

**THE FUTURE OF POLICE BODY WORN TECHNOLOGY
HOW CAMERAS, SENORS AND UNIFORMS MAY SAVE LIVES**

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 optimized the opportunities and minimizes the threats of relevance to the profession.

The views and conclusions expressed in the Command College Futures Project and journal article are those of the author, and are not necessarily those of the CA Commission on Peace Officer Standards and Training (POST).

THE FUTURE OF POLICE BODY WORN TECHNOLOGY

For the past 35 years, Police Officer's body worn equipment has remained essentially unchanged despite the historic evolution in technologies such as artificial intelligence, sensor detection systems and nanotechnology. While some Federal research funds have been directed towards longer lasting Kevlar vests, very little research has been dedicated to other technologies that could make America's police officers safer by enhancing the equipment or uniforms they wear.¹ What could be the possibilities if police officers wore miniature camera systems that were so evolved they could actually protect an officer from danger? There are a number of possibilities coming from technologies in artificial intelligence, facial and license plate recognition, WMD sensors and video analytics that could make this possibility come true. If law enforcement could focus and take advantage of these emerging technologies, could lives be saved? Are there obstacles preventing advanced research in officer body worn equipment such as funding, privacy concerns or the officers themselves?

Imagine that during a citizen contact, an officer would be wearing a smart technology camera capable of multitasking independently from the officer's actions. For example, the camera could track multiple people simultaneously with whom an officer might be talking. It would use facial recognition and automated license plate reading software to check for criminal wants or to compare against a terrorist watch list. The camera system's software would analyze the video of a suspect for potential danger signs such as movements, changes in voice stress and even changes in body pheromones released that might indicate fear or imminent attack towards

¹ Koper, Christopher; Kubu, Bruce; Taylor, Bruce. "Law Enforcement Technology Needs Assessment: Future technologies to address the operational needs of Law Enforcement." *Police Executive Research Forum in partnership with Lockheed Martin*, March 2009: p98-99

the officer. Meanwhile, sensors worn by the officer are checking the environment for signs of chemicals, explosives or contagious diseases. Finally, micro fiber enhanced uniforms and liquid ballistic material keep the officer safe from attack or chemical exposure. Although this officer of the near-future is doing many of the same things as cops today, the cameras, sensors and uniforms they wear will create an entirely different, and enhanced, level of effectiveness for them. Will the smart cameras of the future be an entirely new technology or just an enhancement of the current state of police camera systems?

Vehicle mounted camera systems, commonly found in police cars throughout the nation, have gained general acceptance from the departments, police officers, courts and the public. The best camera systems have integrated Automated License Plate Recognition (ALPR) technology and the most advanced systems incorporate facial recognition software. These technologies combined could provide a glimpse of how automated systems, which act independently of the officer, could operate. Currently, these systems are continually scanning the environment and notifying the officer of potential hazards such as stolen vehicles and wanted individuals. If these technologies were combined along with voice stress analysis software into a body worn camera system, the safety and effectiveness of officers could be increased immensely.

The introduction of body worn cameras in the past few years has slowly gained acceptance in some police agencies, although other law enforcement organizations seeking to employ them have received resistance from their police unions due to officer privacy concerns.² The current generation of body worn cameras lack any true advanced technology because they are only miniature digital video devices. If these camera systems could be integrated with micro

² Schoenmann, Joe "Police Union Threatens Legal Action over Body Cameras." *Policeone.com* 2012. <http://www.policeone.com/police-products/investigation/cameras/articles/5550381-Police-union-threatens-legal-action-over-body-cameras> (accessed May 2012).

sensors capable of detecting environmental hazards, these tools could help save officers lives. Fortunately, private companies and university researchers are working on emerging sensor technologies that could be adapted by Police Officers to make them safer and more effective.

British scientists at the City University London are completing an 18-month study intending to develop a device that can detect the smell of fear in humans.³ One day, this technology could identify terrorists, drug smugglers, and other criminals. The smell, known as fear pheromones, can be detected by sensors. The challenge will be to identify the specific chemical signature for human fear, especially fear related to criminal acts. If these sensors could be developed small enough to be worn humans, could they be worn by police officers in helping sense criminal activity or potentially warn the officer of pending attack?

According to the 2009 FBI Officers Feloniously Killed Report, 45 of the 48 officers killed that year were the result of attack by firearms⁴. Preliminary estimates for 2010 show an increase of officers killed by firearms of 20%. Despite the nationwide acceptance of Kevlar body armor by police officers, one in four or 25% of the officers killed in 2009 were not wearing any ballistic protection. Kevlar, a synthetic fiber invented by DuPont in 1965 invented to make race car tires last longer, was also found strong enough disperse the energy of handgun bullets.⁵ Initially designed for the military, Kevlar body armor became widely used by police officers in the 1980's. Unfortunately, other studies have shown as many as 40% of America's Police

³ Edwards, Lin. "Physorg." *Fear Detector Being Developed*. November 2009. <http://www.physorg.com/news176452932.html> (accessed June 2011).

⁴ Federal Bureau of Investigations. "Law Enforcement Officers Killed and Assaulted Annual Report." *FBI.GOV*. 2009. http://www2.fbi.gov/ucr/killed/2009/documents/feloniously_killed.pdf (accessed May 2, 2011).

