WORKING PAPER 16-01

UNMANNED AERIAL SYSTEMS (UAS) IN THE LOCAL PUBLIC SAFETY ENVIRONMENT: A REVIEW

WITH FEDERAL AVIATION ADMINISTRATION FACT SHEET ON STATE AND LOCAL REGULATION OF UAS (12/7/15)

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February 2016

About Christian Regenhard

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The Christian Regenhard Center for Emergency Response Studies (RaCERS) is an applied research center focused on development of a mix of grounded theory and traditional empirical analysis in the areas of emergency response, coordination of first responders, and dynamics of large-scale incident management and response. The Center is unique in its devotion to first responder-defined and actionable research on policy aspects of emergency response and homeland security from a perspective inclusive of police, fire, and emergency medical services. *Tax deductible donations can be made care of the John Jay College Foundation, 524 West 59 Street, New York, NY 10019.*

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UNMANNED AERIAL SYSTEMS IN THE LOCAL PUBLIC SAFETY ENVINRONMENT: A REVIEW

1. Introduction

Unmanned aerial systems (UAS) – also called "unmanned aerial vehicles" (UAVs) or "remotely piloted aircrafts" (RPAs) – refer to a widely divergent range of aircraft capable of flight without an onboard crew (Elias & Flynn, 2015). Variant types can be distinguished by rotary or fixed wing configurations, being heavier or lighter than air, and their size, payload, and duration of flight. Media have interchangeably used the term "drones" to describe any of these craft, often conjuring images of military weapon systems with comparatively advanced capabilities. However, the range of UAS models is decidedly vaster than the public realizes.

An important distinction lies first in recognizing that the needs of the civil first responder community (local law enforcement, fire services, emergency medical services and emergency management) differ from those of the armed forces. Military-grade weapons systems are far beyond the operational needs, fiscal capabilities, and ambitions of domestic agencies. Still, public perception is decidedly mixed, and often confuses the very limited tactical usage of UAS envisioned by much of law enforcement and public safety with their larger, more powerful, weaponized military counterparts. Still more confusion is created by fears of widespread "drone" use by civilian hobbyists, despite the fact that civilian systems would be much more limited in capability than that of public agencies (Table 1).

Table 1: "Representative" Capabilities of Commercially-Offered UAS

UAS Types	Flight Duration	Payload	Speed	Altitude	Initial Cost
Hobbyist	Short	None to a few pounds	~30 mph	150+ feet	$50 and up
Public safety	< 45 minutes	< 30 pounds	30-80 mph	< 12,000 feet	$35-$400K
Military	24+ hours	3750 pounds	300-500 mph	> 50,000 feet	$30,000K+

This paper reviews the basic characteristics and capabilities of UAS and the potential that they bring in improving first responder operations. It is important to note at the outset, however, that, from a practical standpoint, the regulatory regime and restrictions on UAS flight are already quite constraining. Restrictions on flight altitude and proximity to people, as well as concerns regarding the potential interference with aviation, limit the utility of UAS to a set of very narrowly limited and well-defined circumstances. Unfortunately, this also means that UAS are likely to remain primarily a suburban and rural phenomenon for the near future.[1]

[1] As an example, regulations do not permit, nor has public testing been done of, UAS operating in urban areas at altitudes that would place them in close proximity to buildings and people.

Other limitations arise both from current operational and technological shortcomings existing in the technology at present. For instance, the use of drones by the fire service for aerial views of structure fires offers only limited promise due to the fact that their deployment lags in time relative to fire service response units. Additionally, aerial views of a fire scene likely contribute little to enhanced effectiveness or improved outcomes. Thus, here is one example where UAS would be of limited use, deployed only for well-developed structural fires for which an exterior attack regime is in place and the structure is "written off." However, even here, UAS could offer potential advantages in assisting incident managers in scene surveillance and communication.

An additional need that has not been recognized is the challenge of developing policy guidance and understanding the circumstances in which UAS can offer advantages over existing means for gathering situational awareness. While examples of UAS deployment in law enforcement tactical situations with barricaded or concealed subjects are intuitive, this conclusion is supported by anecdotal evidence for their effectiveness in enhancing officer safety. Additional documentation and an understanding of limitations and operating guidelines are necessary before widespread adoption for this purpose is recommended. Operational plans will also need to consider the hostile use of UAS by adversaries to surveil law enforcement and disrupt the tactical balance in active shooter, barricaded subject, or civil disturbance scenarios.

