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Evaluating the Communities Foundation of Texas’s Gift to the Dallas Police Department

Patrol Car Video Recorders and Laptops

Robert C. Davis, Karin E. Kitchens

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In 2006, the Dallas Police Department (DPD) received an unprecedented \$15 million gift from the Communities Foundation of Texas (CFT). Of that total, \$5 million was given to the DPD to address its technology needs. In particular, the department needed funds to modernize by installing digital video recorders (DVRs) and laptop computers in its patrol cars. CFT asked the RAND Corporation to evaluate the impact of the \$5 million technology gift. Key findings of that study included the following:

- The technology funds were well spent, bringing the DPD up to the standards of modern metropolitan police forces.
- The DVRs and laptop computers had a multitude of uses.
- Both patrol officers and senior DPD officials had highly favorable opinions of the value of the computers.
- Senior officials were also highly favorable in their opinions of the DVRs, but patrol officers were less enthusiastic about having them in their cars.
- The reluctance of patrol officers was rooted in experience: There was evidence that the introduction of DVRs was associated with an increase in the proportion of citizen complaints that were sustained (that is, complaints that were corroborated by the video evidence).
- There was also evidence that abuse of force and other complaints tied to readily observable conduct declined after the cameras were installed.
- Evaluation efforts are best begun at least concurrently with program funding. While we were able to access historical data on DPD Internal Affairs Division cases and citizen complaints to help assess the effects of the DVRs, we could not do the same in assessing the impact of laptop computers, because similar historical data were not available to evaluate the changes to patrol functions resulting from car laptops.

Introduction

Background

Police departments today are expected to pursue a wide range of missions. For example, communities expect departments to engage in traditional *reactive* policing, including responding to calls for service, apprehending offenders, and assisting victims of crime. At the same time, many more *proactive* roles and missions have been added, including those focusing on crime prevention, addressing fear of crime, and managing broader quality-of-life issues in communities. The addition of such proactive roles has expanded the responsibilities of police forces beyond solely fighting crime and has made them broader “problem-solving organizations.” These more proactive roles are embedded in a variety of contemporary policing approaches, including problem-oriented policing, community policing, “broken-windows” policing, “hot-spot” policing, “pulling-levers” policing, and some elements of the CompStat process (Weisburd and Braga, 2006).¹ These new approaches to policing often require technological support to be implemented effectively.

The DPD has faced all the challenges of a modern metropolitan police agency, including changing demographics and budget cuts. Under police chief David Kunkle and now David Brown, the department has responded actively to such challenges by developing sophisticated crime-fighting strategies. Under their leadership, the crime rate has gone down five years in a row, and the DPD has been a forerunner in community policing strategies.

As the world of policing grows more complex and multifaceted, it has become clear that police agencies must invest more in both information technology

¹ CompStat is a system of promoting greater accountability of police commanders through detailed computer analysis of crime statistics.

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and leadership training to cope with the increased demands. Departments that make investments in these areas will be the leaders in law enforcement in the 21st century.

The DPD has been the beneficiary of two exceptional gifts from CFT that have addressed the need for technology that provides better information to patrol officers and enhanced opportunities for high-quality leadership training. In this report, we assess the results of the CFT-funded technology initiative; a companion report (Davis and Kitchens, 2012) focuses on the leadership training initiative.

The Role of Technology in Promoting Departmental Change

To do their jobs effectively, law-enforcement professionals at all levels depend on information. According to one source, roughly 92 percent of an officer's time is spent acquiring, coalescing, or distributing information in one form or another (Brown, 2001). Responses to calls for service and decisions about whether to detain individuals encountered on patrol depend on access to the right data to ensure that officers take appropriate action. In addition, the more sophisticated policing approaches that many law-enforcement organizations are pursuing depend on information to an even greater extent. They often involve not just information about crimes and perpetrators but also data on community conditions, priorities, and other factors that could shape collaborative approaches to crime prevention and response.

Strategies that strive to place more and better information in the hands of patrol officers and investigators at crime scenes are termed *information-led* or *intelligence-led* policing. The fundamental assumption behind information-led policing is that technologies that make it easier for police departments to use and share information will improve their efficiency and effectiveness in fighting criminal activity. Essential to the successful adoption of an information-led policing strategy is state-of-the-art technology, such as a crime analysis center and video technology and laptop computers in patrol cars.

CFT's initial gift of \$5 million enabled the DPD to purchase patrol car DVR systems and laptop computers. The technology provided patrol officers with new information that could significantly enhance their effectiveness in responding to calls for service. In particular, the computers allowed officers to conduct subject checks to access information on criminal records of suspects, to conduct checks on auto tags, and to access firearm registration and history information. They also enabled officers to file reports electronically without waiting in a queue for a phone

clerk and disseminated bulletins alerting officers to new crime trends.

The DVRs captured interactions between officers and persons stopped by the police, creating a visual and auditory record to prove or disprove claims of officer abuse of suspects and to provide evidence against persons charged with resisting arrest, driving while intoxicated (DWI), and other crimes. In conjunction with the DPD's new fusion center—which facilitates the detection of patterns in criminal incidents and allows analysts to supply information in real time to officers and detectives at crime scenes—the technology provided by the CFT gift has enhanced the DPD's ability to develop and implement information-led policing approaches.

Evaluation Goals, Objectives, and Research Methods

The purpose of this review is to determine the value of the technology initiative in improving police effectiveness and to support CFT's efforts to assess the value of this investment in technology.

There is little research that can provide guidance on the potential benefits of computers and DVR systems in enhancing the information available to patrol officers. In general, it is believed that investments in technology, when coupled with management changes, can enhance officer productivity (Garicano and Heaton, 2010). One of the few studies that looked specifically at video recorders—a survey by the International Association of Chiefs of Police (IACP)—found that although some patrol officers believed that video cameras in cars discouraged members of the public from becoming confrontational, overall, officers surveyed did not believe that the cameras had an appreciable effect on officers' safety (Westphal, 2004). Similarly, officers did not believe that the presence of cameras significantly affected their own behavior. Officers did, however, believe that video evidence was useful in defending against citizen complaints: According to survey respondents, video records of incidents leading to complaints nearly always exonerated the officer of the allegation made in the complaint.

We found even less literature on the value of laptop computers in patrol cars. Anecdotal accounts in local newspapers and police publications suggest that car laptops are timesavers that, among other uses, allow officers to confirm vehicle registrations, run driver's license searches, look up state laws, examine the history of calls for service at an address, and read email (e.g., Davis, 2009; Massey, 2004). An informal survey by the online policing publication PoliceOne.com found that deploying laptops in cars was a top priority

State-of-the-art technology is essential to information-led policing.

among departments (Wyllie, 2009). However, the only academic article that we could locate found that patrol officers in England who received laptops for their cars resisted the technology because its introduction coincided with a major change in their work routines (Allen and Wilson, 2005).

Through the evaluation in Dallas, we hoped to learn how car cameras and laptops were used, whether they have increased the effectiveness of patrol officers, and how both patrol officers and senior DPD staff perceived them.

To evaluate the effects of CFT's gifts, we used a variety of research methods that included surveys of end users of the technology, analysis of DPD Internal Affairs Division investigation files, analysis of trends in citizen complaints against the police, and interviews with senior DPD staff to ascertain their views of the value of the technology initiative. Here, we describe how each of these methods was used to address specific evaluation goals and objectives.

