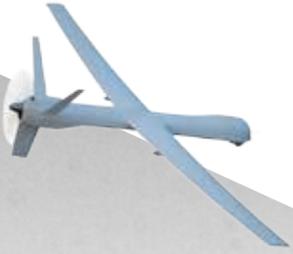


Cities and Drones

What Cities Need to Know About Unmanned
Aerial Vehicles (UAVs)



About the National League of Cities

The National League of Cities (NLC) is the nation's leading advocacy organization devoted to strengthening and promoting cities as centers of opportunity, leadership, and governance. Through its membership and partnerships with state municipal leagues, NLC serves as a resource and advocate for more than 19,000 cities and towns and more than 218 million Americans. NLC's Center for City Solutions and Applied Research provides research and analysis on key topics and trends important to cities, creative solutions to improve the quality of life in communities, inspiration and ideas for local officials to use in tackling tough issues, and opportunities for city leaders to connect with peers, share experiences, and learn about innovative approaches in cities.

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NLC NATIONAL
LEAGUE
OF CITIES

CENTER FOR CITY SOLUTIONS AND
APPLIED RESEARCH

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A drone hovers near the Cincinnati, Ohio skyline.

Drone is a catch-all term which may refer to an unmanned aerial vehicle (UAV), unmanned aerial system (UAS), small unmanned aerial system (sUAS), or other type of small and remotely piloted aircraft. Some cities, such as Santa Clara, California,¹ San Jose, California,² and Miami, Florida³ define drones as unmanned aircraft or unmanned aircraft systems (UAS) that can fly under the control of a remote pilot using a first person view (FPV), or in autopilot mode guided by a global positioning system (GPS).

In recent years, when people heard the word “drone,” it probably referred to unmanned aircraft in a military context overseas (“drone strikes”); these military drones can have wingspans of well over 100 feet and weigh over 16 tons. Today, most drones making headlines domestically are small model “quadcopters” (helicopters with four propellers), with cameras attached to them.⁴ Many highly-rated consumer drones with high-definition cameras cost about \$1000, weigh around ten pounds, and have flight times of around 20 minutes. However, some drones without cameras often weigh less than a pound, can cost less than \$100, and are small enough to fly around a room indoors.⁵ Though not all drones have cameras, much concern about the increasing popularity of drones has to do with the privacy issues that arise when a small device can hover over an area taking aerial photos or video.

Today, their increased accessibility and popularity has people ranging from realtors to inspectors, to photographers and others, using drones to document the world around them. This technology has oftentimes replaced more hazardous operations, has helped in finding missing persons, and has fostered an entire industry of innovators and entrepreneurs.

However, along with opportunity, drones present unique challenges and concerns for city government.

Drones raise safety, privacy, nuisance and trespassing concerns, all of which are compounded by the lack of accountability associated with most drone operations today. Drones can be operated remotely, making it difficult to identify operators who fly recklessly, harass individuals, or cause injury to persons or property.

While there have been several high profile mishaps involving drones, and these incidents raise legitimate concerns, they represent a miniscule fraction of drone operations, the overwhelming majority of which help to augment and serve communities for the better. Among other worthy situations, drones have been used to enable firefighters to see into burning buildings, allowed construction crews to monitor sites for safety hazards, and empowered hospitals to transport urgently-needed medication to remote locations. Both commercial and recreational drone operation can powerfully benefit cities, an opportunity that shouldn't be lost due to the bad acts of the small minority of unsafe drone operators.

This municipal action guide will serve as a primer on drones for local officials, providing insight into the recently released federal rules relating to drone operation, as well as offering suggestions for how local governments can craft their own drone ordinances to encourage innovation while also protecting their cities.

The UAV Landscape

Federal Regulations

The Federal Aviation Administration (FAA) treats all drones as aircraft and subjects them to Federal Aviation Regulations (FARs). Federal law has created four primary categories of unmanned aircraft operators.⁶ The FAA distinguishes between remote pilots holding a Part 107 certificate (civil UAS operations), public UAS operators, model aircraft operators, and those holding 333 exemptions:

- **Part 107 Remote Pilots** are individuals, 16 years of age or older, who have passed an FAA knowledge test and TSA background check and have been issued a Part 107 certificate. These individuals may operate a drone for any purpose (whether commercial or recreational) so long as the operation is in conformity with Part 107 regulations. The vast majority of law abiding operators (whether recreational or commercial) will fall into this category.
- **Model Aircraft Operators** are individuals who satisfy all of the exemption criteria specified in Section 336 of Public Law 112-95. When the FAA released the Part 107 regulations, the agency codified all of the requirements of Section 336 and added it under Part 101 of the Federal Aviation Administration Regulations. The FAA also clarified that an individual can only qualify as a model aircraft operator if they meet each and every one of the specific requirements enumerated by Congress. If they do not, they are expected to be a Part 107 operator.⁷ Recreational and model aircraft operators who wish to operate under the more permissive rules in Part 107 must obtain a Part 107 certificate.
- **Public operators** include public agencies and those operating drones for governmental purposes. Public operators must obtain a Certificate of Waiver or Authorization (COA) from the FAA defining how and where the drone can be used.⁸ Public agencies that wish to operate under the rules of Part 107 may obtain a Part 107 certificate.

The FAA distinguishes between 4 primary categories of unmanned aircraft operators:

- 1 Part 107 Remote Pilots
- 2 Model Aircraft Operators
- 3 Public Operators
- 4 333 exemption

- **333 exemption** holders are individuals who were granted permission to operate drones for non-recreational purposes. Existing 333 exemptions will continue in force until their renewal date.

Part 107 Remote Pilots

On Tuesday June 21, 2016, the FAA released regulations to govern the use of drones. The regulations, referred to henceforth as Part 107 (a reference to the section of the FAA Regulations where the rules appear), establish modest requirements for anyone who wants to operate a drone for any purpose (whether commercial or recreational).

The average consumer over the age of 16 who purchases a drone and attempts to comply with the law will be presented with two options:

- 1) Take and pass the Part 107 test and fly for any purpose (whether commercial or recreational) in nearly any location, or
- 2) Elect not to take the test but be limited to recreational and model aircraft rules, which require the operator to strictly comply with a set of community based guidelines, not fly near

airports or heliports without coordination, fly purely for recreational purposes, and satisfy other restrictive criteria.

While those holding a Part 107 certificate are permitted to operate commercially, Part 107 certificate holders are not restricted to commercial operations. Certificate holders can fly for any reason, including recreational purposes. It is unlikely the Part 107 test will discourage many prospective operators. The FAA has projected they will see a 90% pass rate for first time test takers and that all test takers will pass on the second attempt.

Model Aircraft Operators

Section 336 of Public Law 112-95 exempts from regulation model aircraft that are flown in strict conformity with all of the statutory criteria specified in the law. These statutory requirements have been codified as Part 101 of the FAA regulations. Part 101 requires satisfaction of all of the following criteria:

- 1) The aircraft is flown strictly for hobby or recreational use;
- 2) The aircraft is operated in accordance with a community-based set of safety guidelines



A drone is used to capture a panoramic view of the Benjamin Franklin Parkway in Philadelphia, Pennsylvania. Drones have enabled the public to capture stunning photos that would have been prohibitively expensive in the past.

and within the programming of a nationwide community-based organization;

- 3) The aircraft is limited to not more than 55 pounds unless otherwise certificated through a design, construction, inspection, flight test, and operational safety program administered by a community-based organization;
- 4) The aircraft is operated in a manner that does not interfere with and gives way to any manned aircraft; and
- 5) When flown within 5 miles of an airport, the operator of the aircraft provides the airport operator and the airport air traffic control tower (when an air traffic facility is located at the airport) with prior notice of the operation.

Failing to meet anyone of these requirements, even unintentionally, could expose a hobby or recreational flyer to FAA penalties for violating Part 107. If an individual fails to meet any of these requirements, he or she is deemed to be a Part 107 operator, and if they have failed to take the test and otherwise satisfy Part 107's operational requirements, the operator can be subject to an \$1100 civil penalty per regulation violated per flight.⁹

The FAA has also clarified how strictly they will read Part 101 (previously Section 336) requirements, expecting that operators will need to satisfy all of the statutory criteria. The agency said:

In order to operate under section 336 of Public Law 112-95, a model aircraft must, among other things, be “operated in accordance with a community based set of safety guidelines and within the programming of a nationwide community-based organization.” Today, the largest nationwide community-based organization that operates model aircraft is the Academy of Model Aeronautics (AMA). AMA’s safety code specifically prohibits “flying directly over unprotected people, vessels, vehicles or structures.”¹⁰

This is important for cities because the strict interpretation of Part 101 and the more permissive operating rules under Part 107 means that many operators might choose to become Part 107 operators for their recreational flights.

