

CAN SUPERHERO SUITS SAVE POLICE OFFICERS?

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This article is based on research conducted as a part of the CA POST Command College. It 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 planning & action 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. 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.

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).

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Police officer deaths and early retirements due to health reasons can be devastating for families, organizations and communities. The Bureau of Labor Statistics lists law enforcement in the top ten most dangerous jobs in America (Roufa, 2017). In US History, an astounding 20,789 police officers have died in the line of duty at the hands of others, accidents, heart attacks and other work related illnesses (Desjardins, 2016). In 2016 alone, 135 police officers died nationally in the line of duty, a record number of fatalities in five years (Chan, 2017). The bottom line is - law enforcement is the only profession where being murdered and assaulted is an occupational hazard. This reality, and its impact on an officer's health, can lead to premature retirement and even death.

There have been several studies regarding the life expectancy of police officers as compared to the general public; the results are not positive for police officers. A study of Buffalo New York police officers in 2013 showed the life expectancy of white male police officers is shorter by 21.9 years than the white male general population life expectancy (Violanti, 2013). Can anything be done to change this? What if altering what officers wear for each shift was the answer? What if the uniform distinguishing them as members of law enforcement was also their first line of defense?

Is there a technological revolution in clothing?

The police uniform has been in existence since the first police force in London was established in 1829 and has not changed much since (Johnson, 2017). What if professionals from technology, apparel, and health combined forces to create a suit to protect police officers? Imagine a superhero suit. A suit that could administer life-saving first aid such as compressing a

bleeding wound, delivering medicine, controlling temperature to prevent shock and improve comfort. Imagine a suite that could broadcast an “officer down” message to get help and communicate the officer’s location.

People want to be healthier and live in healthier areas and sensors are going to help them achieve this. For example, a company is working on wearable sensors that can detect how much pollution you are inhaling. Data will allow the mapping of polluted locations for people to stay away from them (Laskow, 2015). The popularity of Fitbits, Apple watches and other health tracking devices has demonstrated a large interest in people wanting to track their health and fitness. Those on this track believe the use of wearable technology will make them healthier.

According to a study in 2014, seventy one percent of the people who use wearable technology with biometric sensors believe they are healthier because of them (Majumdar, 2014). In addition, 54% of Americans believed wearable technology has improved their self-confidence (Majumdar, 2014). Studies are starting to show there is evidence to support this feeling. As wearable health monitors gain in popularity, the ways people can wear them are also evolving. The next leap in wearable tech are smart fabrics.

Smart fabric is taking the tracking of one’s health and fitness to a higher and more personal level. Smart fabrics have several names such as electronic textiles or also known as smart garments, smart clothing and smart textiles. Essentially, they are fabrics that have a technology embedded into them that provide added value to the wearer (Gaddis, 2014). Researchers at the University of California at Berkeley determined biometric clothing can improve the health and safety of the wearers (Hanuska, 2017). This interest and advancements in wearable technology has created a market niche and boom for smart apparel. According to the Researchers at UC Berkeley it is predicted in 2019 the global market size of smart clothing will

be \$2.2 Trillion compared to \$520 Billion for smartphones (Hanuska, 2017). According to the International Data Corporation's Worldwide Quarterly Wearable Device Tracker report, it is predicted that smart clothing will lead the wearable technology market and it will grow by 76.1% by 2021 (Lamkin, 2017). North America already leads the world in global smart fabric due to its large technology sector (Ghughe, 2017). With this boom in the smart apparel sector, could it lead to the making of a super hero suit that could save police officer's lives?

Do we have the technology now to make a superhero suit?

With the advancements of using technology in clothing, companies are able to do things that seem to be straight from the Super hero movies and comic books. They are able to track and record the biometrics and vitals of the wearer and have made significant advancements. Some researchers working on wearable electronics have reached a significant milestone. They are able to embroider circuits into fabric with 0.1 mm precision -- the perfect size to integrate electronic components such as sensors and computer memory devices into clothing (Kiourti, 2016).

"Clothing is by far the most interesting way to get information from the human body," said Jesse Jur, a textile researcher at North Carolina State University Raleigh whose lab has already created iron-on electronics for garments (Gammon, 2017). Jur says, "Sure, we already have patches and wristbands, but what is different about a garment is you have access to a much larger surface area against your skin. In addition, you can make your electronics invisible." They created a tight shirt that monitored heart performance and sent the data wirelessly to a smartphone. Monitoring stress levels and efficiencies for police officers or soldiers could be really useful. Jur addressed public safety specifically, noting that, "Cardiovascular disease is one of the leading causes of death for fire fighters and police officers." Those applications could be

an interesting stepping stone to broader applications for everyone, he said (Gammon, 2017). Once an issue is identified in an overly-stressed officer, an alert would be sent to a contracted health professional to evaluate and refer the officer to a doctor.

Other researchers reported smart textiles are even able to transport the data via cellular to others who can monitor or respond from remote locations. This technological breakthrough clears a path for a host of new developments for the police (Gorgutsa, 2014). In addition, researchers have developed a lightweight, portable nano-fiber that could one day be used to dress wounds on a battlefield. These can create sterile bandages that could be applied directly to a wound (Harvard, 2017), an advancement that would have obvious benefit to police officers injured in the streets.