- **Objective 1: Determine how the DVRs and laptops were used and the level of user satisfaction with their performance.** We conducted a web-based survey to determine patrol officers' experiences with the car cameras and computers. With DPD cooperation, we sent email invitations to all patrol officers asking them to participate in the survey. The invitations contained a link to the survey that officers were able to complete anonymously, which encouraged candid responses. The survey queried respondents about how they had used the technology, whether the technology had enhanced how they did their jobs, whether there had been technical or other impediments to using it to its full potential, and whether the technology was functioning satisfactorily. This information was analyzed to produce measures of user satisfaction with the technology.
- **Objective 2: Obtain senior DPD staff perspectives on the technology initiative.** We interviewed 17 key members of the DPD Internal Affairs Division, communication, and command staffs to determine their perceptions of how the car DVRs and computers affected policing in Dallas.
- **Objective 3: Determine the lifespan of the laptop computers and DVRs.** To establish the average lifespan of the computers and cameras, we requested information from the DPD on computers and cameras still in service and the dates that equipment was taken out of service.
- **Objective 4: Determine the effects of DVRs on internal affairs investigations.** We documented the number of cases in which video evidence was

instrumental in exonerating officers or substantiating complaints against officers.

- **Objective 5: Determine the contribution of video evidence to court prosecutions.** We interviewed investigative staff about how evidence from the car DVRs affected their ability to build successful court cases against suspects for resisting arrest and other criminal acts. We also requested data on the number of cases with video evidence that were forwarded for prosecution.

Evaluation of DVRs

DVRs have become increasingly common in U.S. police agencies, spurred by lawsuits in the late 1990s alleging racial profiling in traffic stops. In Texas, cameras in cars greatly reduce the amount of information that law-enforcement officers are required to record each time a traffic stop is made. Proponents of car cameras also argue that cameras promote officer safety by discouraging citizens from becoming confrontational in their interactions with police officers. Conversely, it is argued that cameras make police officers more circumspect in how they deal with the public. Video evidence is useful in internal affairs investigations, can be reviewed by patrol supervisors as a check on their subordinates, and can be used to illustrate good and poor police behavior in training sessions (Westphal, 2004).

In this section, we discuss the results of our evaluation of DVRs in DPD patrol cars, starting with a brief evaluation of the implementation issues that have surfaced since their introduction. We then evaluate how the DPD has used DVRs, the impact of DVRs in terms of citizen complaints, and the opinions of patrol officers and senior DPD staff.

Evaluation of Implementation Issues Since the Introduction of the DVRs

Prior to the CFT-funded technology initiative, the DPD had just 90 patrol cars with cameras using VHS technology. As a result of CFT's gift, the number of cars with DVRs quadrupled to more than 400. Currently, there are more than 700 cars equipped with DVRs.

The DPD chose Integrion as its DVR vendor, a small start-up company selected primarily based on price. With CFT funds, the DPD purchased Integrion DP1s. The DP1s proved to be both reliable and easy to use. They are fixed to the dashboard of patrol cars, and although they are normally pointed ahead to film events taking place between officers and the public in the front of the patrol car, they can swivel to record field interviews with suspects or other citizens in the back seat of patrol cars. Microphones are

Video evidence is useful in internal affairs investigations and training.

detachable and can be affixed to officers' lapels to capture audio from interactions with citizens in the vicinity of the patrol car.

The video quality of the DP1s was high, and uploading information from the recorders to a server was simple. A state antiprofiling law requires law-enforcement agencies to collect demographic data for traffic stops unless an agency has cameras in its patrol cars. Thus, the DVRs provided an immediate benefit to the DPD by reducing the need to manually collect the data used to determine racial bias in traffic stops.

However, in purchasing the DVRs, the department did not follow IACP guidelines, with the result that there was no guarantee that the DVRs would be forward- and backward-compatible. This proved to be an issue. Within one year after the department purchased the DP1s from Integrion, an Australian company acquired Integrion and withdrew support for the model, instead developing the next generation of DVRs as a completely different product. As the DPD expanded the number of cars with DVRs, and as DP1s went out of service, it had to purchase the new product, known as the DP2, under the existing contract with Integrion. The new DP2s were not compatible with the DP1s, operating on a different frequency: 900 MHz for the DP1 versus 1GHz for the DP2. Because the microphone cradles for the DP1 and DP2 looked identical, officers often picked up the wrong mike, which was a problem because the DP1 mikes did not work with the DP2 DVRs and vice versa and because the DP2 mikes did not work well in general. In fact, issues with mikes not synching correctly with the DVRs were so severe that the department made a decision not to hold officers accountable for mike malfunction.

Uploading information at the end of a shift was also problematic with the DP2s. While the DP1 produced compressed video files, the DP2 created uncompressed ones, which meant that DP2s could take one and a half hours to upload compared to just several minutes for the DP1. The DP2s also needed a dedicated video upload path, but the department had dual-function lines that handled both data and voice. The proportion allocated to data was too small, which often meant that the voice sector had to be used as well. That problem was fixed when the DPD installed dedicated lines for the uploads. Because the DP2s processed video files first before uploading and did not upload to the servers used by the DP1s, the DPD had to upgrade its server software to accommodate the DP2s. Despite these efforts, problems remained in uploading larger files: DP2 servers hung up and transfers failed. On occasion, information technology staff had to fix files and fragments manu-

ally, thus calling into question the integrity of the video record.

Once the department became aware of these problems, it tried to refuse delivery of any more DP2s, but the city's Computer Information Services (CIS) Department insisted on purchasing DP2s from Integrion because the city had already allocated the funds. In August 2009, the DPD finally told CIS not to purchase any additional DP2s in a letter to city hall from then-Chief Kunkle. The DPD determined that no new DVRs would be purchased until the DPD and CIS developed a purchasing plan.

To guide subsequent purchases, CIS analyzed the differences between DP2 functions and the functions that the DPD actually wanted in a DVR. The analysis concluded that the DPD needed more video and audio channels, wireless data transfer capabilities, cameras that could swivel, and a minimum of three audio channels—one for each officer and one inside the car. For future purchases, IACP guidelines will be used in selecting a vendor, and the new units must be compatible with existing servers and files.

CIS and the DPD have looked at what other agencies have deployed and have invited several vendors to give demonstrations. They estimate that once a vendor has been selected, the procurement process will take three to four months. New units will go in new squad cars and in existing cars when the older units break down. At the end of December 2010, 60 vehicles were without DVRs, and another 60 were without them in the first half of 2011. City officials have determined that the first order should be for at least 100 new DVRs. They estimated that it would take years to replace all the DP1s and DP2s.

We had hoped to get data on when DVRs were taken out of service, but the DPD did not maintain these records. However, we do know that as of October 2010, 201 of the DP1s purchased with CFT funds remained in service.

Evaluation of DPD Uses for the DVRs

The DPD developed new policies around the DVRs to ensure that the recorders captured key interactions between officers and citizens:

- Patrol officers must verify that their DVRs are in working order at the beginning of each shift and are required to upload recordings to a server at the end of the shift.
- DVRs begin recording automatically when a patrol car's siren is switched on, when the car exceeds a certain speed, and when the car is involved in a crash.
- DVRs must be switched on during traffic and pedestrian stops and during vehicle pursuits.

DVRs reduced the need for DPD officers to manually collect data.

- Patrol officers are required to wear DVR microphones to record conversations with citizens up to 1,000 feet from their cars.
- Recordings are kept for 90 days and are then erased, unless they have been flagged.

