HARVARD EXTENSION SCHOOL

The Wearable Application of the Axon Body 2

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Homework 1

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1. Introduction

Compact and portable officer body worn cameras (BWC) are on the rise in law enforcement agencies across the country. High profile cases such as the ones involving Michael Brown, Daniel Shaver, and Freddie Gray opened up heated dialog nationwide regarding different strategies to increase transparency in law enforcement in the US. In 2015, the Justice Department took the idea a step further and crafted a pilot program for officer BWCs, awarding $23 million in funding to 32 states for body camera technology in an effort to build "trust and transparency between law enforcement and the communities they serve" (Department of Justice Office of Public Affairs, 2016).

Axon, the creator of the famous Taser stun gun, leads the surge in officer BWCs with the Axon Body and Axon Flex product lines. In this paper, we'll take an in depth look at the newest member of the Axon Body wearable camera family; the Axon Body 2 (AB2). We'll study its design, benefits, user experience, and the challenges faced by the AB2 across each of those categories.

1.1 How to approach this paper

It's important to mention that in order realize the power and usefulness of the AB2 it must be integrated with a few other members of the Axon product ecosystem. In fact, the AB2 typically arrives locked into using a law agencies' Evidence.com subscription service account. For this paper, we'll imagine the AB2 being described is fully integrated with the Axon Ecosystem which

includes Evidence.com membership as well as other Axon products such as the Axon Body 2 Dock, Axon Signal Vehicle, and the Axon Signal Sidearm. We'll focus specifically on how the AB2 behaves in this environment and skim the surface details of other products in the Axon Ecosystem.

2. Benefits of the Axon Body 2

2.1 Empowering Officers and the Public

Human memory is fallible and prone to the creation of memory illusions, especially when recalling traumatic events (Knott, 2015). Nevertheless, eye witness testimony has always played a pertinent role in our justice system. With the introduction of smartphones, we're seeing more and more cases where video footage contradicts police reports or testimony from those involved. We're quickly learning that eye witness testimony doesn't necessarily equate to quality evidence, from any source (Samaha, 2017). BWCs promise to provide the most compelling evidence in court; unfettered and unedited audio and video of the actual events as they occurred. With BWCs everyone involved can rest easier knowing their actions, as well as everyone else's, may be presented in court as truly objective evidence. The result is a deterrence for would be offenders, and protection for law enforcement officers and citizens who might otherwise face unfounded accusations of wrongdoing.

2.2 Seamless Integration

The AB2 integrates seamlessly into an officer's daily routine. When paired up with the Axon Signal product line, the AB2 becomes an almost omnipresent camera, activating when hazards are implied from engaging a patrol cars lights or sirens, or drawing a sidearm. An officer can always activate the AB2 manually through active interaction with the large center button. The Axon Signal feature and product line allows the AB2 to be there and recording evidence in the

most intense confrontations where officers are unlikely to have an opportunity to activate their camera manually.

2.3 A Better Approach to Video Evidence Management

When paired with Evidence.com, the AB2 makes managing video evidence in the cloud simple and easy. Once the AB2 is placed into its dock its footage is securely uploaded to Evidence.com where access to the video can be granted to anyone via a secure link. Footage can also be organized and queried by metadata and tag. Transcriptions and redactions can also be performed in Evidence.com, a process that otherwise could have taken hours and required a specialist. Full audit trails of every video are logged, ensuring both a provable chain of custody and that no videos have been tampered with. All of these features lead to more efficient and secure processes for law enforcement agencies, district attorneys, and the court system.

2.4 Operation "Candid Camera"

In 2013, an experiment was conducted by researchers from Cambridge University and The Police Foundation, in conjunction with the Rialto, California police department. The goal was to uncover the effects of officer BWCs on the public. The experiment ran for one year and the findings were summarized as 6 key points in the groups final research presentation (Farrar, 2013).

- Reduction in use-of-force incidents from 61 to 25.
- Of the 25 use-of-force incidents, 17 were control and 8 Experiment.
- Of the 8 use-of-force incidents on the Experiment days, all 8 were recorded on video.
- Reduction in complaints from 24 to 3 or from 0.7 complaints per 1,000 contacts to 0.07 per 1,000 contacts.
- Contacts increased from the previous years - no backfiring effect.
- Survey of all officers before and during RCT shows no changes in officers' self-legitimacy

3. How the Device Works

Axon outlines three distinct environments in their marketing materials; "In the Field", "At the Station", and "For the Court" (Axon Enterprise, Inc., 2018). Although the AB2 provides holistic benefits for many law enforcement agencies in each of these environments, we'll focus only on the procedure behind the AB2 wearable and the wearer in the field. Many other benefits of the AB2 at the station or for the court are a result of interaction with AB2 footage stored on Evidence.com, not interaction with the actual AB2 device itself.

