

**The Bill Blackwood
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**The Effectiveness of Small Unmanned Aerial Systems
When Used in Law Enforcement**

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ABSTRACT

The most common goal in a law enforcement agency is to safely do their job in an efficient manner. Law enforcement agencies today are faced with dangerous situations in dangerous environments. Law enforcement agencies should implement a well regulated small unmanned aerial systems (sUAS's) program to assist with critical incidents. sUAS's can be used in search and rescue missions as an eye in the sky and can help locate victims in areas not safely accessible by officers on the ground (Lee, 2016). The sUAS's are also being utilized to photograph and document motor vehicle crash scenes and crime scenes, along with their use of 3 dimensional (3D) software used for mapping (Lehmann, n.d.).

sUAS's used by law enforcement agencies are much more cost effective than that of manned air craft. The cost of a sUAS's is well under \$50,000. The sUAS's can also be deployed much faster than manned aircraft. This cost is well under the estimated cost of a manned aviation unit both in startup and in maintaining the unit (Rudisil, 2016). It is estimated that 1.6 million privately owned drones were sold in the U.S. in 2015 for hobby use (Martinez, 2016). Law enforcement could take advantage of this very well-funded and technology advanced industry. When implementing an sUAS program, the public needs to be engaged and educated on the policies concerning the use of the sUAS and address any public concerns.

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INTRODUCTION

There is a large number of privately owned and operated drones in communities, and the number is only going to increase. It is estimated that 1.6 million privately owned unmanned aerial vehicles were sold in the U.S. in 2015 for hobby use (Martinez, 2016). The small unmanned aerial systems (sUAS's) used in law enforcement refer to the aircraft itself and the support equipment that is used in the operation of the aircraft and mission. The support equipment can include data links, communications, control station, telemetry, and the controller (McBride, 2016).

sUAS's are currently being used by criminal organizations to deliver contraband; in 2015, an unmanned aerial vehicle was used to drop 28 pounds of heroin on the U.S. Mexico border close to Calexico. Additionally, private companies with the appropriate licensing are using sUAS's for mapping (Martinez, 2016). The use of unmanned aerial vehicles in biodiversity conservation is also rapidly increasing (Sandbrook, 2015). The United States Air Force has been using unmanned aerial vehicles for surveillance in combat missions since the 1960's. With the advancement in electronic systems and computers in the 1980's and 1990's, it has made modern day drones possible (Rudisil, 2016).

Law enforcement can take advantage of the fast growing market and more technologically advanced sUAS's already being used today by a wide variety of people and industries. An aviation unit is a highly effective but is a costly asset that any law enforcement agency could benefit from. sUAS's are a cost effective and very practical alternative to having a full size aviation unit. The first aviation unit was started in the New York City Police Department (NYPD) in the 1930's with biplanes. Then NYPD

introduced helicopters in 1948 (Shinnamon, 2012). Although the use of the sUAS's or unmanned aerial vehicles is highly regulated, it is possible for a law enforcement agency to get the proper authorization from the Federal Aviation Administration. (FAA)

The FAA is the governing body that is responsible for the airspace, safety, and aircraft that operate in the United States. Prior to 2015, the FAA prohibited the use of unmanned aircraft for commercial use. In 2012, because of pressure from commercial and private parties, congress passed the FAA Modernization and Reform Act of 2012. This made the process to legally operate an unmanned aircraft much more attainable for the average person. The average citizen using an unmanned aerial vehicle as a hobbyist does not require federal authorization. However, a law enforcement agency must apply for and receive a Certificate of Waiver and Authorization (COA) with the FAA when using the same unmanned aerial vehicle. This allows law enforcement agencies to operate the sUAS's under certain conditions (Boreliti, 2017). Now, everyone must register any unmanned aerial vehicle with the FAA if it weighs between .55 pounds and 55 pounds. The unmanned aerial vehicle cannot weigh more than 55 pounds, and it cannot be used commercially. The unmanned aircraft must be operated at less than 400 feet, the operator must have a visual line of sight of the unmanned aerial vehicle, and they must operate during daylight hours. The unmanned aerial vehicle also has several areas, such as major sporting events and populated areas, that it cannot operate near (McBride, 2016).

There are many uses for sUAS's in a law enforcement agency such as search and rescue or surveying a disaster area such as areas affected by flooding just to name a few (Boreliti, 2017). They can increase the effectiveness of an agency and are a force

multiplier. The sUAS's require much less training than conventional fixed wing or rotary aircraft require. sUAS's, when utilizing high powered cameras and sophisticated thermal imaging cameras, are a useful tool that can give law enforcement a bird's eye view that a small or medium law enforcement agency with budgetary constraints could not normally afford. The sUAS's can do all of this while the operator, observer, and, other officers are on the ground out of harm's way. The sUAS's can also be stored in the back of a patrol vehicle and with proper training only take a few minutes to deploy. The sUAS's gives live feedback to the operator or observer on the ground VIA a digital link (Marks, 2017). Law enforcement agencies should implement a sUAS program to assist, and safeguard the officers on the ground in various missions.