The DVRs have been used to corroborate (or refute) officer testimony in criminal incidents and in instances of officer misconduct. We describe such uses in greater depth in the following section, but the DVRs have also been employed in many other ways to help Dallas officers perform their jobs more effectively. Such uses include the following:

- DVRs are commonly used for field interviews when it is not practical to bring someone in for interrogation. There have been instances in which statements in field interviews contradict later information given by witnesses.
- DVRs are running when officers arrive at the scene of a reported crime. As a result, the video may capture witnesses present at the scene who may flee before officers can interview them. In capturing the scene as it existed when officers arrived, it may be used to show that a DPD officer did not disturb the scene or tamper with evidence. DVR video and audio may also capture excited utterances that can be used as evidence later in court, which is especially useful in cases in which victims or witnesses recant.
- Some officers inventory property in front of the DVR to thwart possible claims of theft of a suspect's belongings. In one recent case, DVR footage showed that an officer left a suspect's wallet on the car and it fell off when the car drove away, exonerating the officer on theft charges.

Evaluation of the Use of DVRs in Internal Affairs Investigations. One of the main uses of DVR evidence, and one that officers often fear, is in investigations of misconduct. However, the IACP survey of patrol officers in 20 departments found that officers believed that video evidence exonerated them in 96 percent of investigations of citizen complaints in which video evidence was available. Moreover, the internal affairs investigators also believed that the availability of video evidence increased exonerations and reduced the amount of time necessary to investigate a citizen complaint (Westphal, 2004).

DVR evidence routinely plays a key role in the 30–40 high-speed chases in which DPD officers engage annually. Reports must be filled out after high-speed chases, and supervisors are required to review DVR footage from the chase. In two recent cases, DVR footage resulted in discipline of officers

who violated departmental chase policy by engaging in excessive speed and reckless driving.

The DPD has made video evidence public in misconduct cases to bolster its position that an officer was guilty or not guilty of misconduct. In several well-publicized cases, released footage has served to document officer misconduct. In the most notorious of these, a DPD officer berated professional football player Ryan Moats for running a red light while on the way to the hospital to say goodbye to his dying mother-in-law. The officer resigned after a public outcry before an official investigation was conducted. In another case, two officers were seen on video released by the DPD beating a man who fled from them on a motorcycle. A third officer was implicated for adjusting the car's DVR so that part of the arrest scene was out of view. Criminal charges were filed against the officers.

In other instances, video evidence released by the department has exonerated officers. In one recent case, a robbery suspect died shortly after being shot with a Taser six times; video footage demonstrated that the officers used force only until they had gained control of the man, who was high on PCP. In an earlier case, public outcry about the shooting death of an unarmed hit-and-run suspect was quelled when the DPD released video showing that the officer was being overpowered and beaten in the head by the much larger suspect.

With help from the DPD's Internal Affairs Division, we attempted to document the number of times that video evidence played a crucial role in such investigations. At our request, the division conducted a search of its database for 2009 investigations for all cases containing certain key phrases, such as "digital video recorder," "DVR," and "camera." There were 23 such cases, plus another seven in which the misconduct was directly related to violations of the policy on using DVRs. We analyzed the content of the 23 files and identified seven in which the video evidence had been key to the division's finding in the case.

The seven cases that we identified in which video evidence played a central role are outlined in Appendix A, with identifying information removed. They included four complaints of excessive use of force, one violation of the high-speed pursuit policy, one failure to take proper action, and one failure to account for a suspect's property. There was no clear pattern in favor of sustaining or exonerating complaints: Of the seven allegations, four were sustained and three resulted in exoneration.

The number of cases in which DVR footage was central to a decision and the proportion of cases in which DVR footage supported a finding of no wrongdoing are likely to be substantially higher than

Video evidence played a central role in at least seven DPD Internal Affairs Division cases in 2009.

what we saw among formal DPD Internal Affairs Division investigations. Division commanders or staff first screen complaints made by citizens or spurred by violations of departmental policy to determine the likelihood that an infraction occurred. Video evidence may play a role during the screening process when it is available. Incidents that do not result in formal Internal Affairs Division investigations do not contain the same wealth of information available in formal investigations, and the information may reside in the records of the DPD's seven divisions. Potential infractions that are screened out represent an unknown pool of cases decided in favor of officers.²

Evaluation of the Use of DVRs in Criminal Prosecutions. According to DPD officials, the most common use of DVR footage in criminal prosecutions is in DWI cases. In these cases, DVR evidence is used to document the suspect's state of intoxication and his or her performance on field sobriety tests. In cases in which video evidence is available, a copy of the footage is forwarded to the prosecutor within ten days of the arrest. However, we discovered that, at present, the DPD does not track which cases include video evidence and does not report the aggregate number of such cases.

DVR footage is also routinely forwarded to the prosecutor in traffic stops that result in a charge of resisting arrest, flight to avoid arrest, or assault on an officer—assuming that the action is caught on camera. But, again, we found that there is no central record of the number of cases in which video evidence is forwarded in these or other types of cases filed with the court.

Evaluation of the Impact of DVRs on Trends over Time in Citizen Complaints

We reasoned that installing the car DVRs might affect citizen complaints in two ways. First, it could reduce the overall number of citizen complaints if the recorders make officers more circumspect about their conduct in encounters with citizens. Or the recorders might affect trends in the number of specific categories of complaints—those most likely to be discouraged by the DVRs, such as use of force, criminal activity, or mistreatment of citizens. Second, video recorders might affect trends in the proportion of complaints that are sustained. That is, evidence from the cameras might result in relatively more or fewer sustained complaints because they provide access to information that is otherwise unavailable.

To test for trends in the number of citizen complaints and the proportion of sustained complaints, we obtained a database of 3,044 citizen complaints for the period from January 1, 2005, to July 1, 2010. (The DVRs were installed in patrol vehicles over a period of several weeks in August 2006.)

Figure 1 presents trends over time in the number of citizen complaints. We fit a regression line to the number of complaint cases per month and included an interruption point for when the cameras were installed (in August 2006). We found that after cameras were installed, there were 2.1 fewer complaints, on average, per month. However, although complaints trend downward over time, statistical tests did not indicate a significant change in the trend line when the DVRs were introduced, nor was the slope of the trend line significantly different from zero. (For details of the analysis results, see Appendix B.)

We also examined changes in the *proportion* of complaints in specific categories most likely to be affected by the use of DVRs: the use of force, criminal activity, and mistreatment of citizens. The results are presented in Table 1.

The proportion of complaints in each of the three categories declined after the DVRs were introduced, and each decline was statistically significant. These results suggest that introducing DVRs may have made officers more circumspect in their conduct, especially in their dealings with the public.

We then looked to see whether the *proportion* of sustained cases changed after DVRs were installed. The trend in the proportion of sustained complaints is presented in Figure 2.

We see a change in the proportion of sustained complaints from 29.4 percent prior to the introduction of DVRs to 26 percent after. We conducted a binomial logistic regression analysis that assessed trends month by month in the proportion of sustained complaints, and we included an interruption point for when the DVRs were installed. This test examined the overall trend in sustained complaints and whether the trend changed as a result of the introduction of the DVRs. The results indicated a statistically significant and negative trend ($p = 0.016$), indicating an overall reduction in the proportion of sustained complaints over time.

However, while the overall trend in the proportion of sustained complaints was downward, the results indicate that the introduction of DVRs interrupted the trend and increased the odds of a complaint being sustained by 58 percent. (See Appendix B for details of the analysis results.) These findings contradict the results of the IACP survey, in which rank-and-file officers and Internal Affairs Division staff

The proportion of certain types of citizen complaints decreased with the introduction of DVRs.

² In cases in which it is decided that citizen complaints do not rise to the level of misconduct, citizens can file a formal complaint if they are not satisfied by the staff determination that no wrongdoing occurred.