⁵ Bellis, Mary. "History of Body Armor and Bullet Proof Vests." December 2010. http://inventors.about.com/od/bstartinventions/a/Body_Armor.htm (accessed April 2011)

Officers don't wear their Kevlar body armor routinely.⁶ Many officers complain the Kevlar fibers are stiff, don't allow for body moisture evaporation and are uncomfortable to wear. Nanotechnology may help to make police body armor more comfortable to wear and more effective from sharp object attack.

Researchers in nanotechnology at the University of Delaware in partnership with the U.S Army Research Laboratory have developed technology that appears to allow conventional ballistic fabrics to increase the level and quality of protection without compromising their weight or comfort. This technology referred to as shear thickening fluid (STF) or "liquid armor" maintains a liquid like state and becomes rigid when impacted by a high velocity projectile or fragment.⁷ Dr. Tony Russell is the Chief Technology Officer for Armor Holdings Corporation, a private company using nanotechnology to develop new body armor. Dr. Russell said, "Rarely do the words flexible and armor get used in the same sentence, but this new technology has the potential to unlock entirely new and better solutions for the next generation of armor."⁸ Could it be possible to incorporate this technology directly into the patrol uniform? The uniform could remain light weight and flexible, but immediately become puncture and bullet resistance upon attack. According to Dr. Russell, "Extensive testing by the University of Delaware Center for Composite Materials has demonstrated that when treated with STF, ballistic fabric can resist penetration from an ice pick that would easily penetrate the fabric without the treatment, However further testing and applications in the field are needed to fully understand the properties of STF." In truth, the necessary funding is not yet in the pipeline from federal agencies.

⁶ McBride, Ron. "Officer Safety : A Multidimensional Challenge." *The Police Chief* 78, May 2011: p28-33

⁷ Russell, Tony PhD "Nano Tech Wire." *A Unique Application of Nanotechnology; Flexible Armor Technology*. March 2006. <http://nanotechwire.com/news.asp?nid=2976> (accessed July 2011).

⁸ *Ibid*

Since the terrorist attacks of September 11th, the Federal Government has spent billions of dollars in grant funding at the state and local levels. Despite this funding, most Police Officers have seen little in personal equipment enhancements other than a new gas mask and the empty promise of an interoperable radio system. Research funding allocated to make officers safer and more effective is essentially non-existent. In 2009, the Police Executive Research Forum (PERF) in partnership with Lockheed Martin co-authored a report assessing law enforcement technology needs. The report focused on the National Institute of Justice (NIJ), who has been an important sponsor of technology development and dissemination to law enforcement. According to the report, “Although various forms of new technology hold promise for enhancing the operation of the nation’s approximately 18,000 law enforcement agencies, there is little to guide agencies in selecting, procuring, and implementing technology. Further, there is little in the way of systematic and timely research on technology needs and impacts in law enforcement.”⁹

There should be no financial reason anywhere in the United States that would prevent officers from access to Kevlar enhanced personal body armor, and then to equip them with emerging protective uniforms and body armor when those technologies are developed. Since 1998, the U.S. Department of Justice Bulletproof Vest Partnership Program has awarded \$277 million dollars in grants to Law Enforcement to help purchase ballistic vests for officers. The grants reimburse police agencies 50% of the purchase price for Kevlar ballistic vests, which on average cost of \$700.00 each. Since 1999, over 13,000 law enforcement agencies have

⁹ Koper, Christopher; Kubu, Bruce; Taylor, Bruce. “Law Enforcement Technology Needs Assessment: Future technologies to address the operational needs of Law Enforcement.” *Police Executive Research Forum in partnership with Lockheed Martin*, March 2009: p66

participated in the program purchasing over 800,000 ballistic vests nationwide.¹⁰ The Department of Justice recognized this problem and has now mandated police agencies to implement a policy requiring the wearing of body armor by uniformed police officers to remain eligible for the Bulletproof Vest Partnership Program. If it has taken 30 years to mandate the wearing of body armor, what will it take to implement technology that could protect officers? The technology is rapidly emerging, but the funding and research directed towards implementing body worn technology is far behind. Focus by Law Enforcement leaders and funding by the National Institute of Justice for more research is required to make our officers safer on the streets of America.

Conclusion

Most of the technologies described are either in the early stages of Law Enforcement use or still remain as emerging inventions in the laboratory. A large amount of public and private funding is still needed to bring most of these concepts to a level of viable use by police officers. As nanotechnologists continue to research and discover ways to manipulate matter on an atomic and molecular scale, other discoveries are emerging that could be adapted into equipment worn by police officers. Though these technologies show great promise, there are some obstacles that must be solved to make smart camera systems, sensors and new ballistic materials a reality.

Further research on emerging technologies in artificial intelligence and nanotechnology could lead law enforcement agencies in a new direction with the future development of body worn equipment. There are the emerging technologies that will be developed over the next decade that could make police officers safer and more effective. How will the public and the

¹⁰ US Department of Justice Attorney General. *Attorney General Launches Law Enforcement Officer Safety Initiative*. March 22, 2011. <http://www.justice.gov/opa/pr/2011/March/11-ag-358.html> (accessed July 2011).

officers themselves accept the potential privacy issues? Will the privacy laws and the Courts be able to keep up with the lightning pace of these inventions? Breakthroughs in these technologies are reachable in the next few years, but will not automatically be adapted for police work unless law enforcement is an active participant.

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