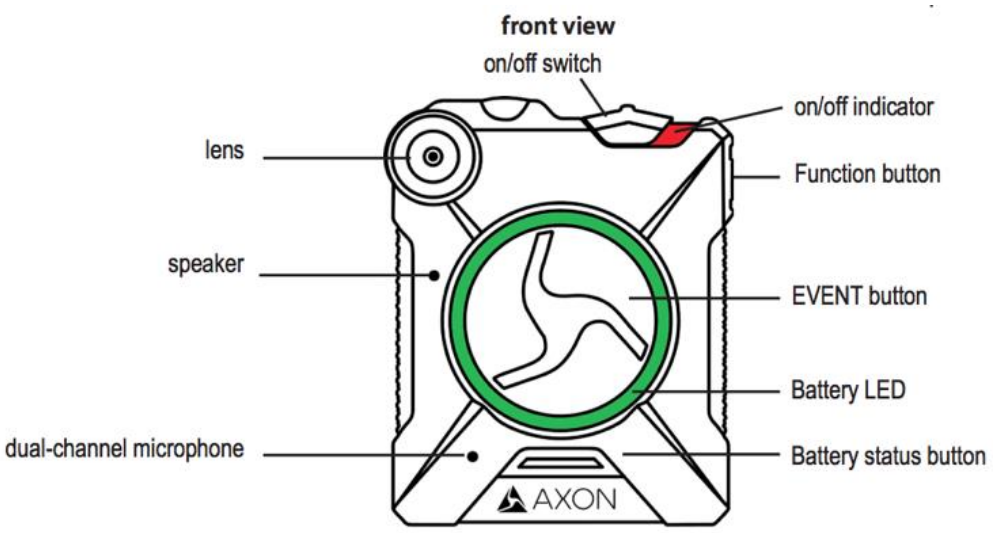
1	**Axon Body Dock**	Charges, syncs, and updates the AB2 for the next shift. **In the Field:** The officer grabs their AB2 unit from their docking station slot prior to starting their shift.
2	**Axon Magnet Mount**	Allows the AB2 to be mounted to a uniform. **In the Field:** The officer slides the magnet under their shirt and attaches the AB2 unit on the outside of the uniform shirt.
3	**Axon View**	Allows for preview of the camera viewing angle. **In the Field:** The officer pairs their AB2 unit with their mobile device, watches the live stream, and adjusts the camera position to their preferred angle.
4	**Axon Signal Vehicle**	Activates the AB2 unit once the patrol car light bar engages. **In the Field:** The officer receives a call to confront a violent individual in a nearby public park. The officer turns on their patrol car's light bar. The AB2 is passively activated using Axon Signal Vehicle and is now recording.
5	**Axon SPPM**	Allows nearby AB2 units to be activated once a Taser is armed. **In the Field:** The officer arrives on site. Foot-patrol Officers with AB2 units are on site but never had an opportunity to activate their AB2 units before engaging with the individual. The arriving officer draws their Taser weapon equipped with an Axon SPPM. All other onsite officers' AB2 units are instantly activated and begin recording. Multiple camera angles and streams are now available for review and as evidence.
6	**Axon View**	Enables on-site review of AB2 footage.

		In the Field: The individual is apprehended but one officer claims to have seen the subject toss evidence during the scuffle. The officer reviews their AB2 footage on mobile, identifying the tossed object and collecting it as evidence.
7	**Axon Body Dock**	Charges, syncs, and updates the AB2 for the next shift. **In the Field:** The officer returns to the station and docks their AB2. Their AB2's footage begins uploading to the cloud immediately. The AB2 will soon be updated, charged, emptied of footage, and ready for another shift.
8	**Evidence.com**	Manages video evidence captured from the AB2 unit. **In the Field:** Prosecutors log into Evidence.com to review footage, from numerous angles and AB2s, of the incident which they'll use to build a case against the accused. Attorneys and other actors may use Evidence.com again to share footage of the incident, transcribe it, redact bystanders identities, or transfer the footage to local storage devices.