Figure 1
Trends in Number of Citizen Complaints

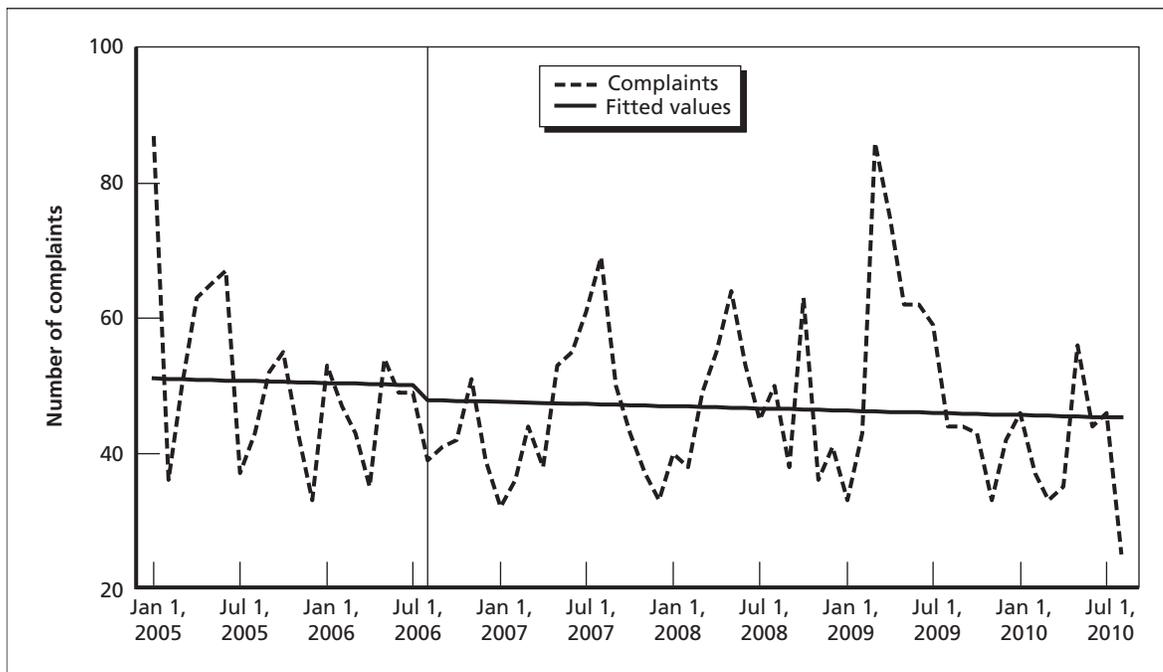


Table 1
Proportion of Specific Categories of Complaints, Before and After Installation of DVRs

Category of Complaint	Proportion Relative to All Citizen Complaints (%)	
	Pre-DVR	Post-DVR
Use of force	30	15
Criminal activity	3	1
Mistreatment of citizens	12	3

NOTE: Excludes complaints that were not included in the DPD database. In all cases shown, the difference is statistically significant at the 0.01 level.

both believed that video evidence acted most often to disprove allegations of wrongdoing.

Evaluation of DVRs by Patrol Officers

New technology sometimes fails to be adopted in whole or in part by the organizations that adopt it, often because of problems with the technology or resistance from staff (Pool, 1997). Thus, factors such as ease of use and perceived incentives and disincentives related to using the technology are key to its acceptance (Park and Chen, 2007). DPD administrators anticipated that DVRs would be controversial among patrol officers because they would expose officers' behavior to far greater scrutiny. To better understand how officers viewed the DVRs, we conducted a web-based survey to ascertain how patrol officers

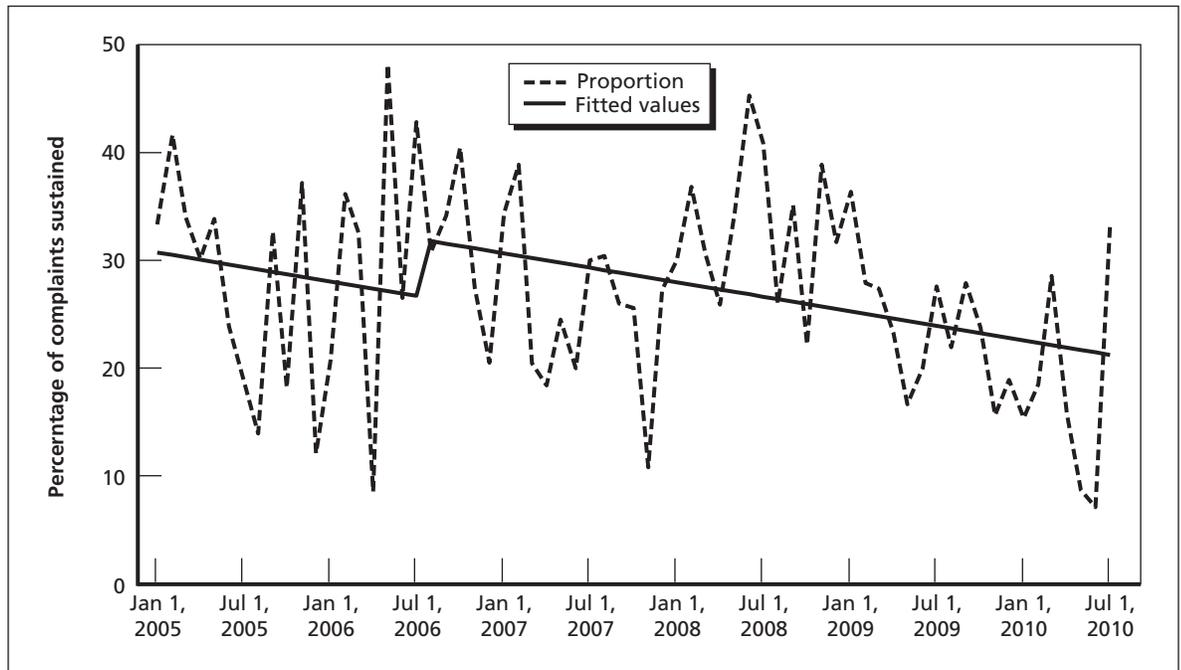
used them and how they thought the DVRs affected their ability to do their jobs.

Because the evaluation was conducted several years after the CFT gift was made, the technology in the cars at the time of the survey was, in most cases, not the original technology purchased with CFT funds. Moreover, as noted earlier, the current DVRs have far more frequent performance issues than the original ones purchased with funds from the CFT gift. Still, the survey does present a picture of how DPD officers react to this type of technology.

In December 2010, we opened a web-based survey for DPD officers in patrol units to provide feedback on the car DVRs and computers. Invitations were issued to all Dallas patrol officers through the departmental email system, followed by two reminders. We

A survey showed how DVRs have affected officers' ability to do their jobs.

Figure 2
Trends in Proportion of Sustained Complaints



received a total of 568 responses to the survey, representing 28 percent of DPD patrol staff. Sixty-four percent of respondents were patrol officers, 27 percent were corporals, and 9 percent were sergeants. Most of the respondents were veteran officers: A majority (51 percent) had been on the force for more than five years, about a third (32 percent) had been on the force for two to five years, 10 percent had one to two years of service, and just 7 percent had been with the DPD for under a year.

Figure 3 shows that the DVRs are employed frequently. Six out of ten survey respondents said that, on average, the technology was activated more than ten times per month, or every other day. At the other extreme, there were a few officers who said that the technology was not activated even once per month.

