



A Primer on

BODY-WORN CAMERAS FOR LAW ENFORCEMENT

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1.0 Introduction

The field deployment of body-worn camera systems (BWCs) by law enforcement practitioners (e.g., patrol, corrections, SWAT and other tactical responders) offers significant advantages in keeping officers safe, enabling situational awareness and providing evidence for trial. A major issue with the use of BWCs is a lack of technical standards and operational standards for protocols and procedures. Without such standards in place, law enforcement practitioners lack adequate information to select the proper system that meets their requirements. The interoperability between systems and associated software also requires a set of standards. Further, such standards are instrumental in ensuring that evidence gathered from BWCs meets courtroom standards.

To mitigate the lack of procedural or technical standards, the National Institute of Justice (NIJ) Sensor, Surveillance, and Biometric Technologies (SSBT) Center of Excellence (CoE) has prepared a primer to aid in the use of BWCs in law enforcement. This report provides an introduction to BWCs and highlights issues and factors that law enforcement organizations should consider prior to and during implementation. Specific questions addressed include:

- Why use BWCs?
- What are the types of BWCs?
- What are the implementation issues that can be expected with BWCs?

Please reference the Market Survey for an overview of various BWCs currently available, including technical specifics and capabilities (see Appendix A).

For information on agencies currently using BWCs, including example policy and procedure documents, please contact the SSBT CoE at ssbtcoe@mantech.com.

In addition, the U.S. Department of Homeland Security (DHS) System Assessment and Validation for Emergency Responders (SAVER) program has recently concluded an assessment project on Wearable Camera Systems (i.e., BWCs). A detailed Market Survey Report and an Assessment Report involving comparative evaluation of different systems in operational scenarios can be obtained by visiting the Responder Knowledge Base at <https://www.rkb.us/> (SAVER, August 2012).

1.1 About NIJ SSBT CoE

The NIJ SSBT CoE is a center within the National Law Enforcement and Corrections Technology Center (NLECTC) System. The CoE provides scientific and technical support to NIJ's research and development (R&D) efforts. The Center also provides technology assistance, information and support to criminal justice agencies. The Center supports the NIJ Sensor and Surveillance portfolio and the Biometrics portfolio. The Centers of Excellence are the authoritative resource within the NLECTC System for both practitioners and developers in their technology area(s) of focus. The primary role of the Centers of Excellence is to assist in the transition of law enforcement technology from the laboratory into practice by first adopters.





2.0 Why Use Body-Worn Cameras?

Agencies considering the implementation of BWCs can benefit from their use in many areas, but only if implemented correctly. Within this section, we highlight some aspects of why an agency would choose to use BWCs, including judicial process, officer safety, professionalism and use cases.

Judicial Process: The International Association of Chiefs of Police (IACP) has performed studies on camera usage with respect to in-car camera systems. Much of this information can be extrapolated to BWCs. The study measured the impact cameras have had on the judicial process. Done as a collaborative effort with the National District Attorneys Association (NDAA) and the American Prosecutors Research Institute (APRI), the study found that of the prosecutors surveyed, an overwhelming number (91 percent) have used video evidence in court that was captured from an in-car camera. They reported that the presence of video evidence enhances their ability to obtain convictions and increases the number of guilty pleas prior to going to trial. The majority of the prosecutors (58 percent) reported a reduction in the time they actually spent in court, although when video evidence was used, 41 percent of prosecutors reported an increase in their case preparation time (IACP, 2004).

Safety: Officers are frequently assaulted and involved in traffic accidents while on duty. Representative assaults can be seen in a multitude of police shows where video cameras are used. The use of a camera system, whether in-car or body-worn, can deter violence or other negative behavior and help to convict a person who would choose to attack an officer. It may also reveal other information that might not normally be recorded by officers.

Professionalism: The use of cameras has been said to help improve the accountability of police officers as well as reduce the number of complaints of police misconduct. There are numbers of reports where cameras have cleared officers of “wrongdoing” once the video evidence was reviewed, as opposed to only 5 percent of complaint cases being sustained (as studied using in-car camera as the representative system) (IACP, 2004).