UAS will continue to grow in popularity inside and outside of government. What follows is a brief review of these domains, with an emphasis on the types, legal constraints, and policy concerns with their generalized use.

2. Market for Unmanned Aerial Systems

UAS have been used by the United States military as far back as the 1960s to avoid the risk of fatality incurred from using human pilots in hostile territories (Sherwood, 2012). Today, the United States Armed Forces continue to use UAS for reconnaissance, surveillance, and targeted missile strikes (*see* Wilner, 2015). However, while the military continues to be the major user of unmanned aerial technology, slowly but surely the utility of UAS in other contexts is being recognized (Elias & Flynn, 2015). One notable instance is the use by the U. S. Department of Homeland Security (DHS) of Predator drones to patrol the U. S.-Mexican border (Gann, 2012) or by private news agencies in what is called "drone journalism" (Corcoran, 2014). Opportunities to expand the use of UAS have been increasingly touted, with drone technology beginning to enter into the arenas of local government, commercial enterprises and personal-use (Federal Aviation Administration, 2012).

3. UAS in Public Safety

One of the most important sectors in which UAS use is burgeoning is in local law enforcement and emergency response. As they are frequently placed in imminent danger, police, firefighters and other emergency responders are drawn to UAS out of considerations primarily of safety, affordability, and flexibility in use and capabilities (Gann, 2012). Public safety agencies may use UAS for a number of activities, including search and rescue, aerial views of emergency incident scenes, hazardous materials exposures, natural disasters, tool transfer and exchange, initial medical assessment, hostage situation surveillance, traffic accident and crime scene

photography, and environmental regulation (Gann, 2012; Abrahamsen, 2015; Elias & Flynn, 2015).

Examples of successful UAS use in real-world emergencies are beginning to accrue, demonstrating their usefulness in saving crucial time and resources and preventing risk to human lives (Sherwood, 2012). While Abrahamsen (2015) demonstrated the use of UAS in delivering tools in a controlled demonstration, in a live situation, a fire chief in Mechanic Falls, ME, delivered a life vest to a stranded adolescent whose river tube had overturned in the midst of the Little Androscoggin River (McFarland, 2015). The year before, footage providing an aerial, tactical view at the scene of a large fire was released by Firegroundimages.com (Fire Engineering, 2014; Firegroundimages.com, 2014). There are many other, similar examples of UAS providing dividends in emergency situations in recent years (Elias & Flynn, 2015). Taken together, these support the need for a close look into the adoption of these systems more widely.

The size and capabilities of UAS systems vary greatly. From one extreme, there are multimillion-dollar drone systems that can be armed and controlled with computer aviation systems thousands of miles away; on the other hand, small cell phone-sized systems with no payload capabilities and extremely limited ranges for remote control are also available (Gann, 2012). Law enforcement and emergency response agencies most often seek systems whose costs and capabilities lie somewhere in the middle. Military-style UAS have historically been too large, impractically complex, and prohibitively expensive for domestic safety uses. For example, the Predator drone weighs over 32,000 pounds and can have an array of gadgetry, including high performance imagining devices and complex sensors. UAS envisioned for local or state government use would be much smaller, lighter, and have greatly limited capability in terms of payload, flying time, and technological enhancements. Expensive components – such as thermal imaging and advanced audio systems – are plausible, but not practical or warranted for use by municipal enforcement and emergency response agencies (Gann, 2012).

To complete the tasks for which UAS are used in public safety, typically the use of small, simplistic vehicles will suffice, with considerations regarding whether to purchase fixed-winged or rotary drones being much more relevant than whether to include more complex technology.[2] Simple HD cameras with basic real-time video streams or high-resolution pictures are much more feasible than sophisticated imagery or sensory capacity (Gann, 2012). This is an important point, as distinguishing small public safety UAS from those larger, more sophisticated models used by the U. S. military will do much to reduce the anxieties of the public about overly aggressive capacities and allay the fears of local administrators about the cost and usability of these smaller systems.