There was a split in how frequently officers uploaded data from the recorders to departmental servers, as shown in Figure 4. About a third of respondents said that they uploaded data daily, while another third said that they uploaded data less than once per week. Another third reported uploading information less often than daily but several times each week.

By far, the most frequent use of DVRs was for traffic stops. As shown in Table 2, 70 percent of respondents reported that the DVRs were used in traffic stops several times a week. Other uses of the recorders included on the survey were documenting crime scenes, documenting suspects resisting arrest,

DWI stops, car chases, conducting field interviews, documenting interactions with citizens, and inventorying suspects' property. None of these uses was said to occur several times per week; the large majority of each of these uses of the video recorders was indicated to be less than once per month.

A section of the survey asked about problems that officers may have experienced with the DVRs, including excessive time spent uploading data to servers, failure to connect during uploads, screens freezing, and microphones not syncing with cameras. Table 3 shows that all these problems were reported to be common. Seventy-three percent of respondents said that they experienced microphone synchronization problems several times per week. A majority of officers (60 percent) reported problems with frozen screens several times per week. A plurality of respondents also indicated problems with failing to connect during uploads and excessive time spent in uploading.

The survey respondents had mixed feelings about the recorders, as shown in Table 4. Some were quite positive. A majority (58 percent) strongly agreed or somewhat agreed that the DVRs were an essential job tool. Roughly half also agreed that they were well versed in using the technology (47 percent), and a majority agreed (59 percent) that departmental policies on the use of the recorders were clear. Slightly fewer than half felt that the DVRs enhanced their ability to do their jobs (40 percent) and increased

By far, the most frequent use of DVRs was for traffic stops.

Figure 3
Frequency of DVR Activation

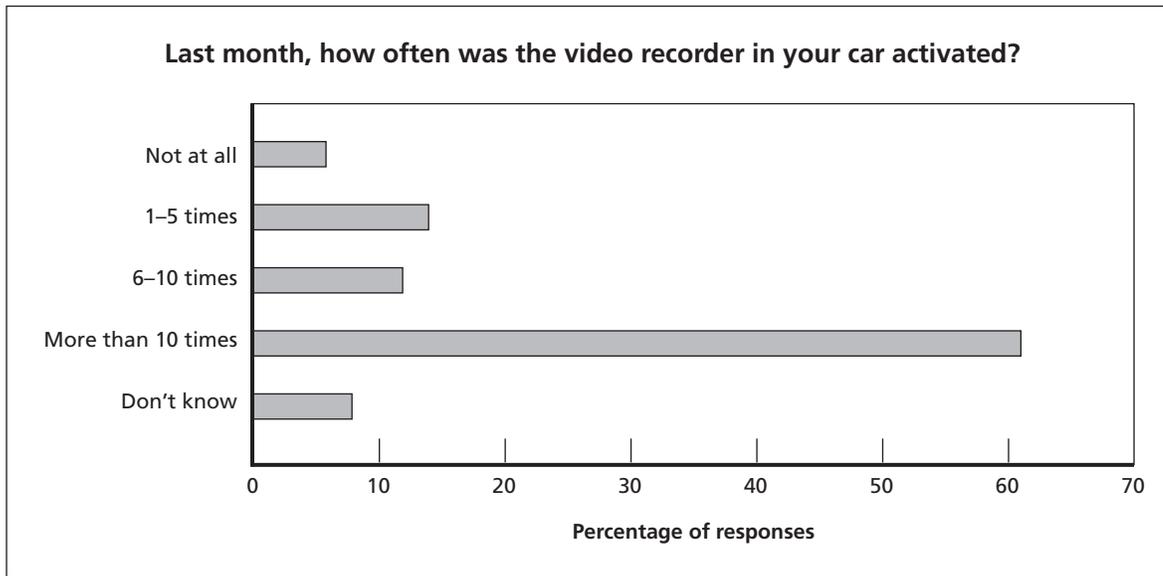
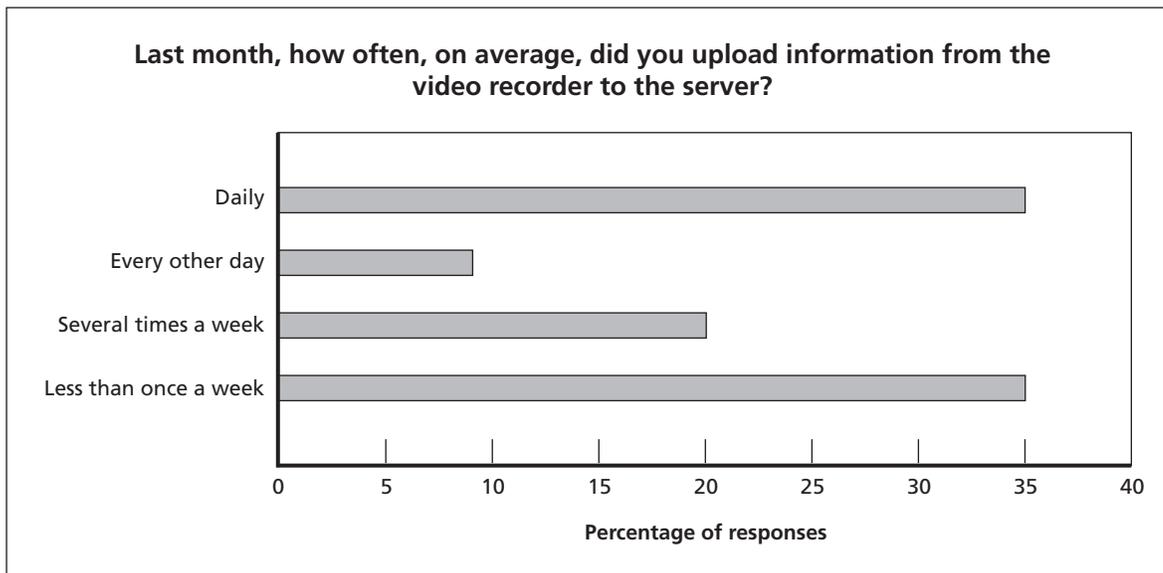


Figure 4
Frequency of Data Uploading



their safety on the job (47 percent). Then again, 67 percent of respondents agreed that they could depend on the DVRs to work according to specifications. When asked whether, given a choice, they would choose to have a DVR in their car, slightly more than a third (37 percent) agreed.³

³Although we did not ask why, we assume that the low percentage of officers who would choose to have a DVR reflects a concern among officers that evidence from the recorders could be used to support allegations of misconduct.

Evaluation of DVRs by Senior DPD Staff

The senior DPD staff whom we interviewed unanimously agreed that the original DVRs purchased with CFT funds were highly reliable and functioned well. According to one, the DP1 “was a great camera. It did what it was supposed to.” There was equally strong consensus that the second-generation DVRs had been highly problematic and unreliable. One senior official called the failure rate of the DP2s “excessive,” adding that “most departments seem to be dumping them as fast as they can.”

Given a choice, slightly more than a third of officers would have a DVR in their car.

**Table 2
DVR Uses and Frequency**

Last Month, How Often Were Video Recorders Used in the Following Ways?					
DVR Uses	Percentage of Responses				Total (%)
	Several Times a Week	Several Times a Month	Once in the Past Month	Never in the Past Month	
Traffic stops	70	17	6	6	99 (558 cases)
Record evidence, document crime scene	4	10	17	69	100 (546 cases)
Record suspects resisting arrest	2	4	9	85	100 (541 cases)
DWI stops	7	11	17	65	100 (543 cases)
Chase suspects evading arrest	1	1	6	92	100 (539 cases)
Conduct field interviews	5	10	14	71	100 (540 cases)
Document interactions with citizens	4	6	11	78	99 (542 cases)
Inventory of suspects' property	8	11	13	68	100 (531 cases)

NOTE: The total number of cases refers to the number of officers who answered the question on the survey. Totals may not sum to 100% due to rounding.

