible

If defense counsel intends to take issue with the qualifications of the witness and the integrity and validity of forensic video analysis, it is during this phase that the witness will be challenged on his/her qualifications and the integrity and reliability of forensic video analysis. This can be a very involved process if defense

counsel is well prepared. This type of cross-examination on qualifications is likely where defense counsel has an expert witness waiting in the wings.

This stage is critical to the future of the proposed expert witness and the ultimate acceptance by the court of forensic video analysis. It follows that no forensic video analyst should be tendered as an expert witness until the analyst has sufficient qualifications to confidently make it through the *voir dire* qualification process.

5. Presenting Forensic Video Analysis Evidence in Court

In the qualification phase, the analyst will have advised the court of what forensic video analysis is in general and the witness' qualifications and experience in particular. Once the analyst has been ruled an expert in forensic video analysis and therefore able to present forensic video analysis evidence to the court, it is critical that the evidence be presented in such a manner as to lend credibility to the analyst and the field of forensic video analysis itself.

As with many types of scientific evidence, especially relatively innovative evidence like forensic video analysis, the analyst must educate the prosecutor on the evidence and the best way to present it to the court. In order to properly present such evidence, it is essential that both the expert witness and the prosecutor leading the evidence work together. An educated prosecutor will do a far better job of assisting the expert to give the expert evidence and in convincing the court to rely on the evidence.

For details on the presentation of forensic video analysis evidence in court, refer to the paper entitled *"You're Going to Court to Present Forensic Video Analysis Evidence – Now What? Guidelines for Giving Evidence."*⁶⁵

Evidence should be presented in a clear and understandable manner such that the trier of fact will walk every step of the way with the expert witness. The goal is to allow the trier of fact to "discover" the evidence that is being presented. It follows that it is important to gauge the interest and understanding of the trier of fact. If it appears that the expert witness is confusing or losing the attention of the trier of fact, it is important to back up and ensure that the evidence presented thus far is understandable and clear before proceeding further. The assistance of the prosecutor is essential to ensuring this objective.

One method of presenting forensic video analysis evidence in court is to outline comparisons that have been made between questioned images and known images. This is often done in the context of a PowerPoint™ presentation and can be very powerful in aiding the trier of fact in reaching conclusions on comparative issues. Interestingly, in a non forensic video analysis case, the Court of Appeal

⁶⁵ 2004, authored by Jonathan W. Hak

of California, in *People v. Maglaya*,⁶⁶ held that an officer who had taken photographs of shoeprints found at a crime scene was allowed to give non-expert opinion evidence as to the similarities between the crime scene shoeprints and the tennis shoes found in the defendant's bedroom. The Court noted that pursuant to California Evidence Code 800, a lay witness could offer his opinion when testifying before a jury if the opinion was rationally based on his perception and if it was helpful in gaining a clear understanding of the testimony. This would avoid the jury having to make its own "tedious" comparison.

Forensic video analysis evidence is more complicated and scientific than simply doing the comparison process at the end, yet this authority is certainly supportive of the value of opinions on comparison as an aid to the trier of fact.

6. Preparation of an Expert's Report

A forensic video analyst must produce a report in conjunction with the work performed. The report must be comprehensive enough to deal with the following:

- list all exhibits received, including the date of receipt and name of the person who provided the exhibits to the analyst
- indicate what forensic work was requested
- examination of each exhibit including an account of the condition of each exhibit
- outline in detail each step that was taken with each exhibit
- the result obtained and if applicable, any opinions formed
- list the new exhibits that were created as a result of the analysis – ie. digitized copy of the original tape, stills, PowerPoint™ presentation
- account for what was done with the exhibits once the analysis was completed

While a report takes some time and care to prepare, a professional should always document his/her work. Aside from disclosure obligations, a complete report is also for the benefit of the analyst when it comes time to present the evidence in court. The more thorough the report, the easier it will be to give good evidence in court and the less fruitful cross-examination will be to opposing counsel.