The benefits of UAS in public safety can, at the outset, be quantified in the reduction of risk to human life or bodily injury; this alone warrants meaningful reflection by local administrators of the need to incorporate these systems into their law enforcement and public safety operations. The case is bolstered tremendously, however, when it is understood that the systems most appropriate for civil use are, in fact, much less expensive and far less intrusive than what is

[2] Regarding the wing selection debate, it should be noted that expected function is key: Fixed-winged systems have the advantage of gliding to conserve fuel, while rotary-winged systems can hover over a desired location (Gann, 2012).

commonly imagined based on military models. As discussed, several public safety organizations, as well as other industries, private and public, have already recognized this potential and developers are currently improving the technology, adding a wide range of capabilities, and increasing flexibility, affordability, and safety (Elias & Flynn, 2015).

Common UAS Uses by State and Local Government

The following are the most common situations in which UAS are deployed by state and local governments:

A) Border security and surveillance – Similar to the border patrol done by the DHS, border states and their city governments may use UAS to secure local border areas and provide aerial oversight for other restricted regions.
B) Disaster site reconnaissance and mapping – Emergency agencies can utilize streaming or captured aerial views of various disasters sites that are either too dangerous for first responders to enter or too large to survey in a feasible amount of time.
C) Alternative to existing manned operations – Piloted aircraft can be replaced or assisted by UAS, providing an affordable, low maintenance, and low-risk option. This can be appealing for reasons of cost and safety.
D) Research/wildlife – UAS may be powered using clean, unobtrusive energy sources. This can be beneficial for operations, like wildlife surveying, in which human presence or pollutant emissions could be disturbing or harmful (Federal Aviation Administration, 2012).

4. Federal Regulation of UAS

The federal government has the "exclusive sovereignty of airspace of the United States" (49 U.S. Code §40103), meaning that "no person may operate a UAS in the [National Airspace System (NAS)] without specific authority" (Federal Aviation Administration, N JO 7210.873). Surprisingly, however, there are no substantive regulations for UAS. Mostly restricted to specific emergency operations by public agencies, UAS use is subject to ad hoc approval through a certificate of waiver or authorization process conducted by the Federal Aviation Administration (FAA).

Early on, this process lacked organization and was slow to grant public entities authorization. To fix this, the FAA, along with the National Aeronautics and Space Administration (NASA) and the Departments of Defense (DOD) and Homeland Security (DHS), formed an executive committee to address UAS integration issues (Federal Avaiation Administration, 2012). As of March 2012, the FAA has streamlined the process somewhat, taking anywhere from 60 days for non-emergency approvals to a few hours in emergency situations, and the agency has extended the period of authorization granted from 12 months to 24 months (Federal Aviation Administration, 2015).

Despite the availability of permitting processes, public entities that are granted a certificate of authorization (COA) still face heavy restrictions. No flight in the airspace around the busiest airports are authorized, systems are often required to be flown in eye sight of their operators, and coordination must be planned with air traffic controllers in some airspaces (Federal Avaition

Administration, 2012). Still, the list of agencies applying for COAs is growing. In 2009, only 146 agencies nationwide had successfully applied for a COA; as of December 2014, 609 agencies were granted a COA by the FAA (Federal Aviation Administration, 2015).

It has also become impossible for the FAA to ignore the commercial and civilian markets' interest in the acquisition and use of UAS in the national airspace. However, the FAA maintains that "operations in civil airspace have different priorities [from those in the defense sector]. Civil performance standards are often more stringent, especially in the areas of reliability" (Federal Avaition Administration, 2012). This stance portends strict regulations for non-federal, and especially private, UAS use for the foreseeable future.

4. UAS and Civil Liberties

A key issue in debate and deliberation regarding the use of UAS concerns citizen privacy. Citizens and lawmakers alike have made it clear that the increased surveillance capabilities UAS grant their users continue to be a source of concern. With the prospect of both civilian and public UAS taking flight in the airspace, civilians will now face a new privacy concern. For example, lawmakers have already begun to question the legal implications of UAS flight above private property (Gann, 2012). In such instances, it is an open question whether these situations constitute trespassing by private persons or a breach of Fourth Amendment protection against unreasonable searches and seizures.