Public use of drones

In publishing Part 107, the FAA said the agency “is not making any changes to the final rule regarding public aircraft operations because this rule applies to civil aircraft operations only.”¹¹ Public organizations that wish to operate drones may still apply for and receive a Certificate of Waiver or Authorization (COA).¹² A COA allows an operator to fly drones in a specific place for a particular purpose and for a specific period of time, often up to two years. Once a public operator has a COA, they are able to self-certify their own pilots and are not held to Part 107 restrictions. When applying for waivers (such as for operating at night, outside of line of sight, or outside of class G airspace) the FAA generally processes those for COAs in about sixty days, whereas waivers for 107 operators average ninety days processing time. In addition, public operators may apply for an emergency COA if the situation meets the FAA’s requirements. An emergency COA is generally granted for a specific purpose in a limited time frame, and the turnaround for an emergency COA request is no longer than 24 hours.

However, public agencies are not required to obtain a COA if they instead choose to operate as a Part 107 civil operator. Specifically, the FAA has noted that public aircraft operators may choose to declare their operations to be civil operations, and thereby have greater flexibility in how their drones are operated. The FAA specifically said, “Under this rule, a public aircraft operation can continue to operate under a COA or can voluntarily operate as a civil aircraft in compliance with Part 107.”¹³ Doing so will provide “greater flexibility to public aircraft operations because it allows small UAS public aircraft operations to voluntarily opt into the Part 107 framework. In other words, a remote pilot may elect to operate his or her small UAS as a civil rather than a public aircraft

and comply with Part 107 requirements instead of obtaining a COA.”¹⁴

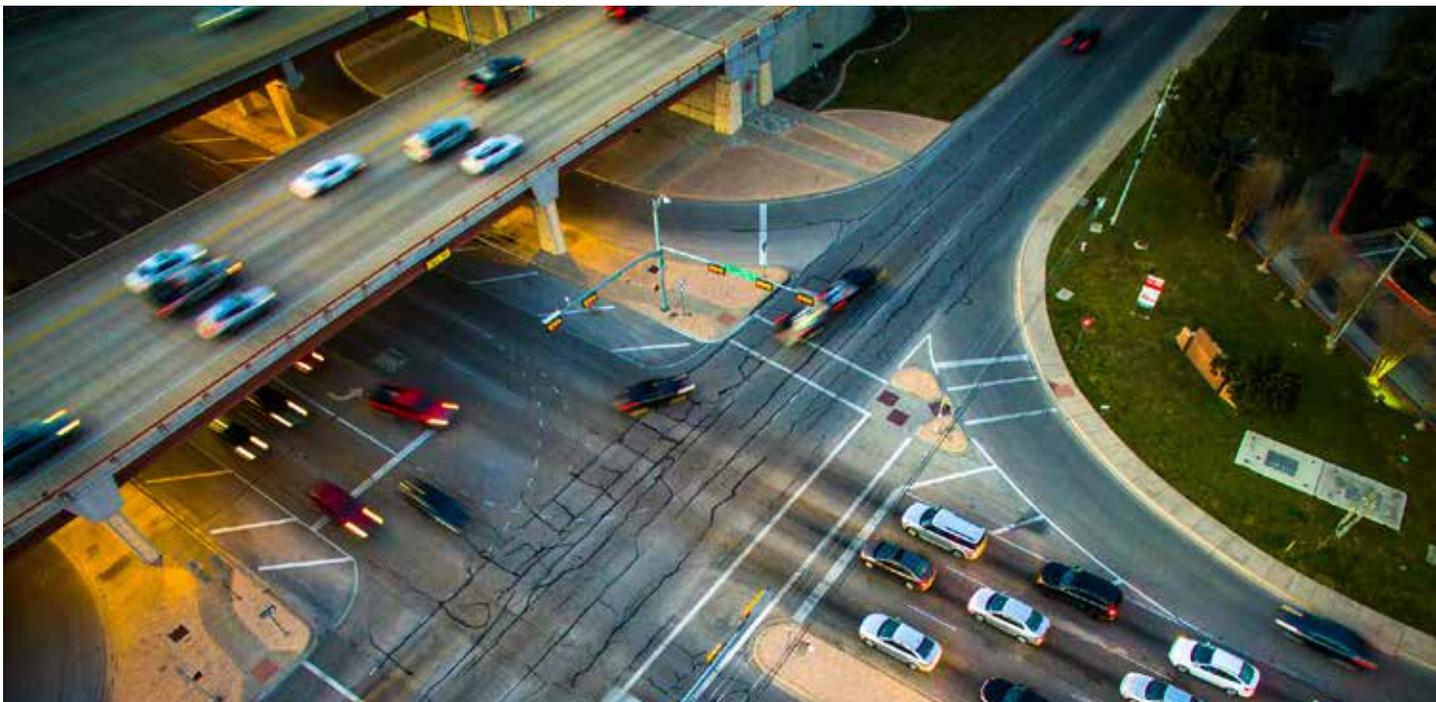
Qualified governmental entities like cities may choose to operate a public aircraft operation as long as they do so within the limits of the public aircraft statute. Under Part 107, “they may choose to operate their UAS as a civil aircraft instead, and operate under the civil regulations. Government entities have always had the option to do this with their manned aircraft; in some cases, government entities may be required to operate under civil regulations if their operations do not comply with the public aircraft statute. The new UAS regulations do not change this option or the requirements of the public aircraft statute.”¹⁵