7. Disclosure Issues

⁶⁶ 112 Cal. App. 4th 1604(November 4,2003); review denied 2004 Cal. LEXIS 522 (January 22, 2004)

The prosecution is required to disclose expert evidence to the defense. In the field of forensic video analysis, the following evidence and documents should be disclosed:

- a copy of the original videotape (if requested)
- a copy of the digitized version of the original videotape
- a copy of any stills produced that will be used in court
- a copy of analyst's report
- a copy of the PowerPoint™ presentation (on CD in read-only format or hard copy)
- a copy of anything else the analyst will be presenting in court
- the analyst's curriculum vitae

Conclusion

There is a perception that forensic video analysis somehow alters the true nature of the original evidence and is therefore unreliable. Reality does not support this concern. Presented properly, forensic video analysis can be of tremendous assistance to the courts. Analysts and prosecutors are proving this with increasing frequency.

The number of times that forensic video analysis will be subjected to ***Frye*** or ***Daubert*** hearings will likely be minimal as the evidence will no longer be considered novel. That does not detract from the care with which this technology must be applied. The use of qualified and competent analysts is critical to developing and maintaining a credible reputation for this evidence. Comprehensive SOPs are a must for any agency that uses digital technology in the examination and presentation of evidence. Poor work or poorly presented work can undermine the gains that have been made thus far. Reliability is the watchword when it comes to the use of digital evidence in criminal prosecutions.

Agency Video, Audio, and Imaging Inventory

Use this form to identify units and personnel employing video, audio, or imaging technology within your agency. Identifying these resources may help your agency maximize their value through the sharing of knowledge and support. There may also be cost savings realized by centralized procurement of equipment and supplies. Check the box next to each application in use in your agency, and identify the division or command to which it is assigned. Check the box in the column marked **D** if digital technology is used, and the box in the column marked **A** if analog equipment is used. (In some applications, both analog and digital technology may be in use.) The blank lines can be used for applications not otherwise identified on this form.

VIDEO

Application	Division or location	D	A
<input type="checkbox"/> <input type="checkbox"/> video production unit	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> public information	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> crime scene unit	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> accident investigation	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> tactical units/SWAT	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> covert/surveillance	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> patrol vehicles	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> robbery/investigation	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> identification unit	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> crime laboratory	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> training	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> jail/booking	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> interrogations	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> facility security (CCTV)	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> _____	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> _____	_____	<input type="checkbox"/>	<input type="checkbox"/>