Several state representatives have drafted legislation against the use of UAS. In fact, at least twenty states currently have legislation restricting the use of UAS (Elias & Flynn, 2015). Federally, in the 113th Congress, U. S. Senator Rand Paul (R-KY) proposed that UAS operations funded or undertaken under the authority of the federal government be prohibited unless a warrant is obtained that meets constitutional muster (The Library of Congress, 2012). This initial effort was followed in the 114th Congress by representatives proposing at least seven additional bills regulating UAS (Elias & Flynn, 2015). In a report addressing the growing use of UAS, the Congressional Research Service (CRS) referenced existing case law concerning private property and the airspace above it. Previous Supreme Court jurisprudence has declared the airspace above property, both public and private, to be public space (*United States v. Causby*, 328 U.S. 256 (1946); Thompson, 2013). If the *Causby* precedent provides the bounds of intrusion by UAS, limits to such systems may be greatly reduced from those desired by the public.

Seemingly as an answer to these perceived liberty threats, organizations such as the Electronic Frontier Foundation (EFF) have arisen to provide civilian oversight of the deployment of UAS (Electronic Frontier Foundation, 2012). The EFF's Transparency Project has filed numerous lawsuits against the Department of Transportation (DOT) to obtain information from the FAA regarding who they had granted COAs to and the purpose of these certificates, which the EFF claims had not been previously available to the public. Public backlash against the use of the UAS has come to such a level that public officials have pulled the technology from use in their municipalities. The Seattle Police Department's ban on the use of their UAS is an example of the public's increased concern for their privacy. On February 7, 2013, the Seattle mayor ordered the police department to discontinue the use of their UAS and to return it to its vendor (The

Associated Press, 2013). Despite police claims that the UAS was only for specialized tasks such as surveying crime scenes and major disasters, residents felt police resources should be used for community building work instead of on potentially intrusive technologies.

At present, the FAA has still not issued permanent regulations for the use of UAS. As of this writing, the published interim guidance on UAS policy has been extended to July 2016. Thus, a firm federal stance on civil liberty by the executive branch is still pending, not to speak of inaction in the legislature and judiciary. UAS provides simply another example the nation's laws failing to keep track with technological advancements.

5. Operational Limitations of UAS

UAS, like any technology, have limitations. While some of these limitations are due to the physical capability and the surrounding environment, some noted limitations are matters of security and safety from external sources (Federal Aviation Administration, 2012; Elias & Flynn, 2015):

A) Technological limitations: Current models of UAS to be used in public safety operations are limited, to some degree, by the payload they can carry, including battery size and, therefore, battery life. They also typically generate at least some ambient noise. The limited scope of view transmitted to the operator creates the potential for missing safety threats approaching lateral or anterior to the aircraft. Finally, a substantial degree of training is required to operate these systems.
B) Operation in inclement weather conditions: The decreased size of domestic UAS may have an advantage in manufacturing expenses and maneuverability, but it poses a problem when vehicles are subjected to harsh weather conditions. Strong winds that would not affect full size aircrafts can render some UAS inoperable. Even humidity and precipitation can pose a problem for UAS, which rely heavily on electronic systems to operate.
C) Airspace: Currently, the FAA mandates that no UAS is permitted to enter commercial airspace, regardless of whether it is controlled by an authorized public or private entity. This is a major restriction, as commercial airspace comprises a substantial proportion of the National Airspace System (NAS). Restriction from commercial airspace makes UAS impossible in many major cities and heavily populated areas, usually classified as commercial air space due to local airports.

D) 

Source: (Federal Aviation Administration)

E) Tall structures: Because of concerns for safety and collision avoidance, the COA's given by the FAA mandate the use of UAS in line of site by the operator. Tall structures pose a problem in complying with this mandate, as operators are unable to keep sight of their UAS. These structures also act as obstacles in which a collision can occur.
F) Time: Flight during night times or low visibility conditions will not permit operators to keep a visual contact with their aircraft. Since COA's mandate UAS be operated in visual range of the operator, this also substantially limits the practicality of their use.

The limitations of tall buildings and commercial airspace pose serious limitations to UAS for usage in densely-built urban areas.

