

Smile, you're on Candid Cop Cam

How the wireless digital revolution will influence the future of Law Enforcement

By

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The Command College Futures Study Project is a FUTURES study of a particular emerging issue of relevance to law enforcement. Its purpose is NOT to predict the future; rather, to project a variety of possible scenarios useful for strategic planning in anticipation of the emerging landscape facing policing organizations.

This journal article was created using the futures forecasting process of Command College and its outcomes. Defining the future differs from analyzing the past, because it has not yet happened. In this article, methodologies have been used to discern useful alternatives to enhance the success of planners and leaders in their response to a range of possible future environments.

Managing the future means influencing it—creating, constraining and adapting to emerging trends and events in a way that optimizes the opportunities and minimizes the threats of relevance to the profession.

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Introduction

Officer Bella surveyed the crime scene. On its face, this looked like a fairly typical suicide scene, but something didn't add up. The neighbor's statement was in conflict with the scene, and what family members had relayed didn't seem to fit either. Bella wasn't sure if this required a detective call out, or if he should get the crime scene tech to record the facts and close the case. Bella thought for a minute, this was a situation he'd never encountered before. This required the insight of a more senior police officer. Bella knew how he would likely proceed but wanted desperately to run this scene by his sergeant.

Officer Jon Bella had three years on the job working dayshift in one of the busiest beats in Averageville. He was learning a lot, but still needed a lot of help from the more experienced beat officers on his shift, not to mention his sergeant. This was one of those times he was glad to have the Personal Digital Video System (PDVS).

Bella cued up the controller that hung on his duty belt next to his radio. Twenty miles away at Averageville PD, Sergeant McAdams received Officer Bella's "request for contact" signal over his office computer. McAdams opened the PDVS window and asked, "Jon, what's up?" It was clear to McAdams that Bella was on a call; he could see the crime scene tape in the picture streamed through Officer Bella's nameplate digital camera.

"Sarge, I need some advice" replied Bella. "I have a suicide where there is some conflict with what the neighbor next door told us and what the wife of victim said about the last time anyone saw this guy alive." Bella continued, "to make matters worse, I'm

not sure if I should have the CST get started on the crime scene or do you think I should put a call into the on duty detective?"

Sergeant McAdams thought for a moment, "OK Jon, one thing at a time here, start by walking me through the crime scene. I want to see the room where the body was found, then let's review what the victim's wife said. In fact, after we have a look at the crime scene, you can ask the wife some follow up questions while I watch from this end."

While the system described above doesn't currently exist, it easily could. This is not science fiction; it's technology that exists today. The question is not whether this system is reality, but when it will be mainstreamed into everyday police use.

Consideration of New Technology

Portable wireless video systems have been engineered for surveillance systems and are used in the coverage of sporting events. You can sit in your living room watching a NASCAR race and see what the lead driver is seeing through a wireless camera attached to the bumper or drivers helmet.¹ Robots have been developed using this technology to allow a remote user to steer and control the robots activities in hazardous environments.² The police vehicle dash-cam has taken law enforcement by storm in the last 7 years. Between the years of 2000 and 2004 the number of state police and highway patrol agencies to utilize dash cam systems rose by 60 percent.³ While most dash-cam systems only record activities, there are systems being used today that can transmit the live video feed of the dash cam to other computers linked on the same network. The city

¹ ESPN brings full time HD to NASCAR (Sept 19 2007), available; <http://www.tvtechnology.com/pages/s.0082/t.8588.html>

² Maintaining Communication Link for a Robot Operation in a Hazardous Environment (March 29 2004), available; http://neelix.nosc.mil/robots/pubs/ans04_amcr.pdf

³ Police Chief Magazine, The In-Car Camera: Value and Impact (August 2004) by Lonnie Westphal, http://www.policechiefmagazine.com/magazine/index.cfm?fuseaction=display&article_id=358&issue_id=82004

of Ripon California is currently utilizing this technology. Officers, sergeants or dispatchers can watch and hear networked camera activity in real time.⁴

Application in Law Enforcement

The idea of recording an officer's contact with the public is not new and goes back several decades. Early cassette recorders allowed officers the potential to make an audio recording of their interaction with the public. The value of this was immediately seen as providing a safeguard against frivolous or untruthful citizen complaints and in capturing best evidence for later use in court. In 2002 the International Association of Chief of Police (IACP) conducted a study to assess and measure the benefits of in car camera systems. The study conducted a survey of state troopers where the question was asked, "Did dash cam systems improve their agencies ability to respond to citizen complaints?" Of 3000 responses, the troopers reported that 96 percent of the time the dash cam system was able to exonerate their actions.⁵