4. User Interaction

4.1.1 Interaction Design

The AB2 is a simple, three buttoned device. The EVENT Button is an active interaction control for camera activation and deactivation. Recording on the AB2 is activated by pressing the center button twice and deactivated by pressing and holding the center button (Axon Enterprise, Inc., 2016). There's an available buffer mode, which records continuously and adds the previous 30 seconds to a clip once the AB2s recording feature is activated. The Battery status button triggers the device to illuminate its center ring with a color reflecting the battery level. The Function button is used in pairing the device with mobile smartphones and tablets, muting the device, and adding metadata markers to footage in real time. Interaction required to use the AB2 is entirely up to the wearer and admins discretion. An AB2 fully integrated with Axon Signal devices is fully functional without an officer ever interacting with the AB2 beyond removing it from its dock, mounting it to their uniform, removing it and redocking it at the end of their shift (Axon Enterprise, Inc., 2016).



(Axon Enterprise, Inc., 2018)

4.1.2 Industrial Design

The unique size and shape of the device, along with the oversized center button, creates what our textbook would consider an easily "gropeable" control surface that allows a wearer to quickly and intuitively feel for the center button and activate recording on the device (Sazonov, 2014). The AB2's center button and rugged build and form factor create a BWC well suited for environmentally demanding applications. The AB2 is IP67 water and dust proof, designed to adhere to MIL-STD-810G US Military Standards, and drop tested at 1.8 meters. (Axon Enterprise, Inc., 2018)

AB2s can be mounted on uniforms via clip mount, magnet mount, or MOLLE mount. A common application location of the Axon Body 2 is mid to upper chest in the horizontal center with a magnet mount underneath the shirt (Axon Enterprise, Inc., 2016). In this open location, the AB2 has an ideal viewing angle and, unlike while waist mounted, is far less susceptible to getting caught on something unless a physical altercation takes place.

Durability and reliability in hazardous, active, and hectic conditions are a high propriety design consideration for a device of this sort. A great deal of thought had to be given in terms of ease of use and reliability because the device must work everywhere and officer is likely to go, and the officer must be able to activate it without adverting their attention from the incident at hand.

4.1.3 Service Design

The AB2 service usually starts with a procurement from the officers' agency for an entire Axon Solution. The AB2 wearer may only rarely interact with service components outside of the AB2 hardware, Axon Signal devices, and the Axon Body Dock. However, included in the service are the Axon View mobile app, which an officer may use in the field to review and tag evidentiary video, and the Evidence.com cloud based evidence management tool provided by Axon for a subscription fee. Evidence.com is cloud service enabling the Axon Dock to sync video form the BWC and update the AB2's firmware and agency administered AB2 configurations (ChiefSaccenti, 2013). The service design and purpose of the system doesn't necessarily afford the wearer any privileges to the data collected by their AB2. Once the wearer has reached the end of the user lifecycle, they simply stop using the device and the system administrators decommission the device for that individual according to their agency's policies.

5. The Axon Ecosystem

An ideal implementation of the Axon Body 2 includes integrations with other Axon products. The minimum recommended addition includes the Axon Body 2 Dock as well as a department wide subscription to Evidence.com.

5.1 Axon Body Dock

The Axon Body 2 Dock allows for easy recharging of AB2 cameras and automated syncing of recorded video to Evidence.com. The unit requires a network connection secured behind a firewall and must be configured to work with an agency's Evidence.com account. Officers dock their AB2 in order to recharge the device, securely sync the AB2's footage into Evidence.com, and update their AB2 with the newest firmware and agency's configurations. In order to discourage any tampering or editing of the AB2's footage, the sync process is automated and footage cannot be managed on the dock before its uploaded to the cloud. (Axon Enterprise, Inc., 2018)

5.2 Axon Signal Devices

Axon Signal devices are designed to free officers from having to face the challenge of interacting with their device while in the field. The products aim to "integrate [the Axon Body 2] seamlessly into an [officers] routine, so they don't even notice it's there" (Axon Enterprise, Inc., 2018). From a UX perspective, Signal devices bring the AB2 interaction design from a primarily active interaction experience, to almost entirely passive interaction experience.

5.2.1 Axon Signal Capabilities and Configurations

All Axon Signal devices broadcast a Bluetooth activation signal indiscriminately for 30 seconds to every AB2 within the 30 ft. range of the unit's Bluetooth LE capabilities (Axon Enterprise, Inc., 2017). AB2 cameras must be configured in Evidence.com to accept activation signals

received from the Axon Signal device family (Axon Enterprise, Inc., 2018). By default, they're configured to do nothing.