6. Moving Forward

UAS faces an uncertain future in domestic markets, with challenges ranging from lack of regulation or vague standards, legal and constitutional adversity, and operational limitations. Additionally, UAS faces issues in the form of both security concerns and public education. UAS rely not only on hardware, but also software to operate. They are, therefore, susceptible to malicious programming through hacking, providing an unauthorized user control of the system. The possibility of UAS being hacked poses a particularly grave threat to the public's privacy and physical safety. Professor Todd Humphreys of the University of Texas demonstrated as much after his team hacked and gained control of the navigational signals of an unmanned aerial vehicle several kilometers away (Sherwood, 2012). This is a critical concern to law enforcement agencies, which use UAS to conduct sensitive missions that criminal offenders might interfere with. Moreover, detection of malicious unmanned aircraft would still be quite limited with the resources available to most local law enforcement today (Elias & Flynn, 2015).

Public education and transparency are still another challenge that must be faced. Public fears have already been awakened about the current use of UAS technology and apprehension about more expansive use in the future has only made them worst. Agencies and organizations that use

UAS must communicate their intended usage and purpose, and the public must be alerted to the difference between domestic and military systems. The FAA has a huge role in ensuring regulation is kept current and transparent. As more becomes known about UAS technology, better regulation and controls can be identified and created. Development of technologies for "counter-UAS" may well outpace widespread positive use of UAS by public safety.

7. Conclusion

UAS gained their reputation largely in military application. Hobbyists' use of small UAS outside or contrary to regulation has garnered considerable attention, catapulting the fear of widespread use of "drones" into the public dialogue. It is imperative that distinctions be made between the military use of UAS, that of civilian hobbyists, and UAS use by local agencies in the execution of their public safety missions. An emphasis on the limited capacity of public domestic UAS should de-intensify concerns over privacy and security violations among the public, while an emphasis on the benefits of public domestic UAS should support the case for allowing their greater use, even amid stricter regulations on their use in the private sphere. Most importantly, public education must center on illuminating the various uses of UAS technology and combat dread of a weaponized police "drone" so predominant in public discourse (see Eidam, 2015).

The use of UAS for mission-critical public safety applications is surely approaching (Elias & Flynn, 2015), but generalized use remains limited. Tactical deployment of UAS shows promise in law enforcement, but more generalized usage remains aspirational.

Development of policy, capture of data on effectiveness, and evaluation of outcomes are necessary to permit further adoption. Technological innovation is expanding rapidly, and new capabilities may emerge for public safety. Autonomous systems are a particular trend that may alter the efficacy of UAS for public safety.

Fears and misunderstandings by both the general public and local policymakers pose real limits to adoption of UAS technology into state and local public safety systems. By outlining the limitations of this technology, the gaps in understanding and harnessing its potential, and the legitimate points of concern in its use, this report addresses this informational void. Still, much more needs to be done in research, policy and public educational arenas in order to fully realize the benefits of this technology.

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State and Local Regulation of Unmanned Aircraft Systems (UAS)
Fact Sheet

Federal Aviation Administration
Office of the Chief Counsel

December 17, 2015

BACKGROUND

Unmanned aircraft systems (UAS) are aircraft subject to regulation by the FAA to ensure safety of flight, and safety of people and property on the ground. States and local jurisdictions are increasingly exploring regulation of UAS or proceeding to enact legislation relating to UAS operations. In 2015, approximately 45 states have considered restrictions on UAS. In addition, public comments on the Federal Aviation Administration's (FAA) proposed rule, "Operation and Certification of Small Unmanned Aircraft Systems" (Docket No. FAA-2015-0150), expressed concern about the possible impact of state and local laws on UAS operations.

Incidents involving unauthorized and unsafe use of small, remote-controlled aircraft have risen dramatically. Pilot reports of interactions with suspected unmanned aircraft have increased from 238 sightings in all of 2014 to 780 through August of this year. During this past summer, the presence of multiple UAS in the vicinity of wild fires in the western U.S. prompted firefighters to ground their aircraft on several occasions.