Use Cases: There are various types of interactions that officers perform on a daily basis. Generally a person’s first thought is that of a traffic stop. Many of these patrol cars have in-car systems that have been in use for years. These in-car systems are hailed by most of

the officers who use them, but what about the other types of officer interactions performed daily?

The following is a sample list of officer interactions. Obviously, there are many more executed on a daily basis where BWCs could support officers:

- Service calls.
- Primary response (patrol in vehicle).
- Self-initiated public contacts/foot patrol.
- Bicycle/motorcycle patrol.
- Emergency response/first responders.
- Searches (vehicle or site).
- SWAT.
- Corrections.



3.0 What Are the Types of Body-Worn Cameras?

BWCs can be a police officer's small but important technological partner. BWCs are mobile audio and video capture devices that allow officers to record what they see and hear. Devices can be attached to various body areas, including the head, by helmet, glasses or other means, or to the body by pocket, badge or other means of attachment (such as in-car on the dash). They have the capability to record officer interactions that previously could only be captured by in-car or interrogation room camera systems.

There are many specification issues to consider before purchasing a camera system. The system requirements and trade-offs will be dependent on the intended use, budget, unit cost, interoperability, operating environment, etc. A single set of BWC technical requirements does not exist, but is of interest to a wide range of law enforcement agencies. Specifications to consider include:

- Battery life.
- Video quality.
- Recording limits.
- Night recording.
- Camera focal width (need wide point-of-view, or POV).
- Audio recording.
- Camera placement.
- Radio integration capability.

Each of the previously mentioned capabilities can vary greatly depending of the cost and use of the device; however, even expensive BWCs are still a fraction of the cost of in-car systems.

A reasonable set of recommendations for product selection was reported in the DHS SAVER Wearable Camera Systems Focus Group Report (SAVER, 2011). It is reproduced here with permission for reference.

DHS SAVER Focus Group BWC Recommendations	
Product Selection Criteria	Description
VGA Resolution	The resolution should be at least 640 x 480 pixels.
Frame Rate	The frame rate should be at least 25 frames per second.
Battery Runtime	The camera should be able to record continuously for at least 3 hours on a fully charged battery.
Data Storage	The camera's onboard storage, at the lowest video quality settings, should permit at least 3 hours of recording.
Low-light Recording	The camera should have a low lux rating and/or an IR illuminator for recording targets in low-light.
Warranty	System purchase should include, at a minimum, a 1-year warranty.

Units can be mounted in several areas to include around the ear or head, on a helmet or hat, on the lapel, pocket, badge or in many other places. Mounting is a serious item to consider as lapel/chest mounted cameras are always body-facing units, whereas head-mounted units have a view of exactly what the officer is seeing. Considerations on replacing in-car units with BWC units would have to include the mounting of the BWC as a chest-placed unit that would not likely capture the needed data.

Standard cameras are likely to have image quality issues (e.g., fuzzy pictures and poor quality at night) as compared to more high-end cameras due to technical compromises to manage costs. There can also be quality issues with stability. For example, when an officer is running or fighting, the video may be shaky and the camera may not be secure; this again links back to placement of the camera on the officer being extremely important. Some feel that head camera placement allows the head to act as a natural gyroscope to reduce some motion issues seen with cameras. Many vendor websites host sample capture video from systems for potential users to sample.



4.0 What are the Implementation Issues?

There are various issues that need to be considered before investing in a BWC to include federal, state and local privacy issues; policy and procedures; the actual camera system; and proper training.

4.1 When Can I Record?

Federal law blocks the warrantless capturing of photo or video images of people where they have an expectation of privacy, and most states have similar laws. When using BWCs, considerations on whether or not audio recording is allowed during video recording will require specific research prior to purchases or even piloting devices.

The Reporters Committee for Freedom of the Press has published reference information on state consent categories with respect to recordings (RCFP, 2008). For reference, that material is included below.