5.2.2 Axon Signal Vehicle

The Axon Signal Vehicle converts any standard patrol car into a passive control interface for the AB2. The unit must be installed by a qualified automotive electronics technician and connected to one of the patrol cars electronic triggers. Axon recommends triggering the unit on a hazard indicator such as engaging sirens, engaging lights, or simply opening the patrol car door (Axon Enterprise, Inc., 2017).

5.2.3 Axon Signal Performance Power Magazine

The Axon Signal Performance Power Magazine replaces the magazine for an officers Taser X2 or X26P non-lethal Smart Weapon. The unit broadcasts a camera activation signal every time the weapon is armed as well as when the triggers are pulled and when the ARC is activated. (Axon Enterprise, Inc., 2016).

5.2.4 Axon Signal Sidearm

The Axon Signal Sidearm is a simple sensor designed to attach to commonly used duty holsters. The unit broadcasts an activation signal immediately after it detects a draw of the sidearm. It's a fairly simple device, the most notable thing about it is that it requires little maintenance as the internal button battery lasts 1.5 years before it must be replaced (Anthony, 2017).

5.3 Axon's Evidence.com Cloud App

Evidence.com software is an integral part of the AB2's platform. Although you can use Evidence sync to upload AB2 footage locally to a computer, Axon recommends using Evidence.com to take advantage of the cloud applications' scalability, reliability, security, and access control features.

Evidence.com is a cloud-based application that can be logged into anywhere there is internet access and hosts a suite of security features including “CJIS-compliant storage, encryption, multi-factor authentication and real-time threat detection” (Axon Enterprise, Inc., 2018). Additional support for audit trails adds capabilities for ensuring a reviewable and provable chain of custody of evidence. Large agencies are supported by integrations with Active Directory and other various access management and user reporting tools (Axon Enterprise, Inc., 2018).

For reporting and court cases, Evidence.com enables users to order transcriptions right in the web app, guaranteeing a 24-hour turnaround time from a CJIS-compliant partner organization (Axon Enterprise, Inc., 2018). Redacting sensitive images form video is also made easier with Evidence.com’s Redaction Studio suite of redaction tools. With Redaction Studio, a user can quickly redact faces using on screen drawing tools or face and skin detection (Axon Enterprise, Inc., 2018). Numerous document, audio, and image filetypes are also supported for evidence storage, making Evidence.com a cloud resource for the storage and management of any and all digitized evidence.

5.4 Axon View Mobile Application

The Axon View app is a mobile application that connects with the AB2 via Bluetooth. Unlike Axon Signal devices, the Axon View app pairs with a single AB2. After pairing, a user can view and GPS-tag videos currently stored on the connected AB2. Another common use case for the Axon View application is to frame the AB2’s camera shot using the Axon View live streaming feature while mounting the device to a wearers uniform. Video cannot be deleted from an AB2 via the Axon View mobile application (Axon Enterprise, Inc., 2018).

6. Challenges

6.1 Legal & Regulatory Challenges

6.1.1 4th Amendment Considerations

BWCs may pose a threat to 4th Amendment rights which ensure the right to a reasonable expectation of privacy. Many BWC videos involving police entering private homes with or without warrants are subject to public disclosure at request and at cost to the department. Some states like Washington have passed legislation allowing recording of the interior spaces where someone might have a reasonable expectation of privacy. However, the 1999 Supreme Court case Wilson v. Layne determined that bringing a reporter into a home while executing a search warrant could violate 4th Amendment rights unless the reporter is "related to the objective of the authorized intrusion" (Newell, 2016). There are numerous other cases that could be used to support or refute the argument that BWCs infringe on 4th Amendment rights. As departments continue their widespread adoption of BWCs, the role of BWCs and the 4th Amendment will continue to gain spotlight until more specific precedent is set.

6.1.2 Privacy Considerations

Public privacy legislation may challenge the use of the AB2 in public certain states. For example, the use of BWC recording by law enforcement in Alaska requires a warrant even if any or all of the parties involved consent to being recorded. Washington state requires law enforcement officers to advice parties that they are being recorded. Although federal wiretapping and recording law requires only one party to consent (the officer may consent), law enforcement agencies could still face legal issues at the state level in regard to privacy protection in public.