Registration Requirements

As of December 2015, all drones that weigh over half a pound and that will be flown outside must be registered with the FAA before they can be flown.¹⁶ The FAA

hopes that new registration requirements will not only provide more accountability for drone users, but will serve as a conduit to help educate individuals about national regulations and safety practices, as many have no prior flying experience and may not be familiar with existing model aircraft regulations. Part 107 requires drone operators to comply with the requirements of § 91.203(a)(2). Section 91.203(a)(2) requires a person operating a civil small unmanned aircraft to have an effective U.S. registration certificate readily available.

The agency also stated that “the FAA will address preemption issues on a case-by-case basis rather than doing so in a rule of general applicability”.¹⁹ To date, the FAA has not taken legal action to challenge a city or state’s drone related laws. Moreover, cities have for years regulated the flight of remote controlled aircraft within cities and the FAA has not taken preemption action against these decades-old ordinances.



A drone monitors traffic at a busy intersection in the Round Rock area of Austin, Texas.





A civilian-operated drone captures a panoramic view of Mitchell, South Dakota at sunset.

How Can Local Governments Regulate Drones?

Local Authority Is Not Generally Preempted

In Part 107, the FAA acknowledges the authority of state and local officials to pass laws that may touch upon drone operations, noting “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.”¹⁷ Moreover, when it comes to regulating “flight altitude, flight paths; operational bans; or any regulation of the navigable airspace” the FAA did not indicate laws are preempted, rather the agency said “consultation with FAA is recommended.”¹⁸

Rather than asserting preemption, the FAA in Part 107 indicated many areas where state and local regulation may be appropriate, including the following:

- 1) “State law and other legal protections may already provide recourse for a person whose individual privacy, data privacy, private property rights, or intellectual property rights may be implicated by a remote pilot’s civil or public use of a UAS.”²⁰
- 2) “Property rights are beyond the scope of this rule. However, the provisions of this rule are not the only set of laws that may apply to the operation of a small UAS. With regard to property rights, trespassing... may be addressed by State and local trespassing law.”²¹
- 3) “[Drone operators] who do not have the facility owner’s permission to operate a UAS near or over the perimeter or interior of amusement parks and attractions may be violating state or local trespassing laws.”²²
- 4) “State law and other legal protections for individual privacy may provide recourse

for a person whose privacy may be affected through another person’s use of a UAS.”²³

Laws That Promote Accountability While Fostering Innovation

To protect communities, promote innovation, and avoid preemption, cities should focus on the following issues when enacting a drone related ordinance:

- 1) Use land use and zoning powers to designate when and where drones may take off, land, and operate, as well any operational limitations or criteria. To promote transparency, these zones can be communicated electronically and/or otherwise published on the city website so residents can easily comply with city law.
- 2) Create an ordinance that punishes operators for operating an unmanned aircraft in a manner that recklessly endangers persons or property while considering appropriate enforcement infrastructure.

This two tiered approach addresses the key municipal concerns related to the use of drones. It allows cities to make local decisions about drone operations, enabling innovative commercial uses while protecting and encouraging recreational flyers and the traditional model aircraft hobby. It also gives cities a mechanism for making carefully calibrated decisions that protect persons and property against unsafe behavior while encouraging good behavior.

