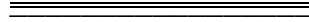
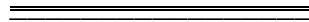


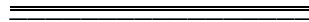
**The Bill Blackwood
Law Enforcement Management Institute of Texas**



Small Unmanned Aircraft Systems



**A Leadership White Paper
Submitted in Partial Fulfillment
Required for Graduation from the
Leadership Command College**



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ABSTRACT

Small Unmanned Aircraft Systems (sUAS) are relevant to contemporary law enforcement because they present a rare prospect for all law enforcement agencies to have access to invaluable aviation assets that are becoming integral for law enforcement to successfully perform their mission. The position of the researcher is that sUAS' should have a role in U.S. law enforcement because they are user friendly, they improve community and police safety, and they provide economical alternatives to traditional airborne law enforcement services. The types of information used to support the researcher's position are a review of aviation industry periodicals, internet sites, articles, reports published by the Federal Bureau of Investigation, the Federal Aviation Administration, and the Airborne Law Enforcement Association. The conclusion drawn from this position paper is that there is no law enforcement tool that can do it all. The implementation of sUAS in U.S. law enforcement should have a role in assisting them in meeting their goals and objectives because technology has made sUASs user friendly, sUAS deployment will enhance concrete and perceived safety issues of the community and police, and the sUAS platform offers many law enforcement agencies access to the proven benefits of aviation assets that would normally be beyond their financial means.

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INTRODUCTION

Any town, USA police department receives a 911 call from a frantic mother who reports that her four year old daughter is missing. The child was last seen approximately 45 minutes ago, playing in the backyard. The first officer on scene meets with the mother and learns that the child may have walked off into a wooded area. It is late in the evening, and the sun is quickly falling as darkness takes the place of daylight. A supervisor was also dispatched to the call for service, and upon her arrival, she meets with the first officer and gets a situational report on the incident. Although foul play is not suspected, the overall life safety of the child is feared by all.

The supervisor learns that the child has possibly wandered off into the wooded area and returns to her vehicle. Other resources are being summoned to the location to help begin searching for the child, but their arrival is at least one to two hours away. The supervisor retrieves a Wasp, a small unmanned aerial system, from the trunk of her vehicle and launches the vehicle to begin searching for the lost child. The colored camera video is losing discrimination capability due to the darkness. The supervisor transitions the camera image to thermal imaging and continues searching. The supervisor quickly discovers an image of a small child on the camera and places the Wasp in automatic hover mode. The location of the Wasp is transmitted back to the supervisor via Global Positioning Satellites, and the supervisor learns the child is about a half a mile away and appears to be lying on the ground. Officers are directed to the child's location, and she is a little shaken up and scared, but uninjured. The child is returned to the frantic mother, search parties are cancelled, and all ends well. This is not fiction, but reality, and the application of Small Unmanned Aerial Systems (sUAS) is

endless in law enforcement. The technology and concepts of small unmanned aerial systems have flourished with the continued development of micro and nano technology.

Traditional law enforcement aviation units, including fixed winged and rotor aircraft, have consistently demonstrated their invaluable contributions and are used in a variety of roles. Today, “there are approximately 800 U.S. law enforcement agencies flying aircrafts” (Solosky, 2009, p. 39). Looking at this statistic from another point of view presents this data in a completely different light. According to the FBI (Federal Bureau of Investigation, n.d.), there are approximately 17,000 law enforcement agencies in the United States. This means that less than 5% of law enforcement agencies have an aviation unit. Aviation support has become a vital and invaluable aspect of law enforcement. However, it requires a funding source that continues to absorb a large portion of budgets. Many leaders of law enforcement agencies are challenged to provide their citizens with police services that are innovative and demonstrate fiduciary responsibility.

Law enforcement personnel should be provided with tools that can effectively assist them in mitigating incidents that include, but are not limited to, vehicle and foot pursuits, traffic jams, missing persons, security for mega events, and the collection of aerial photos for evidentiary purposes. The list of benefits of police aviation units is well documented, but the one big substantial deterrent is the cost. The latest technology in aviation that supports this role is the development of the Small Unmanned Aircraft System (sUAS). The sUAS is capable of providing many of the same benefits of traditional aviation units but at a substantially lower cost.

Utilization of a sUAS in civilian law enforcement is a viable solution for independent or supplemental aviation support. sUASs are frequently confused with Unmanned Aerial Vehicles (UAV). The sUAS more resembles a model airplane and generally weighs between four and 50 pounds. It can even be flown inside a building. It is a radio controlled aircraft outfitted with a digital camera system capable of monitoring in color, thermal imaging, and low-light viewing while transmitting video back to a receiving unit. They have a substantially reduced operational flight time and a limited area of operation. Meanwhile, the UAV is an unpiloted aircraft that the military has developed to utilize in more complex functions. Most UAVs are the size of a small car and have sustained operational flight times and a world wide area of operation. sUASs should have a role in U.S. law enforcement because they are user friendly, they improve community and police safety, and they provide economical alternatives to traditional airborne law enforcement services.