POSITION

The most common goal in any law enforcement agency is for the agency to safely do their job in a fast efficient manner. Law enforcement agencies today are sometimes faced with dangerous situations in unpredictable environments. The circumstances surrounding each incident are never the same, but with use of sUAS's, it can make these tasks more efficient and less risky. The Federal Bureau of Investigation (FBI) has spent more than \$3 million on sUAS's since 2006 and has been using them in supporting its law enforcement operations. From 2006 to 2015, the FBI reported it used sUAS's as many as ten times in real world missions. These missions included search and rescue missions, surveillance, and in narcotic investigations. The sUAS's were also used in a standoff with Jimmy Lee Dykes in Alabama. Dykes held a 5-year-old boy hostage in an underground bunker and Dykes was killed in the standoff. The standoff lasted six days. In addition to the FBI, the Bureau of Alcohol, Tobacco, Firearms and

Explosives, as of February 2015, has invested approximately \$600,000 in the use of sUAS's, and the U.S. Marshal service have followed suit with their own purchase spending \$75,000 on sUAS's (Yost, 2013).

The first time a drone was used in local law enforcement in the U.S. to effect an arrest of a U.S. citizen was on June 23, 2011, in Nelson County, North Dakota. Sherriff Janke was conducting a search of a farm attempting to locate six cows that had been previously stolen. He had to retreat when confronted by three armed men. The three armed men then fled into a 3,000-acre piece of land in eastern North Dakota. Sherriff Janke called for assistance from local surrounding law enforcement agencies. Sheriff Janke also called for the assistance of the U.S. Customs and Border Protection (CBP). CBP had 2 Predator B unarmed Drones at Grand Forks Airbase. CBP used these drones in their everyday mission searching for smugglers and illegal immigrants. The suspects where located unarmed the next morning by the Predator B drones (Bennett, 2011).

The drones used in 2011 were much different than the small unmanned aerial vehicles used in law enforcement today. The sUAS's used by law enforcement today are smaller than the large drones used by the Justice Department and do not stay airborne as long. Although different, the premise is still the same and there are numerous missions other than just searching for a suspect on a large open area sUAS's can be used for in a law enforcement agency. The sUAS's are a much needed and valuable asset in multiple situations.

One of the many uses of the sUAS's is in the gathering of real-time intelligence at a hostage scenario. With the advent of more technologically-advanced sUAS's with

better sensing equipment and miniaturization of the platforms, the gathering of real-time intelligence from the scene could give the hostage crisis team a never seen before advantage. Being able to do all of this from a vantage point not normally accessible to a hostage crisis team all while remaining covert is a clear advantage (Donohue, 2016).

sUAS's can be used in search and rescue missions, as an eye in the sky, to help locate victims in areas not easily or safely accessible by officers (Lee, 2016). These sUAS's can also be deployed much faster than getting the authorization to call in a manned aircraft. Although sUAS's have a limited payload, they can be used to deliver first aid and lifesaving medical supplies in natural disaster areas.

Tactical teams could also benefit from the use of sUAS's to scout out locations prior to the execution of high risk search warrants. Prior to executing a search warrant, the common practice in law enforcement is to conduct a "slow roll" past the target location prior to the operation. This is done by driving past the location and utilizing a video camera or from memory, the police officer or agent will gather intelligence about the target location. This is to get a good description of the location, look for cameras used by the suspect, look for additional suspects, environmental concerns, any safety concerns, and to check for the best avenue of approach for the tactical team. Using a sUAS's to do this task would reduce the risk of the suspect observing the officer or the agent gathering this information and compromising the safety and integrity of the mission. It would also provide high-definition pictures and video of the target location and a real time aerial view the, "slow roll" could not provide. The sUAS also could be used to provide live high definition video via a secure data link to incident commanders as the tactical team executes the search warrant.

The sUAS's are now being utilized to photograph and document motor vehicle crash scenes and crime scenes. With the use of 3 dimensional (3D) software used for mapping, sUAS's are creating 3D maps with great detail of the scene. The Royal Canadian Mounted Police are currently using PIX4D software. Having the sUAS's already on scene in the back of a vehicle is much more practical than utilizing a large fire truck ladder or using a manned aircraft to photograph the scene. It is also less intrusive than the use of manned aircraft (Lehmann, n.d.).