This fact sheet is intended to provide basic information about the federal regulatory framework for use by states and localities when considering laws affecting UAS. State and local restrictions affecting UAS operations should be consistent with the extensive federal statutory and regulatory framework pertaining to control of the airspace, flight management and efficiency, air traffic control, aviation safety, navigational facilities, and the regulation of aircraft noise at its source.

Presented below are general principles of federal law as they relate to aviation safety, and examples of state and local laws that should be carefully considered prior to any legislative action to ensure that they are consistent with applicable federal safety regulations. The FAA's Office of the Chief Counsel is available for consultation on specific questions.

WHY THE FEDERAL FRAMEWORK

Congress has vested the FAA with authority to regulate the areas of airspace use, management and efficiency, air traffic control, safety, navigational facilities, and aircraft noise at its source. 49 U.S.C. §§ 40103, 44502, and 44701-44735. Congress has directed the FAA to "develop plans and policy for the use of the navigable airspace and assign by regulation or order the use of the airspace necessary to ensure the safety of aircraft and the efficient use of airspace." 49 U.S.C. § 40103(b)(1). Congress has further directed the FAA to "prescribe air traffic regulations on the flight of aircraft (including regulations on safe altitudes)" for navigating, protecting, and identifying aircraft; protecting individuals and property on the ground; using the navigable

airspace efficiently; and preventing collision between aircraft, between aircraft and land or water vehicles, and between aircraft and airborne objects. 49 U.S.C. § 40103(b)(2).

A consistent regulatory system for aircraft and use of airspace has the broader effect of ensuring the highest level of safety for all aviation operations. To ensure the maintenance of a safe and sound air transportation system and of navigable airspace free from inconsistent restrictions, FAA has regulatory authority over matters pertaining to aviation safety.

REGULATING UAS OPERATIONS

In § 333 of the FAA Modernization and Reform Act of 2012 (Public Law No. 112-95), Congress directed the Secretary to determine whether UAS operations posing the least amount of public risk and no threat to national security could safely be operated in the national airspace system (NAS) and if so, to establish requirements for the safe operation of these systems in the NAS.

On February 15, 2015, the FAA proposed a framework of regulations that would allow routine commercial use of certain small UAS in today's aviation system, while maintaining flexibility to accommodate future technological innovations. The FAA's Notice of Proposed Rulemaking offered safety rules for small UAS (under 55 pounds) conducting non-recreational or non-hobby operations. The proposed rule defines permissible hours of flight, line-of-sight observation, altitude, operator certification, optional use of visual observers, aircraft registration and marking, and operational limits.

Consistent with its statutory authority, the FAA is requiring Federal registration of UAS in order to operate a UAS. Registering UAS will help protect public safety in the air and on the ground, aid the FAA in the enforcement of safety-related requirements for the operation of UAS, and build a culture of accountability and responsibility among users operating in U.S. airspace. No state or local UAS registration law may relieve a UAS owner or operator from complying with the Federal UAS registration requirements. Because Federal registration is the exclusive means for registering UAS for purposes of operating an aircraft in navigable airspace, no state or local government may impose an additional registration requirement on the operation of UAS in navigable airspace without first obtaining FAA approval.

Substantial air safety issues are raised when state or local governments attempt to regulate the operation or flight of aircraft. If one or two municipalities enacted ordinances regulating UAS in the navigable airspace and a significant number of municipalities followed suit, fractionalized control of the navigable airspace could result. In turn, this 'patchwork quilt' of differing restrictions could severely limit the flexibility of FAA in controlling the airspace and flight patterns, and ensuring safety and an efficient air traffic flow. A navigable airspace free from inconsistent state and local restrictions is essential to the maintenance of a safe and sound air transportation system. *See Montalvo v. Spirit Airlines*, 508 F.3d 464 (9th Cir. 2007), and *French v. Pan Am Express, Inc.*, 869 F.2d 1 (1st Cir. 1989); *see also Arizona v. U.S.*, 567 U.S. ___, 132 S.Ct. 2492, 2502 (2012) ("Where Congress occupies an entire field . . . even complimentary state regulation is impermissible. Field preemption reflects a congressional decision to foreclose any

state regulation in the area, even if it is parallel to federal standards."), and *Morales v. Trans World Airlines, Inc.*, 504 U.S. 374, 386-87 (1992).