States that allow single party consent recording of audio (oral) communications			
Arkansas	Louisiana	New York	Tennessee
Colorado	Maine	North Carolina	Texas
Georgia	Minnesota	North Dakota	Utah
Hawaii	Mississippi	Ohio	Vermont
Idaho	Missouri	Oklahoma	Virginia
Indiana	Nebraska	Oregon	West Virginia
Iowa	Nevada	Rhode Island	Wisconsin
Kansas	New Jersey	South Carolina	Wyoming

States that require all parties to consent to recording of audio (oral) communications			
California	Florida	Massachusetts	New Hampshire
Connecticut	Illinois	Michigan	Pennsylvania
Delaware	Maryland	Montana	Washington

NOTE: All legal aspects regarding privacy rights should be researched prior to investing in a camera system. SSBT CoE has not verified the accuracy of the state consent information prepared by RCFP. They are provided here as a starting point and an example to illustrate potential differences between states.

4.2 When to Consider Use

There are various times when the addition of BWCs would make more sense than others. One such example is when an agency is considering augmenting an existing in-car video system. Although current in-car systems record audio of all events, they are extremely limited in their recording of front forward video from the dash of a car. BWCs in this instance can give a full picture of the stop from beginning to end with audio and video. Another opportunity is when existing in-car systems are in need of replacement. Agencies in these cases would have officers already accustomed to using the systems and thus it would be easier to modify their current operations. Depending on the type of unit procured, there would be different considerations. Head-mounted units would not require any in-car additions; however, other chest-mounted BWC systems allow for the device to be removed and mounted on the dash temporarily while driving. Lastly, BWC systems should be considered when funding is limited. In-car systems are several times more expensive than BWCs. That factor could, in itself, lead an agency to deploy BWCs.

4.3 Policies and Procedures

If cameras are to be used, policies and procedures will have to be put in place, or expanded on, to address several legal issues. These issues extend beyond the more obvious privacy and civil liberties protections toward which agencies must be sensitive. For example, a policy would have to address when a camera should be used and when it should be turned on or not turned on to ensure fair treatment of all citizens. Parameters would need to be set for voluntary, compulsory and prohibited use of the camera. Camera video may also be considered a public

record item and a procedure would need to be created for public assessment and information requests. This policy should be in place before any testing or deployment.

The bridge between policy and training lies in the camera's capabilities. Cheaper cameras will require more officer interaction for off-loading data. Cheaper units will also offer more areas for error in use during data capture or during the data extraction. The amount of time required to extract and maintain data versus the cost of a unit should be strongly considered prior to purchase.

4.4 Training

Proper training on policies and equipment is a must. Agencies should ensure that a thorough logistics plan is in place prior to implementation. Training should not only be for use of the BWCs but also for the officer's perceptions of the camera. Officers should understand the primary purpose of cameras is for evidence collection and officer safety. Officers will need to understand that monitoring officer performance and improving public relations also come with the camera use.

One of the most challenging issues an agency may face is officer acceptance. If officers feel that the video cameras are being used as a tool to monitor officer behavior, as several officers felt in the IACP study, they may be resistant to using the cameras (IACP, 2004).

4.5 Data Storage and Management

This leads to one of the more important items for an agency to consider before purchasing BWC units: data storage and retention. Storage issues, such as how long and who has access to the recordings, must also be considered. Furthermore, states have different laws on how long recordings must be stored based on the type of content and how or whether it is used in court. This is one of the most important things for an agency to consider as this can have a significant cost to a department. Not only must the data be protected and backed up regularly, but it must be accessible to all parties involved. Some data needs to be retained forever; other data can be deleted quickly. Crime recordings must be managed by law and through policies. Even video of standard officer interaction may be retained for a default period of time to cover potential performance complaints. Policies should control the period of time this data is maintained. As recordings become more or less important to your agency, adjustments need to be made. The length of storage time can cost numerous man-hours in addition to the actual cost of the storage device. There are services available that provide end-to-end data management of the exact items mentioned above.

Once recordings are made, agencies will have to consider all aspects of storage and handling, including chain-of-custody issues. As mentioned, many BWC units can allow for manipulation of video data by anyone in contact with the device. One of the disadvantages of these BWCs is that the officers may be responsible for uploading video to the agency systems themselves, as opposed to an automated or third-party process. As a result, ensuring that this is done properly becomes an important training issue. More expensive BWCs often have various safeguards to control data handling and thus assist in chain-of-custody control. They can require a party other than the officer to upload the data. These measures can often support chain-of-custody issues.