**Table 3
Types and Frequency of Problems with DVRs**

Last Month, How Often Did You Experience These Problems with Video Recorders?					
DVR Problems	Percentage of Responses				Total (%)
	Several Times a Week	Several Times a Month	Once in the Past Month	Never in the Past Month	
Excessive time uploading to server	37	30	16	17	100 (556 cases)
Failure to connect during upload	41	32	12	15	100 (556 cases)
Screen freezes	60	23	6	11	100 (561 cases)
Microphone will not sync with camera	73	16	2	9	100 (558 cases)

NOTE: The total number of cases refers to the number of officers who answered the question on the survey.

Senior DPD officials unanimously praised the DVRs.

Senior officials were also unanimous in their praise of the value of car video systems, especially for their use in investigating allegations of wrongdoing by patrol officers. One official said that the DPD Internal Affairs Division “loves videos.” Senior officials noted that DVRs have been instrumental in determining what happened in many incidents, including car chases, traffic stops, and cases of suspects resisting arrest. An assistant chief thought

that “cameras should be on all the time,” not only when triggered by high speeds or by putting on the siren. Some senior officials acknowledged that the DVRs were controversial among the rank and file but argued that, as time goes by, new officers who have always had the cameras in their cars will view them as an integral part of police work.

Chief Kunkle saw the DVRs’ benefits from another vantage point. He believed that they increased the

Table 4
Officers' Opinions of the Value of DVRs

To What Extent Do You Agree with the Following Statements?						
Statement	Percentage of Respondents					Total (%)
	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree	
The video recorder is an essential tool.	29	29	23	9	10	100 (563 cases)
The video recorder enhances my ability to do my job.	15	25	30	14	15	100 (562 cases)
The video recorder enhances my safety on the job.	22	25	28	12	13	100 (564 cases)
I am well versed in using the video recorder.	22	25	28	12	13	100 (564 cases)
I can depend on the video recorder to work according to specifications.	33	34	20	8	6	101 (564 cases)
Departmental policies are clear on when video recorders are to be on.	26	33	21	13	7	100 (560 cases)
If given a choice, I would use a squad car with a camera.	21	16	23	13	27	100 (559 cases)

NOTE: The total number of cases refers to the number of officers who answered the question on the survey. Totals may not sum to 100% due to rounding.

department's credibility with the public: Releasing video evidence to the public makes police decision-making in controversial incidents more transparent and also serves to cut off unfair rushes to judgment by the public or the media in cases in which officers are innocent.

Evaluation of Car Laptops

Introducing computers in patrol cars is one of the components in the evolution of law enforcement toward information-led policing. Modern policing has embraced the concept of analyzing information and disseminating it to patrol officers while they are responding to calls, something made possible by the availability of compact computers in patrol cars.⁴ The car computers also potentially save a great deal of time by allowing patrol officers to complete forms online while in the field instead of returning to the stationhouse to complete paperwork that is then submitted to data-entry clerks.

The fundamental assumption behind information-led policing is that technologies that make it easier for police to use and share information will improve their efficiency and effectiveness in fighting criminal activity. While there has been little attempt to rigorously evaluate the impact of an information-led approach to policing, it seems intuitively obvious that better information in the hands of patrol officers will make them more productive and will produce better outcomes. However, the kinds of outcomes that might test the value of the computers—such as time saved on paperwork and looking up license plates—could not be collected years after their introduction. Unlike the situation with the DVRs, in which we were able to obtain data from records on Internal Affairs Division cases and citizen complaints, there were no archival sources of data that we were aware of that could help document the value of the laptops.

In this section, we discuss the results of our evaluation of laptops in DPD patrol cars, starting with a brief evaluation of the implementation issues that have surfaced since their introduction. We then evaluate how the laptops have been used, followed by

Computers in patrol cars are another component of information-led policing.

⁴Nunn and Quinet (2002) and Ratcliffe (2002) argue that, while such technology is promising, implementation and acceptance may prove difficult.

an evaluation of the opinions of patrol officers and senior DPD staff.

Evaluation of Implementation Issues Since the Introduction of Car Laptops

Prior to the CFT-funded technology initiative, only patrol cars had computers. The CFT gift enabled the DPD to put new, faster General Dynamics Itronix GoBook III computers into patrol cars and transfer the older computers to other cars. The GoBook IIIs interfaced with the DVRs that were also installed with CFT funds.

Initially, there were some problems with the GoBook III laptops. Specifically, the city radio network was used to transmit information to and from the laptops and the DPD's server, which meant there was limited bandwidth. The limited bandwidth precluded the ability to use some of the laptop's capabilities, such as mapping, graphics, images, and the web browser. This problem was solved when air cards were installed and used solely to provide access to the DPD intranet site.

Another implementation issue centered on the fact that the GoBook IIIs were put into service in the summer of 2006 and replaced with GoBook XR1s in the fall of 2007, when the manufacturer discontinued the GoBook III. We had hoped to determine the lifespan of the GoBook IIIs to assess, for example, how many had gone out of service prior to the wholesale replacement. However, while the DPD does keep maintenance records, it did not maintain records of any GoBook IIIs that were removed from service before the fall of 2007.

The DPD has just finished fitting cars with another new generation of computers purchased with city funds because the XR1s did not interface with the DPD's new computer-aided dispatch system. When the system was installed last year, transmissions to the Federal Bureau of Investigation's National Crime Information System had to be encrypted by law, and the XR1s did not have this capability. The new generation of laptops have encryption capability, built-in air cards, and more computing power than the older generation. They also have imbedded Global Positioning System technology, allowing the patrol dispatcher to know the position of patrol cars at all times and to track the speed of cars.

Evaluation of the Uses of Laptop Computers in Patrol Cars

According to the DPD administrator in charge of communications, the car laptops have become "indispensable" to patrol work. The computers have found a variety of uses, including

- enabling dispatchers to provide patrol officers with context on calls they are responding to
- reviewing incoming calls for service and assignments of other officers
- tracking the location of patrol vehicles
- sending alerts and information on suspects and crime patterns
- entering crime reports and other forms online
- maintaining a running history on call locations
- looking up driver's license information or running suspect background checks.

Patrol Officer Evaluation of the Use of Laptop Computers in Patrol Cars

The same web-based survey of patrol officers that asked for opinions about the use of DVRs also asked about their use of car laptops and their opinions about how that technology added or detracted from their ability to do their jobs. The results presented here suggest an overwhelmingly positive picture.

Car computers have become an essential part of DPD patrol processes. As shown in Figure 5, nine out of ten survey respondents said that they used their laptops more than ten times each shift. The car laptops presented far fewer maintenance problems to patrol officers than the DVRs did (Table 5): Just 7 percent of survey respondents said that the computers had maintenance problems several times per week, compared with 37–73 percent of survey respondents who reported various maintenance problems at least several times per week with the DVRs (see Table 3). The most common response to the question about maintenance (accounting for 44 percent of all responses) was that the computers needed maintenance less than once per month.

The most common performance complaint about the laptops was slow response times, but even this was reported to occur several times a week by only 13 percent of the survey respondents. Sixty-six percent of respondents reported that slow response times occurred several times per month or once per month. Other problems—including difficulty logging in, insufficient knowledge of needed procedures, and maintenance issues—were relatively rare.