In more dangerous but less frequent occurrences, law enforcement agencies encounter explosive devices or chemical weapons. The sUAS's could ensure the law enforcement officers stay far out of harm's way while getting a closer look at the threat. They could also use the sUAS's to conduct a systematic search of the area ensuring no other devices or suspects were present. sUAS's not only have the ability to be remotely piloted, they can also be flown with the use of on-board GPS, being programmed to fly a very specific path or pattern. This enables them to conduct a very-thorough grid search, and, again, this makes the sUAS's very efficient at fugitive recovery (Lehmann, n.d.).

While there are many uses for the sUAS's, there are also just as many configurations, it can be equipped with various types of high definition cameras, sensors, and thermal imaging. There are only two types of aircraft configurations: fixed wing, and vertical takeoff and landing (VTOL). The configurations are dependent on the missions and the individual agency's plan for the use of the sUAS's.

The fixed wing aircraft is best used to conduct systematic searches of large areas and it can stay airborne for several hours. The fixed wing aircraft also needs an open area to take off and must stay moving forward to remain airborne. The VTOL

aircraft does not need as much space to take off and can stay airborne in a hover. The VLTOR aircraft also has more control during takeoff and landings. Because of hovering and more control, the VTOL aircraft requires more power. The most common VTOL aircraft have a flight time between 20 and 30 minutes. The VTOL aircraft is also easier to operate than the fixed wing aircraft. In law enforcement agencies, the tendency is to gravitate towards the VTOR aircraft because of the ease of use and are more versatile, although both types of aircraft are useful (Marks, 2017).

While the versatility of an aviation unit is clear, the main concern with a manned aviation unit is cost. The startup cost of a manned aviation unit is complex. The initial cost of the aircraft is well over \$100,000 for one manned helicopter. Then, the agency must house the aircraft, conduct aircraft maintenance. Insurance is also a major consideration with manned aircraft. The cost to fly a helicopter is between \$600 and \$650 an hour and the responsibility is sometimes shared over several agencies. This means if an agency needs the helicopter, it might not be available because of other missions in another area. Drones used in recreation are less-expensive than the sUAS's used by law enforcement agencies. The cost of a sUAS's is under \$50,000 with an estimated operational cost of \$25 an hour. The sUAS's can also be housed in the trunk of a car and have no high fuel cost. This cost is well under the estimated cost of a manned aviation unit both in startup and in maintaining the unit (Rudisil, 2016). This is around the same cost of a fully-outfitted police cruiser.

COUNTER ARGUMENTS

There are some who may argue that drones are an autonomous killing machine that is equipped with bombs and missiles. On October 7, 2001, just a little less than a

month after the terror attacks on the Twin Towers in New York City (9/11), the Central Intelligence Agency (CIA) conducted the first weaponized drone strike by the United States. The CIA was tracking the Taliban Supreme Commander Mullah Mohammed Omar while he was traveling in a convoy of vehicles through the city of Kandahar, Afghanistan. The convoy stopped and Omar exited his vehicle and entered another building complex. Instead of waiting for a manned aircraft strike of F-16 fighter jets just 20 miles away, someone at U.S. Central Command (CENTCOM), or the CIA decided to use the Predator drone to conduct a missile strike. The drone targeted the vehicles in front of the complex and not the complex itself killing several bodyguards; Omar escaped in the confusion. The drone strike was considered a failure but is forever remembered as the first drone strike in U.S. History. The Predator drone tailfin number 3034 is now hanging in the Smithsonian Air and Space Museum in Washington, D.C. (Woods, 2015).

Although this mission was considered a failure, the use of weaponized drones was plentiful and successful in the war on terror after 2001 and highly publicized on the evening news (Woods, 2015). Because of this highly publicized war on terror, the use of domestic drones or sUAS's is sometimes misunderstood and confused with weaponized aircraft. One example of these public misconceptions associated with law enforcement use of sUAS's was on March, 2014, in Ontario, Canada. A group was protesting and when the local law enforcement agency used a sUAS's to monitor the situation. A picture of the aircraft was posted online and it was publicly debated over the ethics, surveillance practices, and use of drones by law enforcement on social media. This

highlighted the public mistrust and misunderstandings of drones (Saulnier & Thompson, 2016).

These misconceptions lead the public to believe local law enforcement is militarizing. These kinds of public misconception should be directly addressed. The community stakeholders, as a whole, need to be educated about the use and the realities of sUAS's. The many uses of drones, such as search and rescue missions, wanted person searches, and photographing crime scenes should all be discussed. Some of the more-tactical and sensitive uses should not be discussed. Also, the use of words such as "surveillance" and "gathering intelligence" should be avoided. The media is a critical tool when reaching the public. The law enforcement agency could conduct a demonstration for the public and media of the new equipment and answer questions (Shinnamon, 2012).