EXAMPLES OF STATE AND LOCAL LAWS FOR WHICH CONSULTATION WITH THE FAA IS RECOMMENDED

- Operational UAS restrictions on flight altitude, flight paths; operational bans; any regulation of the navigable airspace. For example – a city ordinance banning anyone from operating UAS within the city limits, within the airspace of the city, or within certain distances of landmarks. Federal courts strictly scrutinize state and local regulation of overflight. *City of Burbank v. Lockheed Air Terminal*, 411 U.S. 624 (1973); *Skysign International, Inc. v. City and County of Honolulu*, 276 F.3d 1109, 1117 (9th Cir. 2002); *American Airlines v. Town of Hempstead*, 398 F.2d 369 (2d Cir. 1968); *American Airlines v. City of Audubon Park*, 407 F.2d 1306 (6th Cir. 1969).
- Mandating equipment or training for UAS related to aviation safety such as geo-fencing would likely be preempted. Courts have found that state regulation pertaining to mandatory training and equipment requirements related to aviation safety is not consistent with the federal regulatory framework. *Med-Trans Corp. v. Benton*, 581 F. Supp. 2d 721, 740 (E.D.N.C. 2008); *Air Evac EMS, Inc. v. Robinson*, 486 F. Supp. 2d 713, 722 (M.D. Tenn. 2007).

EXAMPLES OF STATE AND LOCAL LAWS WITHIN STATE AND LOCAL GOVERNMENT POLICE POWER

Laws traditionally related to state and local police power – including land use, zoning, privacy, trespass, and law enforcement operations – generally are not subject to federal regulation. *Skysign International, Inc. v. City and County of Honolulu*, 276 F.3d 1109, 1115 (9th Cir. 2002). Examples include:

- Requirement for police to obtain a warrant prior to using a UAS for surveillance.
- Specifying that UAS may not be used for voyeurism.
- Prohibitions on using UAS for hunting or fishing, or to interfere with or harass an individual who is hunting or fishing.
- Prohibitions on attaching firearms or similar weapons to UAS.

CONTACT INFORMATION FOR QUESTIONS

The FAA's Office of the Chief Counsel is available to answer questions about the principles set forth in this fact sheet and to consult with you about the intersection of federal, state, and local regulation of aviation, generally, and UAS operations, specifically. You may contact the Office of Chief Counsel in Washington, D.C. or any of the following Regional Counsels:

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APPENDIX – LIST OF AUTHORITIES

Federal Statutes

- 49 U.S.C. §§ 40103, 44502, and 44701- 44735 (former Federal Aviation Act of 1958, as amended and recodified).

- FAA Modernization and Reform Act of 2012, Public Law No. 112-95 (Feb. 14, 2012), Subtitle B, "Unmanned Aircraft Systems."

Federal Regulations

- Title 14 of the Code of Federal Regulations, Chapter 1.

The U.S. Supreme Court

- "Congress has recognized the national responsibility for regulating air commerce. Federal control is intensive and exclusive. Planes do not wander about in the sky like vagrant clouds. They move only by federal permission, subject to federal inspection, in the hands of federally certified personnel and under an intricate system of federal commands. The moment a ship taxies onto a runway it is caught up in an elaborate and detailed system of controls. It takes off only by instruction from the control tower, it travels on prescribed beams, it may be diverted from its intended landing, and it obeys signals and orders. Its privileges, rights, and protection, so far as transit is concerned, it owes to the Federal Government alone and not to any state government." *Northwest Airlines v. State of Minnesota*, 322 U.S. 292, 303 (1944)(Jackson, R., concurring).

- "If we were to uphold the Burbank ordinance [which placed an 11 p.m. to 7 a.m. curfew on jet flights from the Burbank Airport] and a significant number of municipalities followed suit, it is obvious that fractionalized control of the timing of takeoffs and landings would severely limit the flexibility of FAA in controlling air traffic flow. The difficulties of scheduling flights to avoid congestion and the concomitant decrease in safety would be compounded." *Burbank v. Lockheed Air Terminal Inc*., 411 U.S. 624, 639 (1973).