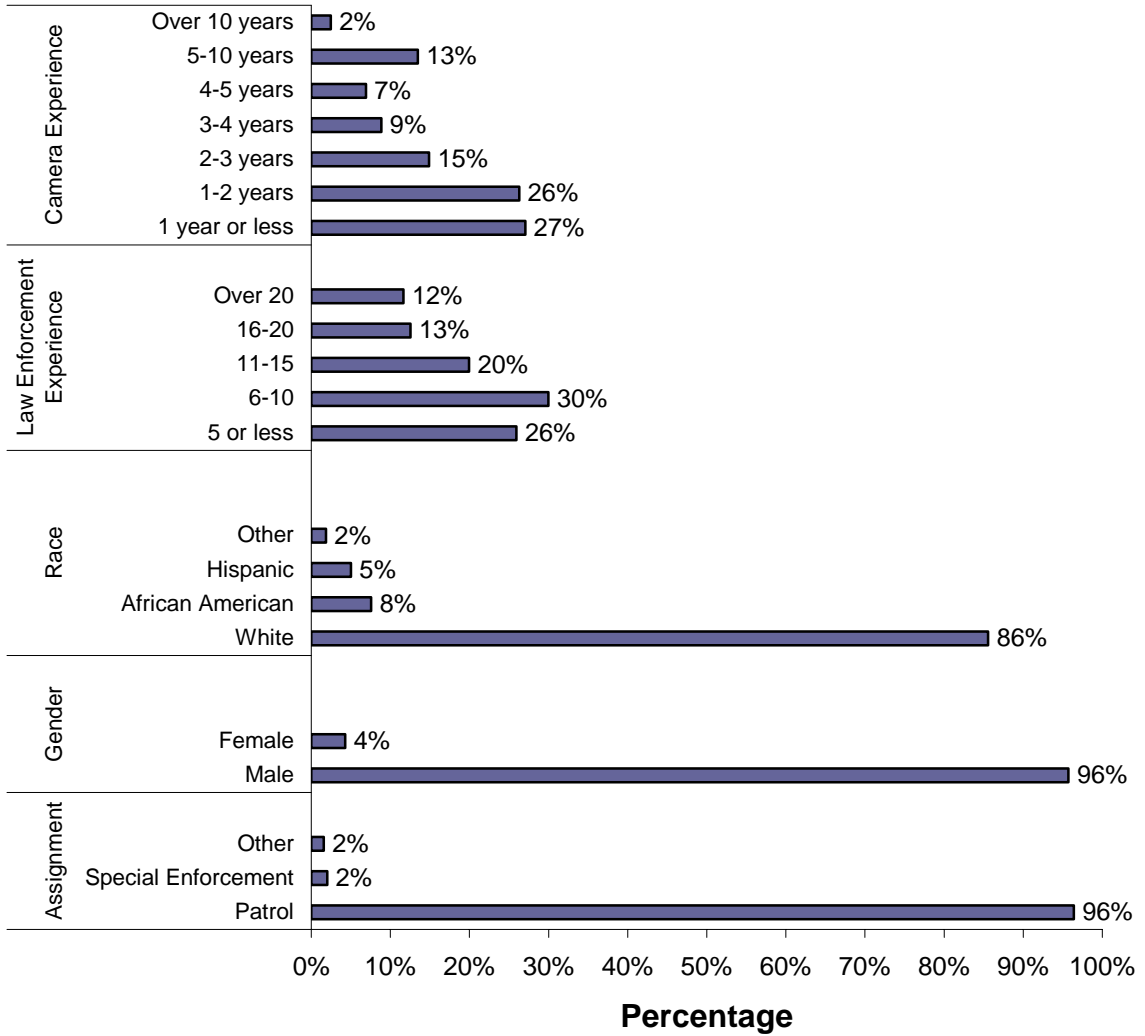
PHOTOGRAPHY/IMAGING

Application	Division or location	D	A
<input type="checkbox"/> <input type="checkbox"/> crime scene unit	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> accident investigation	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> tactical units/SWAT	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> public information	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> latent prints/ID	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> crime laboratory	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> forgery/documents	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> sex offender registry	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> training	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> jail/booking	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> security (ID badges)	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> _____	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> _____	_____	<input type="checkbox"/>	<input type="checkbox"/>

AUDIO

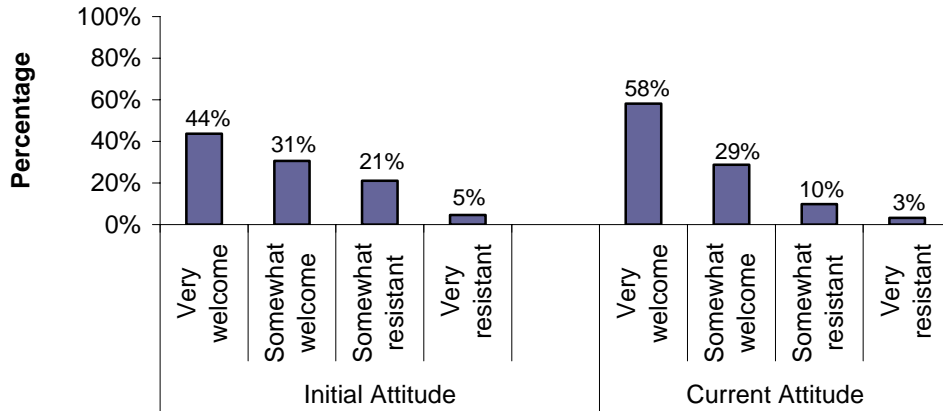
Application	Division or location	D	A
<input type="checkbox"/> <input type="checkbox"/> tactical units/SWAT	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> audio forensics	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> public information	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> interrogations	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> covert/surveillance	_____	<input type="checkbox"/>	<input type="checkbox"/>
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Profile of the Line Officers' Survey Respondents



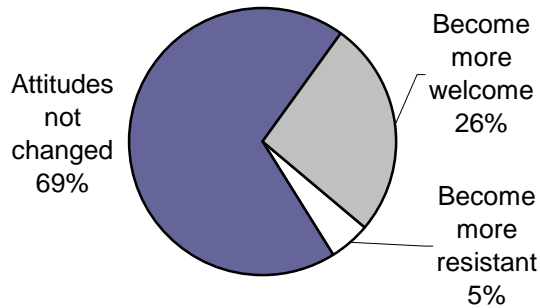
The Line officers' survey was the key instrument used to evaluate the impact of in-car cameras. Altogether, 3680 line officers from 20 state police agencies and two test sites-Prince George's County Police Department and Fairfax County Police Department have completed the surveys.