Another issue associated with the law enforcement use of sUAS's is public trust. The public believes the sUAS's will be used for illegal searches. In San Diego, California, a panel of community members was convened in 2015 regarding the law enforcement use of sUAS's. They voiced the above concerns and believed laws needed to be put in place regulating law enforcements use of sUAS's (Martinez, 2016).

However, the protection of unreasonable searches of someone's person or property has been protected by the Fourth Amendment since 1791 and has been challenged several times since. Although the use of sUAS's is a relatively new idea, the use of aircraft for surveillance has been around since the advent of manned aircraft. There are several U.S. Supreme Court cases involving manned aircraft, the need for a search warrant, and the use of since enhancing equipment. In 1986, the Santa Clara

Police Department in California was working on a tip they received and used a private airplane to observe marijuana growing in the suspect's backyard. The backyard was fenced in and the officers could not see anything from ground level. The information was used to obtain a search warrant and the marijuana was taken and the suspect, Ciraolo, was arrested. Ciraolo was convicted and he appealed. The Supreme Court upheld the guilty verdict. The Supreme Court ruled the backyard was considered the curtilage of the home and he had no expectation of privacy from the aerial view (*California v. Ciraolo*, 1986).

The U.S. Supreme Court had to decide another case in 1989 involving a marijuana arrest. This time the aircraft was a helicopter. The officers from a Florida county sheriff's department flew at a height of 400 feet above the suspect's property. The marijuana was located in a greenhouse and observed through the open sides and the roof. The officers obtained a search warrant and arrested the suspect and confiscated the marijuana. The evidence was suppressed by the trial court and the U.S. Supreme Court reversed the trial court's decision. The U.S. Supreme Court cited the suspect, Riley, could not have had a reasonable expectation to privacy and the fact that a helicopter was used was irrelevant (*Florida v. Riley*, 1989). These two U.S. Supreme Court cases uphold the right for law enforcement, while in public airspace, to view criminal activity on private property.

There is a case from 2001 that involved the use of thermal cameras. Law enforcement officers in Oregon used a thermal camera to detect a high amount of heat on the roof of an individual's home. The information was used to obtain a search warrant to search the person's home. A marijuana grow operation was located and the

suspect was arrested. The suspect, Danny Lee Kyllo, pled guilty, then, appeared to the U.S. Court of Appeals for the Ninth Circuit. The court found in favor of Kyllo determining the use of sense enhancing equipment was considered a search of Kyllo's home thus an unreasonable search (*Kyllo v. U.S.*, 2001). With these cases in mind, law enforcement agencies can reduce the risk of improper use with the implantation of well-thought out policy and procedures.

RECOMMENDATION

The current direction society is heading regarding the use of sUAS's for law enforcements everyday operations will be more prevalent as unpredictable incidents continue to increase. A sUAS can redefine the tactical standpoint that law enforcement agencies have used for several years, making it safer for multiple tactical missions. It would be cost effective for a law enforcement agency to incorporate a sUAS's into their department.

For a law enforcement agency to incorporate a sUAS's into their fleet could alleviate other costly resources. For under \$50,000, this could free up additional officers for other critical incidents and use the one manned sUAS's unit during search and rescues missions or natural disasters. Technology has advanced in the last few years and has increased making this possible and obtainable by many small to medium law enforcement agencies. For the purchase of the sUAS, a whole new world would open up where they are not relying on neighboring agencies or resources.

To prevent the misuse of sUAS's, the law enforcement agency needs to create a complete policy and procedure governing the use of the sUAS's. The agency needs to do its due diligence in the research and implement policy and procedures prior to

purchasing the sUAS's. The policy and procedures need to regulate the training, use, and who can authorize the use of the sUAS's, just to name a few key points. The policy and procedures need to be in compliance with the current case law in regards to manned aircraft and technology.

As sUAS's become more prevalent in everyday law enforcement practices, education will need to be established for the general public. With public perception sometimes being seen in a negative light, educating the public on the rules and regulations will help bridging the gap of negative perception. Establishing and possibly distributing the policies and procedures that a department will need to follow can help show the general public that the use of a sUAS's is a valuable tool for critical incidents. By doing this, a law enforcement agency can build rapport with the potential citizens and stakeholders who have concerns about the possible misuse of the equipment. This will also educate the public about the misconception that law enforcement agencies are using militarized drones. Law enforcement agencies should implement a well-thought out sUAS's program to assist with critical incidents.

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