Once an audio/video recording is admitted as evidence in a court of law, the question of admissibility can be linked to whether an officer can authenticate the audio/video recording as a true and accurate depiction of the events. The defense, in order to prevent incriminating evidence from being presented at trial, may challenge the recording's admissibility based on the chain of custody. The best policy, as with any physical evidence, is to always guard the integrity of the evidence, and ensure policies and procedures maintaining a strict chain-of-custody are followed (IACP, 2004). This would include being sure that recordings include information necessary to be admissible in court. Specifically, time and date stamp/identifiers must be imprinted on the media, either in the video images directly or in the underlying metadata information of the data files. This can be done by using a GPS, if available, or other functions of a camera unit.



5.0 Closing

The use of in-car cameras has proven to be highly beneficial; any agency with high instances of citizen contact and self-initiated calls should strongly consider BWCs to be standard equipment for officers in these units. BWCs have also been a great benefit in resolving complaints and allegations against officers. As in-car cameras are used throughout the country for traffic-related incidents and the video has been proven to hold up in court, BWC video is sure to follow suit.

Agencies should look to neighboring departments for information and prior usage before venturing and deploying on their own. Utilizing a department that has already proceeded and has lessons learned can save a multitude of time and money.

Having policies, procedures, training and feedback mechanisms in place and used prior to even a pilot deployment is exceedingly important. If an agency considers all aspects of deployment, the project will be effective, efficient, and maintain the agency's and officer's integrity.



6.0 References

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- DHS SAVER. June 2011. *Wearable Camera Systems Focus Group Report*. Washington, DC: U.S. Department of Homeland Security. Retrieved September 2012: https://www.rkb.us/saver/SaverDocs.cfm?sort=sortequipment&action=content&content_id=2148#DOCS (restricted access).
- DHS SAVER. August 2012. *Camera Systems, Wearable*. Washington, DC: U.S. Department of Homeland Security. Retrieved September 2012: https://www.rkb.us/SAVER/SaverDocs.cfm?sort=sortequipment&action=content&content_id=2148
- The Reporters Committee for Freedom of the Press. 2008. *Can We Tape?* Arlington, VA: The Reporters Committee for Freedom of the Press. Retrieved September 2012: <http://www.rcfp.org/can-we-tape>.

In addition to the above published documents, the SSBT CoE gathered information on law enforcement use of BWCs at various events through exhibit booth interactions and outreach. Events included:

- NIJ Sensors Technology Working Group Meeting (April 19-20, 2011; Arlington, Va.)
- The Critical Incident Preparedness Conference (Aug. 30-Sept. 1, 2011; National Harbor, Md.)
- NIJ Technology Institute for Law Enforcement (Fall 2011 and Summer 2012; Annapolis, Md.)
- Biometric Consortium Conference (Sept. 27-29, 2011; Tampa, Fla.)
- NIJ Technology Institute for Rural Law Enforcement (Dec. 5-8, 2011; Annapolis, Md.)

Additional supplemental references related to the use of BWCs in law enforcement include:

- DHS SAVER. December 2011. *Wearable Camera Systems Assessment Report*. Retrieved September 2012: https://www.rkb.us/SAVER/SaverDocs.cfm?sort=sortequipment&action=content&content_id=2148 (restricted access.)
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- University of Central Florida. 2011. *Police Technology: An analysis of in-car cameras and body-worn cameras*.
- Office of the Police Ombudsman, City of Spokane (Wash.). *Body-Worn Video & Law Enforcement: An Overview of the Common Concerns Associated With Its Use*. Retrieved September 2012: <http://www.spdombudsman.com/wp-content/uploads/2012/02/Attachment-G-Body-Camera-Report.pdf>

A Appendix- Body-Worn Camera Market Survey

Market Survey of Body Worn Cameras

NIJ SSBTCoE

Potential reasons an agency would consider implementation or expansion to Body Worn Cameras include:

- Less cost compared with in-car units
- Officer's safety/violence against officers
- False accusation protection
- Audio/video of consent to search
- Video collection of evidence for trial/juries
- Professionalism/Perception
- Training as related to the camera use
- Use in all agency units (Traffic, Bike, Patrol, etc)