Comparison of Initial and Current Attitudes



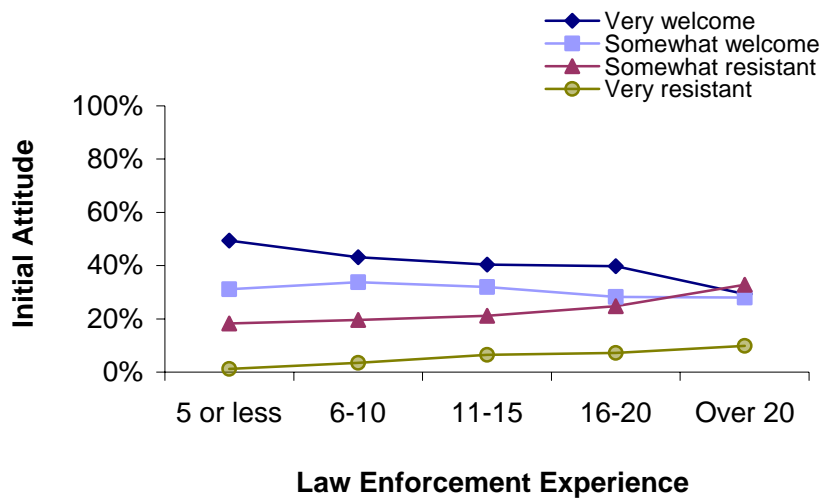
Initially, 74% of line officers were either somewhat welcome or very welcome to the idea of in-car cameras. Currently, this percentage has increased to 87%.

Change of Attitude toward In-car Cameras



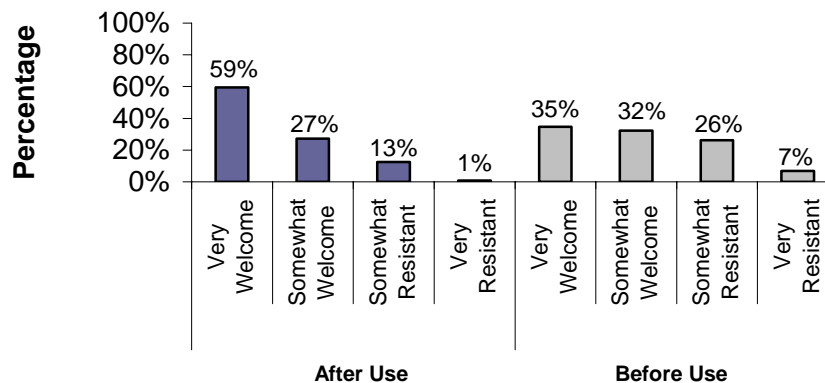
The survey indicates that officers become more comfortable with the technology over time. Since their agencies implemented in-car camera programs, over a quarter of survey respondents reported their attitudes changed, becoming more accepting of the technology; about 5% became more resistant.

Law Enforcement Experience vs. Initial Attitude



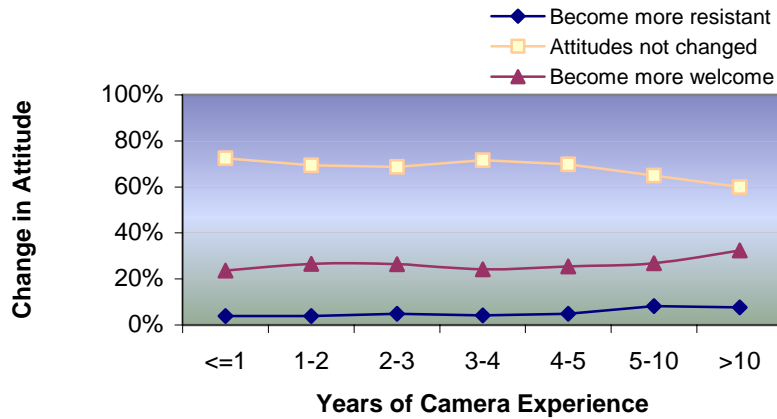
Officers with 5 years or less law enforcement experience were much more welcoming of the technology than more experienced officers.