Progressive law enforcement has recognized the value of video recording equipment. Dash cams came on the scene mating VHS media to cameras and microphones worn by officer to capture high liability activities. Law enforcement saw the benefit from this application of cameras to increase officer safety, spur more professional conduct with the public and have better evidence in both complaints against police and for criminal arrests.⁶ Technology made improvements in these devices, making them

⁴ Mission Critical Data Mobile Mesh Networking in Ripon California, available; <http://www.motorola.com/staticfiles/Business/Solutions/Industry%20Solutions/Government/Fire%20Protection/Documents/Static%20files/Ripon-csFINAL.pdf>

⁵ Police Chief Magazine – The In-Car Camera: Value and Impact (August 2004)), available; http://policechiefmagazine.org/magazine/index.cfm?fuseaction=display&artical_id=358&issue_id=82004

⁶ Ibid

smaller and more powerful. It wasn't until the advent of digital media, however, that huge application of these devices began to appear for law enforcement.

Small unobtrusive digital video cameras mounted in police vehicles paired with small wireless microphones now make it possible to record all of an officers' activity around their patrol car for an entire shift. All this digital information can be stored on a small media card. The next stage of technology development will be to miniaturize the concept of the dash-cam and make it wearable, imbedded in an officer's equipment. This phase of equipment development is already in its early stages of development. With adequate band width and wireless networking, the same digital information that is stored can now be sent anywhere along a network of wireless transmitters or through transmission along fiber optic infrastructure. This could allow for remote viewing in the police building or in other police vehicles.

In examining the use of the PDVS (Personal Digital Video System) concept, three unique applications for law enforcement become evident; 1) Risk Management, 2) Evidence Collection; and, 3) Supervision. A PDVS system allows for a permanent record to be stored for later recall when citizens complain about their police contact or when activities occur that are fraught with liability. The idea of dash-cams is largely built around these two concerns. PDVS's are also uniquely suited to provide the best evidence available in a wide variety of law enforcement activities.

The system could record a moment in time memorializing what the arresting officer saw and heard establishing a very damaging case in court. Witnesses, victims and crime scenes could be recorded in real time, allowing for an uncontaminated record of how facts were established. A suspect's objective actions and symptoms of intoxication

could be recorded in the field for review by juries. Lastly, the PDVS opens up whole new possibilities in the realm of supervision.

With a properly engineered system, officers would be able to consult with supervisors instantly and be able to show them, in real time, issues they might be facing. Supervisors would be able to see and respond to officers questions from any location. As with risk management, supervisors would be able to review the record of an officer activity to assess their performance and allow for mentorship and supplemental training.

Technology and Issues

While the peripheral technologies exist to support the concept of a PDVS system, no system has yet been engineered for police use. The closest attempt to manufacture a system that would be adaptable for this purpose is manufactured by “Darim Visions Co”. The Darim system is a hybrid design incorporating military network technology with digital video. The system was created to allow command post personnel to see critical incidents from a first responder’s perspective. The Darim system consists of a camera, microphone and digital encoder/transmitter weighing approximately 1.5 pounds. The system is powered by a Lithium battery that will last 3 to 5 hours between charges. The camera is small, and can be mounted in equipment or worn on a uniform connected via a cable to the encoder/transmitter designed to be worn on the belt.⁷ The Darim system is designed to integrate into an existing wireless network. It typically utilizes a WiFi network, and can communicate with a laptop computer equipped with WiFi technology. Digital images from the camera are transmitted to the network, and can be sent to any other location or device on the same network. This would allow other officers,

⁷ DARIM Vision Co Ltd – PVE400 Portable Wireless IP Camera, available; http://www.darimcctv.com/products/pve_overview.php

supervisors or dispatch personnel to view in real time the digital images generated on the users camera.

The Darim system utilizes WEP/WPA (the WiFi industry security standards) to secure data that is transmitted wirelessly, thereby eliminating the danger of hacking. While this system is able to broadcast streaming video over a network, it isn't designed to provide two-way communications, point-to-point across the network. The current design depends on the system to send streaming video one way (away from the sender). According to Sergey Shimskevich, of Darim Ltd., the next generation of design will keep the one way streaming video and add the ability to send two way voice communications over the same network.⁸ This should be a relatively easy upgrade that would require slightly more bandwidth. Most high speed networks that exist today could easily accommodate this design change.

A second limiting factor to the concept of the PDVS concept is a lack of adequate infrastructure to support wireless networks within confines of the urban areas. The PDVS requires a wireless network that can transmit and receive data at a rate that supports streaming video. Most police communications systems are not engineered with a wireless network that has adequate bandwidth and reliability to support the amount of data that would have to flow through a PDVS. Law Enforcement communication systems typically support the transfer of information found in MDT (Mobile Data Terminals) use, but this is inadequate for streaming video. Cellular phone based modems are used to transmit this information and are handicapped by speed of data transmission, inadequate network coverage (cell towers) and public safety users having to compete with the public over network bandwidth .