POSITION

The continued advancement in science regarding micro technology and nano technology has had a tremendous positive effect on the development of sUASs. These advancements are in the specific spectrums of capability and platform. The in-flight capabilities of sUASs have nowhere to go but up. To be truly beneficial, a sUAS should be capable of being fully operated, including flying the aircraft and the manipulation of onboard electronics, by one officer. This does not suggest that the safety officer/observer position is not required. The safety officer needs to concentrate on the environment the sUAS is flying within, not the flying or interpreting of electronic data supplied by the sUAS.

The expansion of “GPS provides accurate location and time information for an unlimited number of people in all weather, day and night, anywhere in the world” (U.S. Coast Guard, n.d., para. 1). GPS technology allows the sUAS to report exact locations back to the operator. In addition, GPS positioning allows the sUAS to be put in a hover mode, and the aircraft will make self correcting flight maneuvers to hold a designated GPS position.

Flight capability of the sUAS is clearly demonstrated by the modern radio controlled system. However, the sUAS must have more than the ability to fly to be beneficial for law enforcement. Micro and nano technology allows preprogramming of essential safety protocols and flight competence. For example, when a sUAS is launched, it would automatically relay its location via GPS. If there was a malfunction of the radio controls, the sUAS would enter into an auto return mode and land by itself. Working in unison with GPS technology and micro and nano technology, the flying of the sUAS involves minimal input from an officer, thus it becomes user friendly and requires only nominal training.

One of the primary objectives of law enforcement is to protect the citizens and the community in which they serve. Public safety not only includes the reactive protection but involves the proactive prevention of incidents. Incidents can be a natural or man-made event, but the key to mitigating these events is that they “require extraordinary measures to protect lives, meet human needs, and achieve recovery” (FEMA, n.d., Unit 5, “Critical Incidents and the ICS,” para. 1). Law enforcement agencies are held accountable, as they should be, for their role and actions in protecting the community.

Unfortunately, many critical incidents are unplanned, and the ability to rapidly deploy assets is critical to resolving these issues with minimal property damage and no loss of life. The technology of sUASs is already being deployed by some military and federal agencies. In large scale incidents, these federal resources would be available, but the local, county, and state agencies will not be able to access these assets for at least four to 72 hours after the onset of the incident. This time frame is unacceptable when operating in a rescue mode. Another key concept in deterring crime is the prevention of crime by detecting the incident before it occurs. The sUAS is an optimum system for providing complete big picture situation reports and detecting criminal activity in the most surreptitious manner.

The benefits of aviation are well documented by the Airborne Law Enforcement Association (ALEA). It is asserted by police aviation unit advocates that “a helicopter is equal to 15 patrol cars” (Yates, year, p. 2) and clearly demonstrates the immediate advantages through a concept known as force multiplication. This refers to a factor that increases the operational effectiveness of a piece of equipment or work group. Essential law enforcement resources are quickly deployed and depleted when mitigating critical incidents. The sUAS is a tool that can improve upon resource allocation by providing real time intelligence to command personnel. This will ensure an economy of force by proper utilization of resources as they are employed by command personnel. The general safety of the community and first responders is improved when resources are maneuvered and massed at key spots. This is why the sUAS would be an effective tool in providing law enforcement an advantage in increasing community and police safety.

The range of cost for a sUAS platform will range from \$20,000.00 to \$70,000.00. A single helicopter can begin at \$800,000.00 and easily exceed \$5,000,000.00. sUAS platforms are important to law enforcement and the community they serve because they develop police aviation capabilities through an economical program. The sUAS is equipped with miniaturized electronic equipment that provides similar data as the traditional law enforcement aviation platform (rotor or fixed wing). The integrity of the data is not sacrificed when delivered through a sUAS platform.

The initial expense of starting an aviation unit can be quite lofty as indicated above. However, the routine maintenance costs of maintaining a helicopter can be even more demanding. Helicopters can have an hourly operating cost ranging from \$600 to \$1,400 per flight hour (Conklin & de Decker, 2010). Aggressive law enforcement aviation units can fly an average of 1,500 hours a year. A fixed wing platform can be less expensive \$60 an hour, but it does not meet the operational needs of many law enforcement agencies like a rotor platform. The ancillary personnel, aircraft storage building, office space, and annual remedial training for pilots and mechanics are operational costs that are not related to a sUAS. This is not to say that there are no such costs for personnel trained to operate a sUAS or capital expenses, but the expenses are substantially lower.

The sUAS platform does have its obvious deficiencies when compared to the traditional law enforcement aviation rotor platform. These deficiencies include the lack of the ability to carry passengers, flight capability during moderate to heavy weather conditions, and flight time endurance. Otherwise, the sUAS can achieve the same

operational goals. Nonetheless, the sUAS does provide adequate aviation assets to law enforcement agencies that would otherwise be prohibited by excessive costs.