Initial Attitude vs. Whether Cameras Were in Use before Officers Joined the Agency



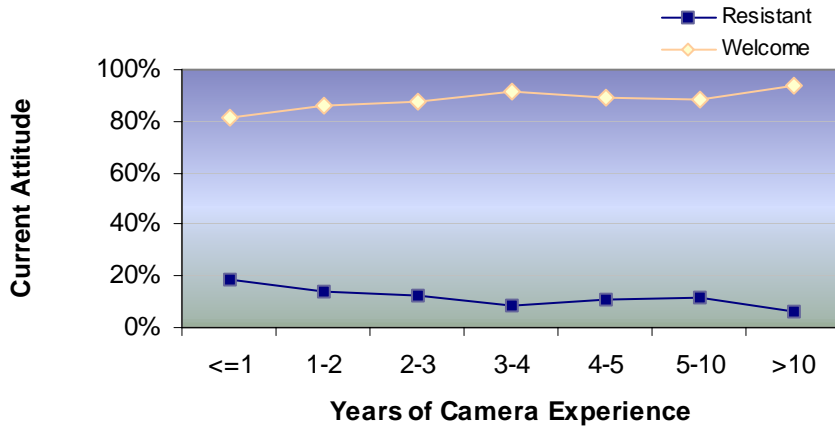
Officers who were hired by an agency that already had an in-car camera program in place were more likely to welcome the use of the cameras than officers whose agency introduced the camera program after they were hired.

Camera Usage Experience vs. Attitude Change



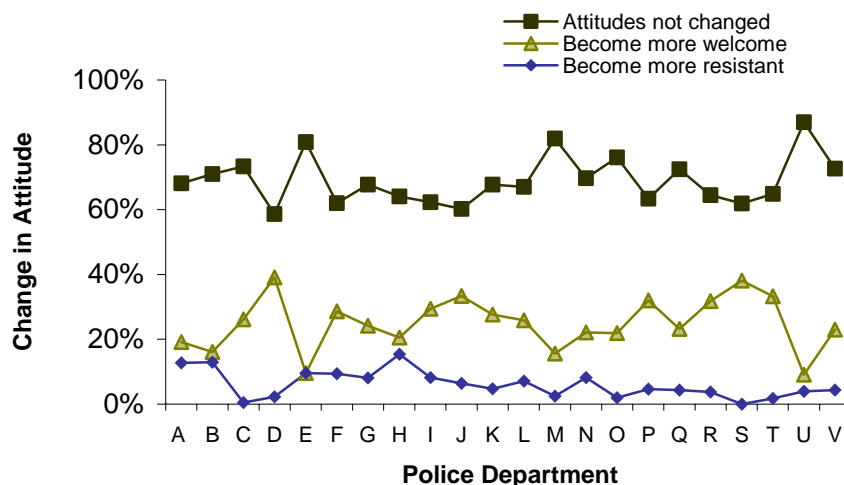
Regardless of the length of camera experience, the proportion of officers becoming more accepting to camera usage is bigger than those becoming more resistant. Compared with officers with less camera usage experience, officers with more camera usage experience are more likely to report change in attitude in either direction.

Camera Usage Experience vs. Current Attitude



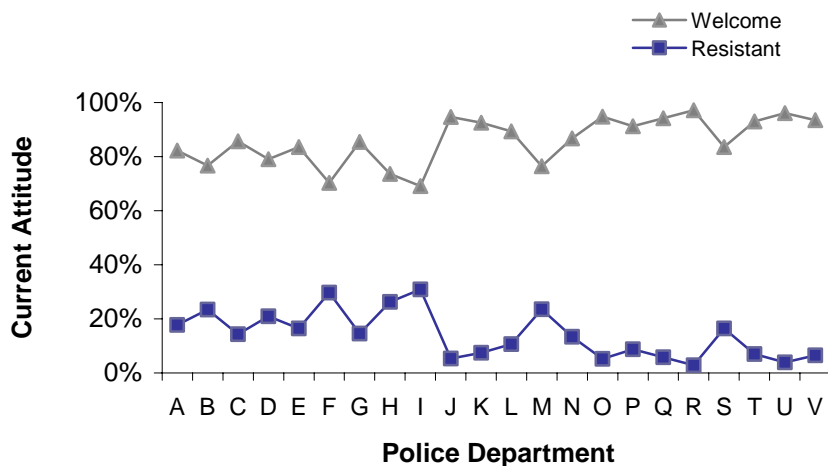
Officers with longer camera experience tend to be more acceptant to the technology.