The most common uses of the laptops are shown in Table 6. The computers were used daily by more than eight out of ten respondents to review calls holding (95 percent), view dispatcher comments on calls (92 percent), run suspect checks (88 percent), enter reports online (87 percent), and review assignments of other officers (80 percent). Most officers also used their laptops daily to obtain histories on call locations (63 percent). Less common daily uses included accessing the Internet for problem-solving (37 percent) and reading bulletins online (31 percent).

Car computers were used by eight out of ten survey respondents.

Figure 5
Frequency of Car Laptop Use

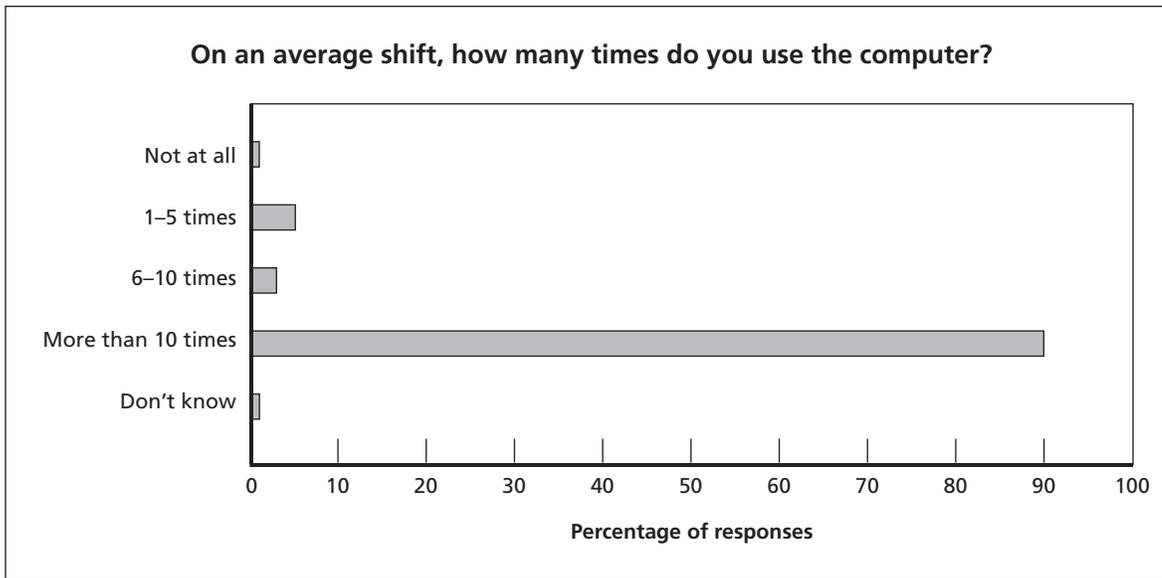


Table 5
Types and Frequency of Problems with Car Laptops

Last Month, How Often Did You Experience These Problems with Car Computers?					
Laptop Problems	Percentage of Responses				Total (%)
	Several Times a Week	Several Times a Month	Once in the Past Month	Never in the Past Month	
Problems logging in	4	12	31	53	100 (561 cases)
Slow response time	13	35	31	21	100 (560 cases)
Unable to understand how to use necessary functions	2	6	16	77	101 (559 cases)
Maintenance problems	7	14	35	44	100 (557 cases)

NOTE: The total number of cases refers to the number of officers who answered the question on the survey. Totals may not sum to 100% due to rounding.

Officers had very positive opinions about having computers in their cars (Table 7). Nearly all respondents (97 percent) agreed that the laptops were an essential job tool, and 98 percent believed that the computers enhanced officers' ability to perform their jobs. An overwhelming majority (89 percent) of officers also believed that computers enhanced their safety on the job. Nine out of ten felt that they were well versed in using the laptops. A smaller proportion of respondents, but still a substantial majority (76 percent), said that they could rely on the computers to work according to specification.

Evaluation of Car Laptops by Senior DPD Staff

As was the case with the DVRs, senior officials were unanimous in their praise of having computers in cars. And, as was true for the original DVRs, the consensus was that the laptops held up well and presented few maintenance problems.

Senior officials thought that having computers in cars significantly enhanced the effectiveness of patrol officers. From pulling up calls and telling officers the best route to locations on their call list to checking license plate numbers, filling out offense and arrest forms, and gathering information on suspects

Officers had very positive opinions of the computers.

Table 6
Car Laptop Uses and Frequency

Last Month, How Often Were Car Computers Used in the Following Ways?						
Laptop Uses	Percentage of Responses					Total (%)
	Daily	Several Times a Week	Several Times a Month	Once in Past Month	Never in the Past Month	
Review calls holding	95	1	2	0	2	100 (559 cases)
Dispatcher comments on calls	92	3	2	1	1	99 (561 cases)
Suspect checks	88	7	3	1	2	101 (558 cases)
Enter reports online in cars	87	7	2	1	3	100 (557 cases)
Review assignments of other officers	80	11	5	1	3	100 (554 cases)
Get histories on call locations	63	16	11	4	6	100 (558 cases)
Use the Internet for problem-solving	37	11	11	6	34	99 (553 cases)
Read bulletins online	31	13	20	16	20	100 (552 cases)

NOTE: The total number of cases refers to the number of officers who answered the question on the survey. Totals may not sum to 100% due to rounding.

Table 7
Officers' Opinions of the Value of Car Laptops

To What Extent Do You Agree with the Following Statements?						
Opinions on Laptops	Percentage of Responses					Total (%)
	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree	
The computer enhances my ability to do my job.	92	6	1	0	1	100 (564 cases)
The computer is an essential job tool.	91	6	2	0	1	100 (564 cases)
The computer enhances my safety on the job.	74	15	6	2	2	99 (562 cases)
I am well versed in using the computer.	70	21	7	1	1	100 (563 cases)
I can depend on the computer to work according to specification.	42	34	12	7	4	99 (564 cases)

NOTE: The total number of cases refers to the number of officers who answered the question on the survey. Totals may not sum to 100% due to rounding.

and locations, the computers were seen as producing significant time savings, helping officers to make smarter decisions, and increasing productivity.

Conclusions

The findings of the evaluation strongly support the idea that CFT's gift to the DPD helped the department implement major changes in its approach to policing. The technology funds allowed the DPD to purchase DVRs and laptop computers for its cars that modernized its patrol functions. Officers and supervisors found many uses for the DVRs, including monitoring officer conduct, aiding in Internal Affairs Division investigations, recording traffic stops, documenting erratic behavior of drunk drivers or suspects resisting arrest, conducting field interrogations, capturing views of crime scenes, capturing excited utterances at crime scenes, and conducting field inventories of suspects' property.

An examination of 2009 Internal Affairs Division investigation files revealed that video evidence was dispositive in seven cases during that year. Of the seven, four were sustained and three officers were exonerated. An additional seven cases involved violations of the departmental policy on the use of video recorders. Although this is a relatively small number of cases, there is another unknown number of cases that never rose to the level of an Internal Affairs Division investigation because video evidence caused the case to be screened out.

Officers' opinions of the cameras were mixed: While a majority of patrol officers surveyed felt that the DVRs were an essential job tool, only one out of three would choose to have a DVR in his or her car. The hesitance of patrol officers in having their actions recorded had some basis in fact: There was evidence that introducing DVRs was associated with an increase in the proportion of citizen complaints in which officers were found culpable. The opinions of senior staff were unambiguously in favor of the DVRs. They felt that the DVRs were an essential tool in monitoring officers in the field, significantly benefited Internal Affairs Division investigations, and

were helpful in promoting good community relations and an atmosphere of transparency.