- "The Federal Aviation Act requires a delicate balance between safety and efficiency, and the protection of persons on the ground … The interdependence of these factors requires a uniform and exclusive system of federal regulation if the congressional objectives underlying the Federal Aviation Act are to be fulfilled." *Burbank* at 638-639.

- "The paramount substantive concerns of Congress [in enacting the FAA Act] were to regulate federally all aspects of air safety … and, once aircraft were in 'flight,' airspace management…." *Burbank* at 644 (Rehnquist, J. dissenting).

U.S. Courts of Appeals

- "Air traffic must be regulated at the national level. Without uniform equipment specifications, takeoff and landing rules, and safety standards, it would be impossible to operate a national air transportation system." *Gustafson v. City of Lake Angeles*, 76 F.3d 778, 792-793 (6th Cir. 1996)(Jones, N., concurring).

- "The purpose, history, and language of the FAA [Act] lead us to conclude that Congress intended to have a single, uniform system for regulating aviation safety. The catalytic events leading to the enactment of the FAA [Act] helped generate this intent. The FAA [Act] was drafted in response to a series of fatal air crashes between civil and military aircraft operating under separate flight rules …. In discussing the impetus for the FAA [Act], the Supreme Court has also noted that regulating the aviation industry requires a delicate balance between safety and efficiency. It is precisely because of 'the interdependence of these factors' that Congress enacted 'a uniform and exclusive system of federal regulation.'" *Montalvo v. Spirit Airlines,* 508 F.3d 464, 471 (9th Cir. 2007), citing *City of Burbank v. Lockheed Air Terminal Inc*., 411 U.S. 624, 638-39 (1973).

- "[W]hen we look to the historical impetus for the FAA, its legislative history, and the language of the [FAA] Act, it is clear that Congress intended to invest the Administrator of the Federal Aviation Administration with the authority to enact exclusive air safety standards. Moreover, the Administrator has chosen to exercise this authority by issuing such pervasive regulations that we can infer a preemptive intent to displace all state law on the subject of air safety." *Montalvo* at 472.

- "We similarly hold that federal law occupies the entire field of aviation safety. Congress' intent to displace state law is implicit in the pervasiveness of the federal regulations, the dominance of the federal interest in this area, and the legislative goal of establishing a single, uniform system of control over air safety. This holding is fully consistent with our decision in *Skysign International, Inc. v. Honolulu*, 276 F.3d 1109 (9th Cir. 2002), where we considered whether federal law preempted state regulation of aerial advertising that was distracting and potentially dangerous to persons on the ground. In upholding the state regulations, we held that federal law has not 'preempt[ed] altogether any state regulation purporting to reach into the navigable airspace.' *Skysign* at 1116. While Congress may not have acted to occupy exclusively all of air commerce, it has clearly indicated its intent to be the sole regulator of aviation safety. The FAA, together with federal air safety regulations, establish complete and thorough safety standards for interstate and international air transportation that are not subject to supplementation by, or variation among, states." *Montalvo* at 473-474.

- "[W]e remark the Supreme Court's reasoning regarding the need for uniformity [concerning] the regulation of aviation noise, see *City of Burbank v. Lockheed Air Terminal*, 411 U.S. 624 (1973), and suggest that the same rationale applies here. In *Burbank*, the Court struck down a municipal anti-noise ordinance placing a curfew on jet flights from a regional airport. Citing the 'pervasive nature of the scheme of federal

regulation,' the majority ruled that aircraft noise was wholly subject to federal hegemony, thereby preempting state or local enactments in the field. In our view, the pervasiveness of the federal web is as apparent in the matter of pilot qualification as in the matter of aircraft noise. If we upheld the Rhode Island statute as applied to airline pilots, 'and a significant number of [states] followed suit, it is obvious that fractionalized control ... would severely limit the flexibility of the F.A.A ….' [citing *Burbank*] Moreover, a patchwork of state laws in this airspace, some in conflict with each other, would create a crazyquilt effect … The regulation of interstate flight-and flyers-must of necessity be monolithic. Its very nature permits no other conclusion. In the area of pilot fitness as in the area of aviation noise, the [FAA] Act as we read it 'leave[s] no room for ... local controls.' [citing *Burbank*]. *French v. Pan Am Express, Inc*., 869 F.2d 1, 6 (1st Cir. 1989).