Change in Attitude across Police Departments



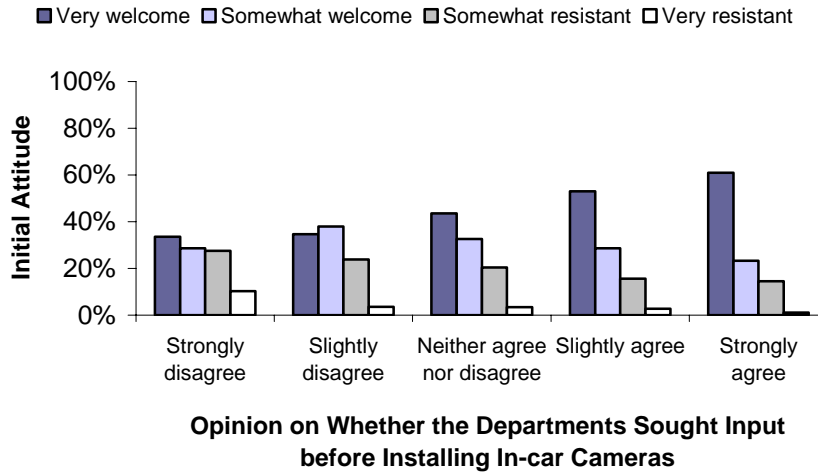
The change in attitude differs somewhat across police departments. For instance, in Department A, B, and H, more officers have become more resistant to in-car cameras than in other departments.

Current Attitude across Police Departments



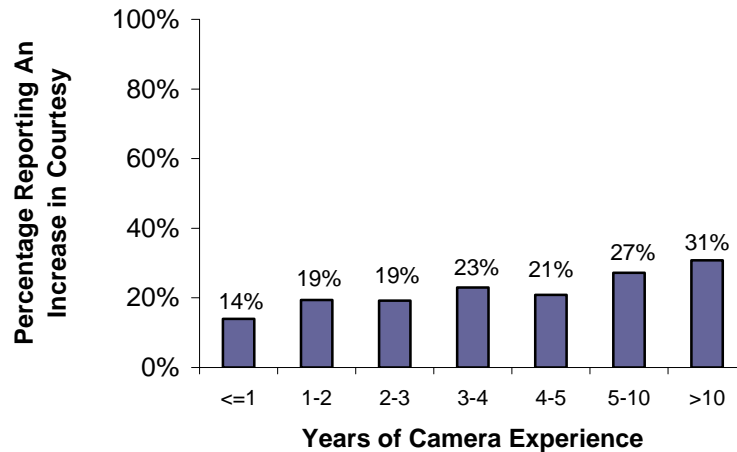
In every department, officers welcoming in-car camera technology far out number those resisting the technology.

Initial Attitude vs. Seeking Input before Installing Cameras



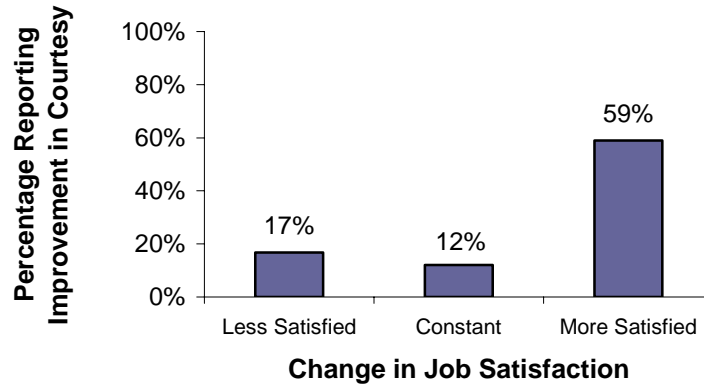
The survey found that agencies that asked their officers for input into the decisions leading to the installation of in-car cameras gained significantly more support for the program from the rank and file. Among officers who strongly agreed with the statement that their agencies sought officers' input before installing in-car cameras, 84% expressed that they were either very welcome or somewhat welcome to the use of cameras. Among officers who felt their agencies did not seek officers' input, 62% reported they were very welcome or somewhat welcome to the use of cameras.