⁸ Sergey Shimskevich, DARIM Visions Co Ltd., Interview by author via phone, Hayward California (November 29 2007)

Many cities have adopted WiFi technology as an alternate means to secure a data infrastructure. A recently developed WiFi based system was introduced by Motorola called Mobile Mesh Networking or “Motomesh”. This new system could solve the PDVS’s bandwidth and reliability problems, and counters many of the issues impeding an adequate urban wireless network. The Motomesh system utilizes 2.4 GHz and 4.9 GHz network architecture to allow multiple client devices to set up their own Ad-Hoc network. The system was designed for modern battlefield communications, and its utility is easily adapted to the modern policing environment. It allows for broadband data to be transferred at speeds capable to supporting high resolution video data from mobile cameras or fixed surveillance cameras.⁹

The City of Ripon, California is currently using a Motomesh system. The system allows officers to communicate over the network with each other and their dispatch center. Anyone on the system can transmit and receive streaming video as provided by fixed surveillance cameras or by vehicle dash cams that are wired into the system.¹⁰ Ripon’s total expenditure for the Motomesh system was \$ 550,000 in which \$ 75,000 was offset by a homeland defense grant.¹¹ Others can use Ripon’s example to gain a sense of possible costs, although there are other considerations when contemplating the use of a PDVS.

⁹ Motorola Ltd, Motomesh – The Multi-Radio Broadband Solution for Public Safety, Public Works and Public Access, available; <http://www.incam.co.uk/ds/motomesh/systems%20Brochure.pdf>

¹⁰ Ibid, page 3 reference footnote 3

¹¹ Federal Computer Week, City of Ripon Goes Wireless, California Municipality adopts holistic approach to mesh networking (June 20, 2005) by Dibya Sarkar Available; http://www.fcw.com/print/11_24/news/89302-1.html

How to Pay for Technology

The cost to implement a PDVS system is not limited to equipment and network infrastructure. The system will require vast amount of sever memory to store the data generated from each officer equipped with the system. IT staff will need to be increased to support the equipment and network infrastructure. The size and scope of the PDVS system is likely to dwarf other tasks normally supported by IT departments. Records staffing will need to increase to handle the extra volume of information stored in PDVS digital files. PDVS digital information will be considered a public record, and as such will be subject to the same requirements of disclosure as other police documents. Digital information will be evidence in arrests and will be subject to subpoena. The end result may mean an increase in the number of personnel assigned to maintain and access police records.

While WiFi networks are expensive to establish, there is some relief in the funding this technology through the use of grants. Providence Rhode Island installed a 2.3 million dollar mesh wireless system in September 2006 by using UASI Department of Homeland Security funding to offset the cost.¹² The system includes 450 mesh wireless routers and will accommodate 200 public safety vehicles. Providence intents to use the mesh network to enable streaming video from both vehicles and fixed surveillance assets. The system was installed exclusively for use by public safety and is controlled by the City's IT staff.

A second emerging strategy to pay for the building of local WiFi networks is to privatize its operation. In 2006 the City of Tempe Arizona contracted with Kite Networks

¹² Computer World, Providence Unveils Wireless Network for Police, Fire Departments (Sept 11, 2006), by Matt Hambien available;
<http://www.computerworld.com/action/article.do?command=viewArticleBasic&articleId=112751>

to establish and operate a public WiFi system for the city's 160,000 residents.¹³ Kite Networks purchased and installed the infrastructure on city owned light poles. In return for the free use of the light poles, Kite Networks planned to allow city public safety free access to the network and would charge residents only \$20 monthly for access to the Internet. Unfortunately, Tempe's attempt to build a public safety network ultimately failed when Kite abandoned the network due to financial problems in December 2007. At this point Tempe is still searching for a resolution; in either directly managing the network or in finding a second vendor to contract the networks services.

Any and all means should be scrutinized when considering different options to pay for PDVS technology. There clearly is no right or wrong way to fund this technology, as each municipality will have different needs and financial means. Where how the technology is funded is open for debate; planning for system use, growth and sustainability is not. Public safety executives should carefully consider what type of network they would be using given who established it and for what purpose it was established.