6.2 Cost Challenges & Unions

BWCs also face opposition from Unions and the high costs of adopting BWC systems. Unions are quick to argue that their bargaining rights have been infringed upon when departments adopt

BWC systems policies without the local police union's consideration and input (Boss, 2016). They also argue that BWC systems infringe upon officer's rights to privacy on the job as well as privacy of videos that could be considered part of the officer's performance review (Sisitzky, 2018) (Bruninus, 2016). Of course, costs are another point for friction when it comes to the adoption of BWC systems, with cities such as El Paso refusing to adopt BWCs simply because they cost too much (Perez, 2017).

6.3 Societal Challenges & the Illusion of Accuracy

Police BWCs solve more problems for society than they create. However, BWCs are not entirely without challenge in society. One of the biggest challenges is known to as the 'Illusion of Accuracy.' Many police departments allow officers to review BWC footage while writing their reports. The argument goes that since those reports are evidentiary, this practice is no different than manipulating evidence as reviews of the BWC footage may influence the officers' true recollection of the event (Yu & Bogen, 2017).

In a November 2017 research paper written by The Leadership Conference on Civil and Human Rights reviewed in 2014 incident where BWC footage was used to write police reports in a confrontation with an individual named Mr. Price. The BWC footage corroborated the police reports. However, the police reports also included details from before the body cameras were activated. This gave the illusion that the police reports were accurate when they claimed Mr. Price resisted arrest before cameras were rolling. When footage from a nearby security camera was release, it became clear the officers had lied in the report and that Mr. Price didn't resist arrest. Mr. Price had attempted to surrender and was beaten by the officers. (Yu & Bogen, 2017)

The Illusion of Accuracy might simply be solved by not allowing officers to review the video at all and forcing them to get approval to view the video only after the report is finalized. However,

this would mean the disabling features such as the Axon View mobile app and would make it impossible to review camera footage in time sensitive scenarios similar to the one used in this paper to describe how the AB2 works in the field. One solution may be to have the camera constantly recording and designed so that active interaction is required to stop recording rather than start recording.

6.4 Training & Proper Usage

Training is always a challenge when you change processes deeply ingrained in an agency and its employees. According to PoliceOne.com, in their survey of 160 police officer's, 60 percent of officers found their BWC training to be insufficient (Zercoe, 2017). Improper training of police body cams of any sort may lead to discipline for individual officers who fail to follow guidelines and eventually added costs as agencies ramp up training to account for failures from the first time through. If agencies fail to adequately train officers on how to use their body cams and also fail to remedy the poor training, then the value of body cams is entirely lost once officers inevitably fail time and time again to activate their cameras when needed. The Denver police department dealt with this exact issue in October 2017, eventually having to "boost body camera training after dozens of officers fail to use them" (Phillips, 2017).

6.5 Technical Trust, Security and Protection

Cyber security is also a big consideration and challenge when dealing with officer worn body cameras. In order to receive all the value from any officer worn body camera system you typically have to adopt the entire cloud-based service layer of the product ecosystem too. This adds a nice feature set but also opens up the door for typical cybersecurity vulnerabilities you may see with any other cloud-based service. However, this time the data being secured is far

more sensitive and includes court evidence as well as personally identifiable information of the accused, bystanders, and even witnesses.

There's a level of trust involved in convincing the market that your solution is safe from cyber-attacks. For this, Axon chooses to list their platform's certifications on their website.

Evidence Data Encryption at Rest:

- CJIS Compliant, NSA Suite B 256 bit AES encryption

Data Encryption in Transit:

- FIPS 140-2 validated: Axon Cryptographic Module (cert #2878)
- TLS 1.2 implementation with 256 bit connection, RSA 2048 bit key, Perfect Forward Secrecy

(Axon Enterprise, Inc., 2018)

However, the ultimate test of how secure a platform is can only ever be whether or not cyber attacker ever gains access to the system. To make sure this never happens, Axon's Evidence.com will be fighting a lifelong battle to monitor, secure, and thwart attacks on their cloud service. It's a challenge for which a permanent solution doesn't exist and Axon will have to fight to keep their platform secure for as long as any component of their platform is cloud based.

7. Summary

It's clear that body cameras are the future of policing. They limit liability in situations that could otherwise costs agencies millions of dollars in lawsuits and they also make officers and society more comfortable in interactions with the police. But body cams are not without their drawbacks. Legal and societal issues still need to be addressed to have body cams be the perfect solution for truly transparent policing. Body cameras are still a very new technology and I think with time they'll become a vital part of policing across the world and the Axon Body line of cameras may just lead the way.

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