Camera Experience vs. Improvement in Courtesy



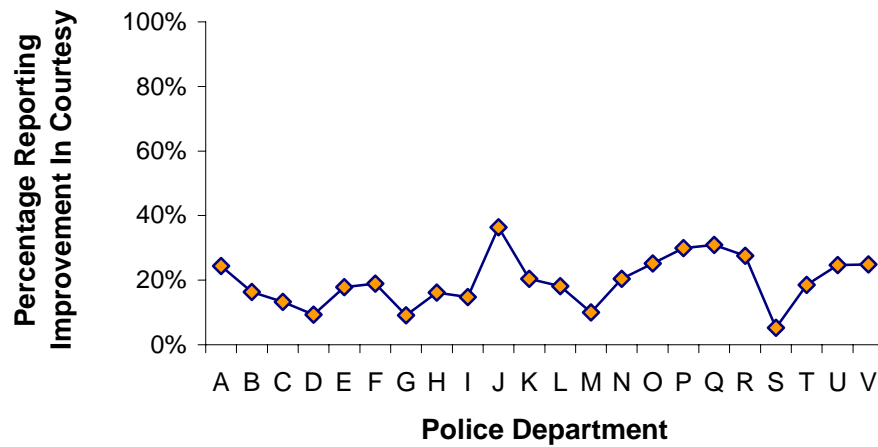
When asked if the presence of the camera resulted in improved courtesy by the officer during public contacts, the survey showed an increase in courtesy that coincided with years of experience with the cameras.

Job Satisfaction vs. Courtesy



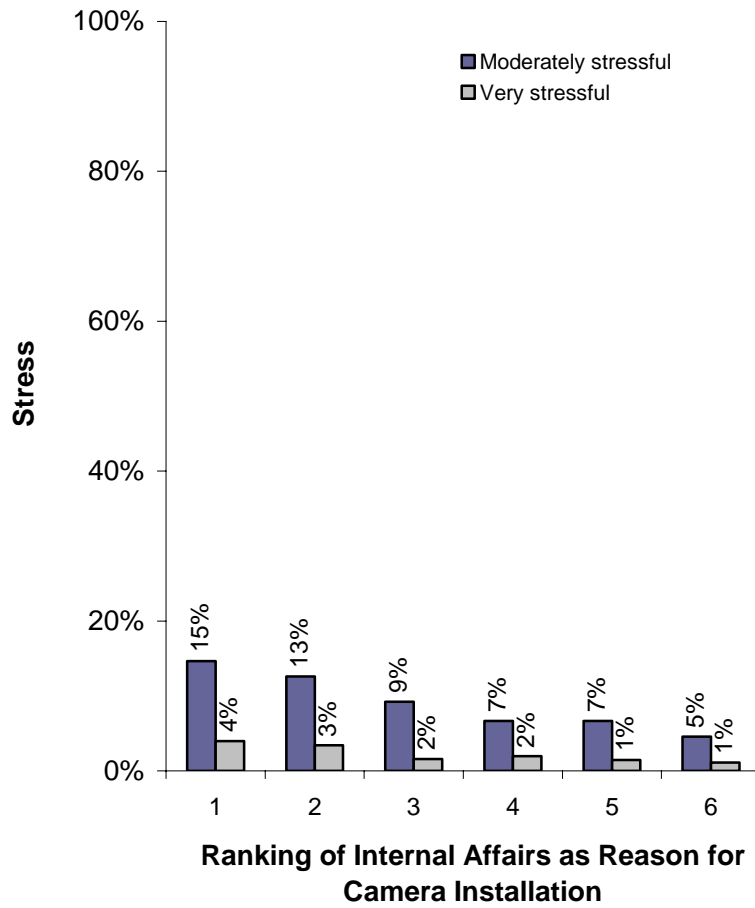
Officers who have become more satisfied with their jobs are more likely to report improvement in courtesy.

Improvement in Courtesy across Police Departments



The percentage of officers reporting improvement in courtesy differs across agencies.

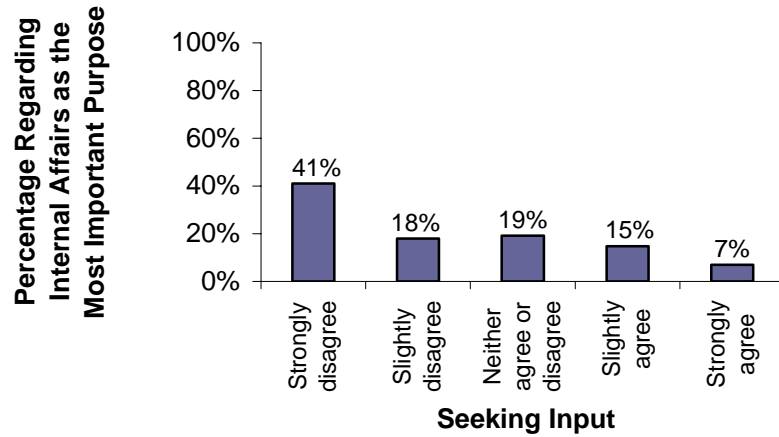
Stress vs. Ranking of Internal Affairs as Reason for Camera Installation