With regard to the laptops, our evaluation found that they quickly became an essential tool for patrol officers without the controversy of the video recorders. Officers use the computers many times each day in the course of their work to examine waiting calls for service, identify best routes to calls, obtain information on locations or suspects while en route to calls, run checks on suspects, enter crime reports and other forms online, read email from supervisors or other officers, and conduct online research. More than nine out of ten officers considered the laptops to be an essential tool in the performance of their jobs. Senior DPD staff agreed, seeing the laptops as a significant enhancement to the effectiveness of patrol officers.

Based on the evidence reviewed, the DPD has been a good steward of CFT's gift, and the \$5 million has made a significant difference to the department's patrol operations. Problems with the DVRs might have been mitigated had the department followed IACP guidelines in purchasing the video recorders; it would have avoided the ensuing problems with backward compatibility when new units were purchased. This is not to say that CFT would be well advised to get involved in micromanaging the decisions made with regard to the projects that it funds. Despite this glitch, the gift helped to propel the DPD toward 21st-century patrol operations.

If there is a lesson to be gleaned from the current evaluation, it is that evaluation efforts are best begun at least concurrently with program funding. We were able to access historical data on Internal Affairs Division cases and citizen complaints to help assess the effects of the DVRs. However, similar historical data were not available to evaluate the changes to patrol functions resulting from car laptops. It would have been useful to be able to compare before-and-after measures of how officers allocated their time, time savings achieved through completing paperwork online, and so forth. Nonetheless, we were able to use patrol officer surveys to help gauge the uses of the laptops and their effects on patrol functions. ■

CFT's gift to the DPD enabled major changes in the department's approach to policing.

Appendix A. Cases in Which Video Evidence Played a Key Role in 2009

Use of Force (Sustained)

Following the authorized pursuit of two aggravated robbery suspects, officers struck one suspect multiple times during the arrest. The DVR evidence shows the officer punching the suspect four times. The video documents that the suspect was compliant during his arrest.

Use of Force (Exonerated)

The complainant arrested on pedestrian in the roadway, outstanding warrant, and resisting arrest charges alleged that, during his arrest, officers used an inappropriate amount of force. The recording captures the arrest, the resistance the suspect displayed toward the officers, and the force utilized by the officers to effect the arrest.

Emergency Vehicle Operation Violation (Sustained)

An officer was responding code 3 (emergency) to a disturbance call when he lost control of his patrol vehicle and struck a parked vehicle. The video showed the officer driving 73 mph in a 45 mph zone and 72 mph in a 30 mph zone. The video also showed the officer running stop signs.

Failure to Take Proper Action (Sustained)

An officer stopped a driver for the traffic violation of having an illegal window tint. During the stop, the driver stated that he had just purchased the vehicle and did not have a driver's license or insurance. The officer received information over the patrol car computer that the driver had outstanding misdemeanor warrants. The officer issued citations for the window tint and for having no driver's license and no insurance; he then had the vehicle impounded. The driver was released at the scene. The vehicle contained bags of clothing, a television, and other items. The driver and two unidentified passengers were permitted to remove the property from the vehicle before it was towed. It is alleged that the officer did not fully investigate the situation and take enforcement action.

The traffic stop recording revealed that the officer did not ask for the vehicle registration or proof that the driver had just purchased the vehicle. The driver and the two passengers were allowed to remove property from the vehicle. The officer did not examine the property or ask the other passengers in the vehicle for any identification. As the officer was issuing three citations, he told the driver he was giving

him a break because he has other outstanding tickets. (The driver was a known burglar.)

Use of Force (Exonerated)

The suspect alleged that, following a traffic stop, officers used unnecessary force during his arrest, injuring his nose. Statements from civilian witnesses were not consistent with the actions that were documented on the DVR.

Use of Force (Exonerated)

During an arrest for burglary, the complainant stated that several white officers slammed his head into the ground and that an officer tried to break his wrist with handcuffs. The complainant stated that he was surrounded and then dragged to the ground. Additionally, he stated that the officer made some type of move on the handcuffs that caused him pain. The DVR documents the complainant's noncompliance with the officers, the controlled takedown of the complainant and another suspect, and the officer's actions.

Failure to Account for Prisoner's Property (Sustained)

A suspect was arrested and released. After release, he called the DPD and stated that he was missing a cell phone and \$60 that had been taken from him while he was searched by officers at the scene. The DVR shows the arresting officer removing the property from the suspect's person.

In the seven cases examined, the citizen complaint was sustained four times.

Appendix B. Results of Time-Series Analysis of Trends in Citizen Complaints

Table B.1
Regression of Time on the Number of Cases

Source	SS	df	MS
Model	248.423	2	124.211
Residual	10,251.695	65	157.718
Total	10,500.118	67	156.718

Complaints	Coefficient	Std. Error	t	P > t	95% Confidence Interval	
date2	-0.002	0.004	-0.44	0.660	-0.010	0.006
camera	-2.135	5.395	-0.40	0.694	-12.909	8.639
_cons	80.486	67.767	1.19	0.239	-54.853	215.825

NOTE: Number of observations = 68. $F(2,65) = 0.79$. Probability > F = 0.4592. R-squared = 0.0237. Adjusted R-squared = -0.0064. Root mean square error = 12.559.

Table B.2
Binomial Logistic Regression of Time on Proportion of Sustained Cases

Sustained	Coefficient	Std. Error	z	P > z	95% Confidence Interval	
camera	0.461	0.144	3.21	0.001	0.179	0.743
date2	-0.001	0.000	-5.88	0.000	-0.001	-0.001
_cons	10.399	1.919	5.42	0.000	6.638	14.161

NOTE: Log likelihood = -1,838.3622. Number of observations = 3,244. Likelihood ratio chi-squared(2) = 42.44. Probability > chi-squared = 0.0000. Pseudo-R-squared = 0.0114.

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About This Report

Police departments today are expected to pursue a wide range of missions beyond simple crime-fighting. With these new responsibilities come new requirements, particularly in the area of technology. In 2006, the Communities Foundation of Texas allocated \$5 million to the Dallas Police Department, which it used to acquire and install digital video recorders and laptop computers in patrol cars, helping it modernize its operations.

This report examines the devices' uses and frequency of use by officers, senior and patrol officers' opinions of the devices, and trends in the overall number of citizen complaints and the proportion of complaints in which disciplinary action was taken as a result of video evidence, among other factors. It also examined implementation challenges and the frequency of problems with the technology.

The research presented here was sponsored by the Communities Foundation of Texas and will be of interest to police agencies that are interested in exploring options for modernization via investments in technology to facilitate new approaches to policing, as well as foundations that are seeking to fund such efforts.

The RAND Center on Quality Policing

This research was conducted under the auspices of the Center on Quality Policing (CQP), part of the Safety and Justice Program within RAND Infrastructure, Safety, and Environment (ISE). The center's mission is to help guide the efforts of police agencies to improve the efficiency, effectiveness, and fairness of their operations. The center's research and analysis focus on force planning (e.g., recruitment, retention, and training), performance measurement, cost-effective best practices, and use of technology, as well as issues in police-community relations.

The mission of ISE is to improve the development, operation, use, and protection of society's essential physical assets and natural resources and to enhance the related social assets of safety and security of individuals in transit and in their workplaces and communities. Safety and Justice Program research addresses occupational safety, transportation safety, food safety, and public safety—including violence, policing, corrections, substance abuse, and public integrity.

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