Model	TASER AXON Flex® www.taser.com	VIEVU PVR-LE2* www.viewu.com	StalkerVUE www.stalkerradar.com/ law_vue.html	Scorpion Micro DV	FirstVu www.digitalallinc.com/ body-camera.html	Wolfcom 3rd Eye www.wolfcomusa.com	MuviView HD Series www.mphindustries.com
Placement/Format	Various	Chest	Chest	Various	Chest	Chest	Various
Max Video Resolution	640x480	640x480	1280x720	640x480	640x480	1920x1080	1080p
Recording Speed	30 fps	30 fps	**	30 fps	30 fps	30 fps	**
Recording Format	MPEG-4	MPEG-4	MPEG-4	MPEG-4	MPEG-4	MPEG-4	MOV
Still Photo Mode	No	No	Yes	Yes	Yes	Yes	Yes
Time/Date Stamp	**	Embedded	**	No	Metadata	Yes	**
Field of View	75°	71°	**	72°	Wide	120°	160°
Night Mode	Low light	Low light	IR Lens	No	IR Lens	IR Lens	Yes
Playback Screen	Via phone	No	Yes	No	Yes	Yes	Yes
Audio/Format	Various	MP2	Yes	Yes	Yes	AAC	Yes
Video Safeguards	Yes	Yes	No	No	Yes	Yes	No
30 sec Pre-Event Record	Yes	No	No	No	Yes	No	No
Event Marking	Yes	No	No	No	Yes	No	No
Recording Life	4 hrs	4 hrs	8 hrs	4 hrs	4 hrs	5 hrs	0.5/3 hrs
Standby	12 hrs	72 hrs	400 hrs	250 hrs	12 hrs	**	**
Charge Time	6 hrs	3 hrs	2 hrs	2 hrs	**	**	3 hrs
Battery Type	**	Li-Ion	Lithium	**	**	**	Li-Ion
Storage	**	4GB	8 or 32GB	8GB	Variable	32GB	4/8 GB
GPS	Via phone	No	No	No	No	Yes	No
Dimensions***	Multiple	3x2.2x.75	3.8x2.5x.8	2.8x.85x.8	2.7x4.3x1	**	3.3x2x.75
Weight	3.8 oz	3.5 oz	10 oz	1.7 oz	**	**	**
Environment Testing	MIL-STD 810F	IPX5	**	**	IP55	IP67, IPX3	**
Warranty	1 yr, 90 days	90 days	1 year	**	**	**	**
Optional Video Software	Yes	Yes	**	**	Yes	**	**
Police Radio Interface	No	**	**	**	**	Yes	No
Vehicle Mountable	**	Yes	**	**	**	Yes	Yes
Approximate Price	\$1,000.00	\$900.00	\$800.00	\$120.00	\$800.00	**	\$119/\$249

* Also sold as CopVU or Coban VIEVU

** Unspecified

*** Dimension in inches

At the time of publication, the Panasonic WVW310 was not available for comparison.

This market survey may not be fully comprehensive and all-inclusive. Many company websites host sample capture video.

What should an agency consider before implementation?

Policy/Training – An agency should develop policies and procedures for cameras, ensure the policies and procedures are in place, and officers are properly trained on the use prior purchase and use. These would outline when the camera can be/are required to be used, what the download requirements are and describe the limitations regarding recorded data.



B Appendix- Acronyms and Abbreviations

Acronym	Description
APRI	American Prosecutors Research Institute
BCC	Biometrics Consortium Conference
BWC	Body-Worn Camera
CoE	Center of Excellence
DHS	Department of Homeland Security
DOJ	Department of Justice
e-IC	Enterprise Integration Center
IACP	International Association of Chiefs of Police
LETI	Technology Institute for Law Enforcement
ManTech	ManTech Advanced Systems International, Inc.
NDAAs	National District Attorneys Association
NIJ	National Institute of Justice
NLECTC	National Law Enforcement and Corrections Technology Center
POV	Point of View
R&D	Research and Development
RCFP	The Reporters Committee for Freedom of the Press
SAVER	System Assessment and Validation for Emergency Responders
SSBT	Sensor, Surveillance, and Biometric Technologies
SWAT	Special Weapons and Tactics
TCIP	Technologies for Critical Incidence Preparedness