COUNTER POSITION

The Federal Aviation Administration (FAA) is tasked with ensuring air safety of US airspace and developing administrative policy to meet this goal. The FAA has issued a Certificate of Authorization (COA) to just a handful of law enforcement agencies to use the sUAS in a very limited role. Until recently, all COAs were issued for training and not for mission deployment. The FAA was considering a long-term, 15-year, multi-stage timeframe for implementing a plan to accommodate use of the sUAS in National Air Space (NAS). This implementation plan “is bumping up against industry pressure to accelerate the regulatory authorization of UAVs for civil commercial use” (UAV MarketSpace, n.d., para 16). It should be noted that there has been a nomenclature change in the US to adopt the sUAS moniker rather than UAV.

The FAA is concerned with the flight worthiness of the sUAS and the danger it will pose to civilians if there is a malfunction with the sUAS. Law enforcement agencies who have “aviation units reported that almost half the aircraft (45%) used for law enforcement activities were 20 years or older” (Langton, 2009, p. 6). The sUAS is certainly based off of new technology but built upon the foundation of radio controlled aircraft that have been in operation for over 50 years. The flight capabilities have been improved as well as the delivery of intelligence information due to micro and nano technology. The amount of possible damage caused by a full size helicopter crashing is substantially more than a sUAS crashing. In either case, it would be a great loss but certainly less hazardous to the public and police with the use of a sUAS.

In addition, the FAA is concerned with interference with general and commercial aircraft flying in NAS from the sUAS. Keeping aircraft from colliding with one another is a very good idea. Most fixed winged aircraft are prohibited from flying below 1,000 feet above ground level unless they are landing. Rotor aircraft generally fly at an altitude of at least 500 feet above ground level. The FAA has identified several different airspace designations within NAS. These concerns are exacerbated when such operations are within Class A, B, or C airspace (altitude controlled and highly or moderately congested) and become less of a concern when operating in Class D, E, F, or G airspace (altitude controlled and less congested). For the most part, the operational objectives of a law enforcement agency can be met by flying the sUAS at an altitude of below 400 feet above ground level and within a 150 feet horizontal from an obstacle. This airspace is not normally utilized by other aircraft. The use of a safety officer is critical to the safe operation of a sUAS in any airspace. However, supplementary safeguards can later be implemented by installing a transponder/beacon on the sUAS if it would be flying in an operational area outside of the above perimeters and ensuring that automated “see and avoid” technology is perfected.

There is a reasonable expectation of privacy guaranteed under the Fourth Amendment of the US Constitution. There are people that already believe the use of aviation assets by law enforcement agencies constitute an invasion of personal privacy. This issue has already been resolved with the current use of traditional law enforcement aviation assets. The technology and means of collecting intelligence information is essentially the same for the sUAS. The US court system has ruled on this issue, and rules and procedures have been developed on said court rulings. Law enforcement

agencies operating sUASs under such guidelines would not be a violation of the Fourth Amendment.

CONCLUSION

People have a tendency to question things they do not understand and do not want to change the status quo. History has proven that a society must be able to adapt with the changing times. The FAA has taken a stance of prohibiting the general use of sUASs by law enforcement agencies. Tim Adelman, an aviation lawyer, stated, "The FAA is essentially trying to scare people into not using these devices or to require stricter authorization. But that policy exceeds their authority granted by Congress" (as cited in Weinberg, 2009, para. 2). Yes, law enforcement and the FAA are entering into uncharted waters and they should proceed with caution, but the FAA cannot ignore and defer the issue.

The scope of law enforcement has experienced many changes since 9/11 and other world events. The dynamics of law enforcement continues to be in an intermediary state because they are tasked with ensuring the public's safety, but the threat sources and capabilities change daily. Unfortunately, national security has become more than simply preventing foreign countries from invading the U.S. It has become synonymous with narcotics smuggling, human trafficking, and foreign and domestic terrorism. Sharing and gathering of intelligence information is a must to ensure national security on a combined federal and state government level. Wheatley (2004) stated, "The joining of law enforcement and intelligence agencies has been complicated by the differing roles and missions, operational practices, and bureaucratic cultures of the two sets of government agencies" (p. viii). The best way to forecast the

future is to create it. The sUAS platform can provide law enforcement an edge in accomplishing their goals and bridge the multifunctional roles of government agencies, both federal and state.

There has been a generalization of the sUAS, and it is frequently considered synonymous with the UAV. There are distinct differences between an UAV and sUAS as it pertains to size, operational capability, and payload. The Department of Justice (DOJ), FAA, civilian law enforcement agencies, and other stakeholders must be able to establish a set of rules and regulations that all can agree upon. Each entity certainly has their own agenda, but the benefits of the sUAS will serve all in a positive manner. The sUAS platform does have its limitations and cannot completely replace traditional aviation platforms. However, there is no law enforcement tool that can do it all. The implementation of sUASs in U.S. law enforcement should assist law enforcement in meeting their goals and objectives partly because technology has made sUASs user friendly. Additionally, deploying sUASs will enhance concrete and perceived safety issues of the community and police, and the sUAS platform offers many law enforcement agencies access to proven aviation assets that would normally be beyond their financial means.

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