The development of a biometric smart suit could positively impact this. By enabling proactive personal health management and continuous monitoring of health conditions, healthcare professionals can predetermine needed care for their patients (Imahara, 2016). The use of smart apparel that has GPS, bullet wound detection, blood pressure measuring and other biometrics could help to save an officer's life. Monitoring by dispatch or other health professionals could keep officers safer in the field (Jontz, 2016). In addition, there could also be some creature comfort benefits. For example, researchers in Finland are currently working on the development of smart fabric that can be used for heating or air conditioning the body. The fabric can also be used to dispense small fluids like perfumes or medicines (Technical Research Center of Finland, 2015).

Some companies see the financial potential combining fitness and smart fabrics and are ahead of the curve. The Levi Company and Google are working on Project Jacquard to incorporate smart fabrics into clothes, specifically a jacket (Arthur, 2016). According to Arthur,

the new thread and sensors can monitor biometrics and respond to touch creating interactive surfaces on the clothing (Arthur, 2016). In addition, Montreal-based OMsignal, unveiled its biometric shirts for men in November with plans for a women's line in the works (Basich, 2015). Available in short-sleeve, long-sleeve, and sleeveless versions, these compression shirts cost around \$200 each and come with a small black box that snaps onto the shirt to relay information such as heart rate and breathing to a smartphone (Basich, 2015).

What are some other challenges of a smart suit?

Some significant challenges for a superhero suit to overcome if it's to be accepted by police and the public are privacy and financial concerns. Police officers will be concerned about the privacy of the data, the safety of the smart suit and the reliability of the results. During a panel discussion on this topic on December 13, 2017, at the Walnut Creek Police Department, Detective William Jeha asked, "How will you keep the data private? What if someone hacks into the suit and is able to get my personal health data? What if they then used it criminally?" In addition, he added others may consider the collection of data as an invasion of privacy, the unlawful sharing of the information and who really owns the data. For example, wearable technology data became a huge privacy issue between Nike and Michigan football players. Nike was able to gather numerous amounts of data on individual players and there are no laws protecting the player. Attorneys are now getting involved (Tracy, 2016).

Speaking to a 9 year veteran Walnut Creek Police Officer, Thomas Brown (personal communication, May 4, 2018) said, "I think it would be beneficial and I would wear one if it was comfortable; light weight and breathable and didn't restrict my movement." In another interview, a Walnut Creek Police Sergeant, Andrew Brown said he would be concerned with the privacy of

the data and whether an organization would use it to restrict an officer's promotional ability or worse yet move to terminate an officer whose health is subpar based on the information from the smart suits. He also believed his officers would be even more suspicious of big brother watching them. However, he said personally he would wear one if his privacy concerns were addressed (A. Brown, personal communication, May 4, 2018).

There is little evidence in the research, though, that police departments, health professionals or smart fabric companies are close to developing a biometric smart fabric suit for police officers. Law enforcement tends to be behind the curve in research and development as many law enforcement agencies do not have a research and development budget to help create a lifesaving suit. If the idea is pushed, however, there is a possibility a superhero suit could arrive sooner.

There is some hope in the financial arena. The Department of Homeland Security has set up a \$750,000 grant program for companies to develop smart apparel for law enforcement (Basich, 2015). In addition, the US Department of Defense partnered with Massachusetts Institute of Technology and 89 other universities, manufacturers and non-profits to start a nonprofit research and development consortium, called the Advanced Functional Fabrics of America Alliance, with almost \$400 million dollars in funding (Akerman, 2016). The consortium brings together nontraditional partners to integrate fibers and yarns with integrated circuits, LEDs and solar cells, for example. This would create functioning fabrics that could hear, see, sense, communicate, store energy, regulate temperature, monitor health and change color (Akerman, 2016).

Some next steps to make a superhero suit a reality would be to encourage departments to take a look at these life-saving technologies, provide local grants and partner with the retirement

systems to share costs. The cost of a supersuit development would be outweighed by the financial blow of early retirement, costs of recruitment and training, and death. Next address the data and privacy concerns. Police managers will have to tackle the security of the data, getting the buy in of the officers and who and how the data will be used. Walnut Creek Police Department Captain, William J. Hill (personal communication, May 4, 2018) suggested police departments could put technology securities, policies and procedures in place that would help to protect the officer's data from being hacked or for being used in a negative way. He also said police organizations would really have to do a robust "buy in" campaign so officers would see these smart suits as a benefit for them.

Conclusion

The research is showing we can do a better job with preparing, maintaining and improving officer's short-term and long-term health with the use of technology. The smart suit alone could also identify an early health issue that could possibly be corrected before it's too late. The research shows the technology is just starting to be developed but it has a way to go. Police departments and law enforcement as a whole will need to invest in these smart systems to continue on this trend to keep their officers' healthier day in and day out for their entire career. Police departments should actively work with smart fabric clothing companies, health providers and other developers to be on the forefront of this new technology. If law enforcement is intertwined with the development of this smart suit technology it will provide for large groups to test the technologies and have a say in its development. It will allow law enforcement agencies to steer the companies into developing lifesaving uniforms at a quicker pace and in essence save more lives sooner. Improved funding for research and development in smart suits and other wearable health technology can improve officer's health and career longevity.

Some small first steps could be police department's partnering with their agencies wellness programs, current health care providers and the hospitals in an effort to start a pilot program where officers receive a wearable technology. This would allow for the monitoring, education and acceptance of such a program. It could also enhance police departments officer wellness programs.

With a superhero suit, the flagged draped coffins, bag pipes and twenty one gun salutes just maybe silenced a little longer for these modern day superheroes.

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