1 for "Most Important" and 6 for "Least Important"

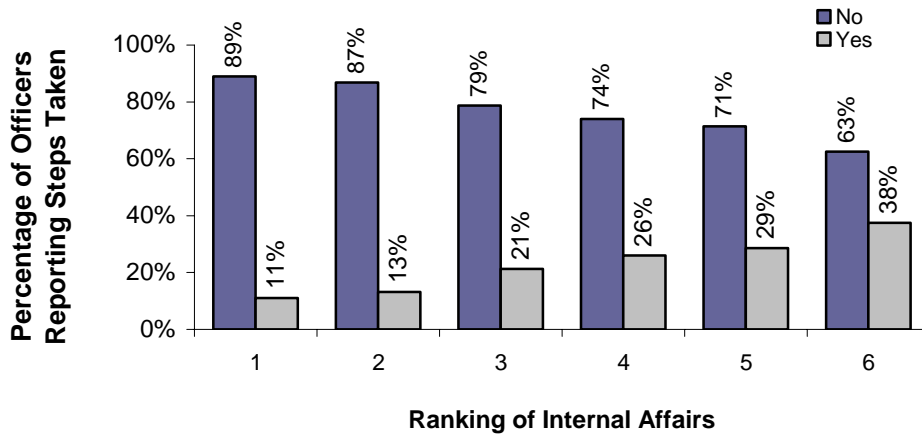
Officers who believed Internal Affairs investigation was an important factor in the decision to install cameras also reported higher levels of stress caused by the presence of the cameras.

Seeking Input before Installation vs. Perceived Purpose of Installation



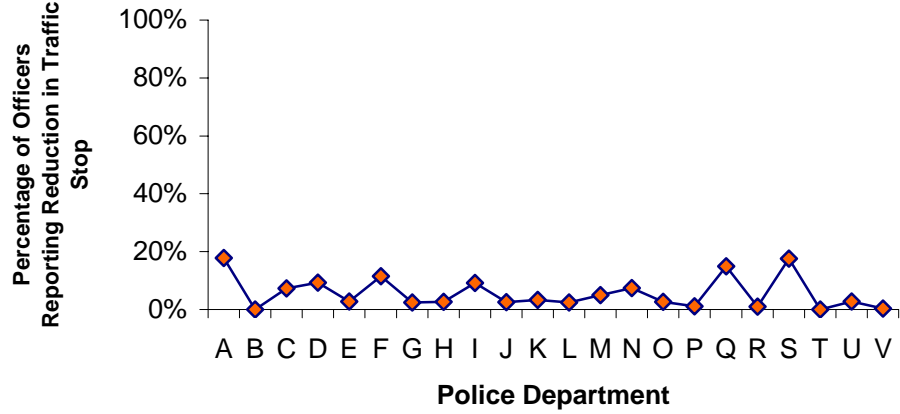
41% of the officers who do not think that their departments have taken enough efforts in seeking their input have listed internal affairs investigation as the top most purpose of camera installation, whereas only 7% of officers believing that departments have sought their opinions have done so.

Agency Taking Steps to Relieve Concern vs. Ranking of Internal Affairs as Reason for Camera Installation



Officers were asked if their agencies had taken steps to alleviate officers' concerns that the cameras' primary role was their use in internal affairs investigations. The survey found that the officers who felt IA was the primary reason for installing cameras overwhelmingly felt their agencies were not taking steps to alleviate those concerns. Officers who did *not* believe the cameras were installed for IA investigations were much more likely to report their agencies were taking steps to alleviate concerns.

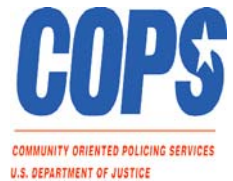
Reduction in Traffic Stop across Police Departments



Overall, 7% of officers reported an increase in traffic stops, whereas 5% reported a reduction in traffic stops. The percentage of officers reporting deduction differs across agencies, ranging from zero to 18%.



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