Technology Transition & Privacy

Utilizing a PDVS network would allow cameras to go where officers go. This concept might at first be disturbing to the public, but safeguards would have to be engineered into the system to allow "fair warning" to the public, so its common knowledge the system is on and recording an officer's contact. Several legal precedents have addressed the issue of cameras and privacy concerns. In *Katz vs. United States*, the US Supreme Court set the standard that government action does not constitute a search if

¹³ Computer World, Tempe Ariz, CIO faces WiFi reality check (Feb 19, 2008) by Matt Hambien available; http://www.computerworld.com/action/article.do?command=viewArticleBasic&taxonomyId%20=15&articleId=9063138&intsrc=hm_topic

there is no reasonable expectation of privacy.¹⁴ In *Oliver vs. United States*, the courts further defined that the use of surveillance equipment in the public right of way is not a violation because there is no expectation of privacy.¹⁵ To allay any fears, the PDVS could easily have a flashing LED light attached to some part of the officers uniform to indicate the system is on and recording images. A verbal disclaimer might need to be part of any opening conversation when contacting a person relative to a call and utilizing the system. Widespread public knowledge that a law enforcement agency is using a PDVS would be the best hedge against a citizen thinking that they had an expectation of privacy when contacted by police.

PDVS as a Supervision Tool

A limiting factor in effective supervision in any organization is the span of control of the work force. The number of line employees that can be effectively supervised by the number of supervisors as a ratio is known as the span of control.¹⁶ According to a study conducted by the Kansas State University Police Department, the national average span of supervision in law enforcement appears to be around 7:1.¹⁷ This can be a very limiting factor in how resources are deployed and services are rendered to the community. The question that comes up is whether technology can be used to increase and augment the supervision of personnel resources.

The use of a PDVS system might have dramatic effect on span of control in supervision. Its use would save supervisors time in daily operations and allow for finer

¹⁴ FBI Law Enforcement Bulletin, Volume 69 Number 2 – Electronic Surveillance a matter of necessity (February 2000), available; [http://libcat.post.ca.gov/dbtw-wpd/article/FBI/FBI69\(02\)25-32Feb2000.pdf](http://libcat.post.ca.gov/dbtw-wpd/article/FBI/FBI69(02)25-32Feb2000.pdf)

¹⁵ Ibid

¹⁶ Police Chief Magazine – Span of control for Law Enforcement Agencies (October 2006), available; http://www.policechiefmagazine.org/magazine/index.cfm?fuseaction=display_arch&article_id=1022&issue_id=102006

¹⁷ Ibid

more meaningful evaluation of performance. The PDVS system would allow the leverage of supervision in several ways. Accessibility to supervision would be greatly increased. Supervisors would be able to consult with line employees electronically over a streaming video network. The quality of the electronic consultation would be better than current technologies (cell phone or via police radio). Officers would be able to show their supervisors in real time what they are facing. As the old adage says, "A picture is worth a thousand words." The PDVS allows for much clearer communications. Supervisors in turn could provide more direct advice in dealing with issues. Finally, supervisors could review officer performance from digital records. This would cause more personalized mentorship in allowing officers encouragement for strong performance and advice to improve weak performance.

Supervision in law enforcement is more challenging now than it ever has been before. Sergeants are asked to perform a wide variety of tasks and are pulled in different directions, finding it tough to leave the office and supervise from the field. The PDVS system could help spread their influence and supervision by allowing another conduit for officers to communicate with their sergeant. The modern work place is ever more influenced by high speed communications. Computers can be found in office space, patrol vehicles and are starting to appear on the person (use of PDAs and certain phone technologies). The PDVS system would allow for real time video communications, while supervisors are in a variety of different work environments. Sergeants wouldn't be restricted to being on site, or being tied to an office equipped with telecommunications equipment.

Conclusion

A PDVS system has many applications for law enforcement. Many of the traditional applications of risk management and evidence collections have already been explored when examining ways to record an officer's activity. Very little attention has been given to the idea of supervision, and how a PDVS system could focus and direct an officer's development in the field. An officer's beginning years are filled with a steep learning curve and certain amount of "risk taking" when making decisions in the field. Through repetition of activity and effective decision making, officers acquire experience. The PDVS could be an enormous tool in making this acquisition of job experience.

A lot of attention has been focused on the idea of supplanting sworn personnel with less expensive civilian employees. An equally viable solution would be to leverage technology to maximize resources. A PDVS system could expand the span of control in first line supervision. Officers still need to be led from the field, but the ability to conduct video conferencing could defer a lot of the routine business of supervision. Streaming video with two way communications allows for a new means of "cyber supervision" that will likely have a dramatic effect on resource allocation.

The succession of this technology in the last decade has made it smaller and more powerful, but certainly has altered the public attitude about its value. The video "CSI effect" has blossomed in the last decade. With significant events like Rodney King and the Twin Towers being captured and disseminated by the media, the public now readily accepts video technology. This growing demand for societal transparency has evolved to a point where many agencies could successfully exploit a PDVS. The idea of embedding wireless digital video technology in police equipment is just now making an appearance. As with all technology, electronic devices and infrastructure will become cheaper, more

powerful and widespread; which will cause the PDVS concept to take law enforcement by storm.