At an FAA sponsored event in Daytona Beach, Florida in April of 2016, the General Counsel of the FAA, Reginald Govan, noted that cities have the authority to make reasonable time, manner, and place restrictions on the operation of unmanned aircraft. He reiterated these points at the Association of Unmanned Vehicle Systems International conference in May, 2016. Courts have held, and the FAA has reiterated, that 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.²⁴ Moreover, in March of 2016 the FAA’s MicroUAS Task Force (a group focused on rules for unmanned aircraft flights over people) recommended that UAS operators coordinate with state and local officials prior to their flight.²⁵

While cities have the right to enact time, manner, and place restrictions upon the use of drones, most cities want to exercise land use and policing authority in a way that does not inhibit the use of this new technology. Courts have regularly held that states and municipalities have the right, pursuant to their respective police powers, to regulate the use of land in any rational way, and such zoning decisions will be afforded a presumption of validity.²⁶ Accordingly, a regulation governing where an aircraft can takeoff and/or land will be constitutionally valid unless it is found to be “clearly arbitrary and unreasonable, having no substantial relationship to the public health, safety, moral or general welfare.”²⁷ Cities have substantial authority in this area, as regulations enacted with the stated purpose of protecting public

safety,²⁸ public health,²⁹ aesthetics,³⁰ and the general welfare³¹ are regularly found to be a legitimate exercise of a state’s or municipality’s police power.³² This includes regulations that prohibit an aircraft from taking off or landing in certain areas,³³ and regulations that prohibit certain in-flight activities that are directed at the local population.³⁴ A non-exhaustive list of jurisdictions that have regulated where an aircraft may takeoff or land includes Minnesota,³⁵ New York,³⁶ Florida,³⁷ California,³⁸ Illinois,³⁹ Oregon,⁴⁰ and Texas.⁴¹ In sum, several regulatory schemes targeting takeoffs and landings have been upheld.

Given that states and municipalities are generally permitted to regulate when and where aircraft takeoff and land, and because these regulations are afforded great deference by the courts, a state or municipality also has the ability to require notice of takeoffs and landings occurring within its jurisdiction. Indeed, if a state or municipality has the power to affirmatively prohibit takeoffs and landings from occurring in certain areas,⁴² it also has the lesser-included power to condition what steps must be taken to perform such takeoffs and landings, to include requiring notice be filed with the city prior to take-off and landing.⁴³

How Can Local Governments Use Drones?

Many cities are already experimenting with using drones to support the work of city departments. Common uses to date include law enforcement, firefighting, disaster relief, and search and rescue missions. Cities must obtain permission from the FAA to use drones for any type of government-related purpose; the process includes submitting plans for use and having a qualified pilot in place.

Local Laws on Government Drone Use

Local Government Use

Though several cities are currently experimenting with various ways in which drones can be used, fewer have delineated how public officials can use drones. Much of the legislation in this area has happened at the state level; over one third of all states have laws governing how public agencies can use drones, including at least 17 that outline use by law enforcement.⁴⁴ Many states require probable cause warrants before drones can be used, often with exceptions for terrorist attacks, natural disasters, and other emergencies.^{45 46} A few states, like Nevada⁴⁷ and Oregon,⁴⁸ require state registration of drones operated by public agencies.

Law Enforcement Use

Several cities are beginning to explore the use of drones for law enforcement activities, although most efforts are still in the testing stages. About a dozen local law enforcement agencies have received permission from the FAA to use drones as of December 2015.⁴⁹

Some local governments have purchased drones but are not using them while they wait for approval from the FAA or develop their own internal guidelines.

For instance, the San Jose Police Department purchased a drone in 2014, but is not using it while the department develops a policy in response to residents' privacy concerns.⁵⁵ The city of Berkeley passed a one-year moratorium banning the city police department from acquiring and using drones, while the San Francisco Recreation and Parks Department purchased nine drones in the fall of 2014 which are not being used until the city develops guidelines.⁵⁶

Firefighting

Drones may be a new tool for firefighting, particularly in fighting wildfires. Cutting-edge military-grade drones that are built to withstand intense heat can travel to locations where humans cannot, while infrared cameras can allow drones to navigate in low-visibility conditions.⁵⁷ Public officials hope that unmanned aerial vehicles will be able to assist firefighters by spotting new fires and monitoring fire conditions.

The Twin Falls (Idaho) Times-News reported in 2014 that, while wildfire fighting costs are a "major issue", at present the U.S. Bureau of Land Management and the U.S. Forest Service were still exploring how to incorporate drones into wildfire fighting efforts without creating new hazards for firefighting efforts already operating in those airspaces.⁵⁸ In California,

Examples of local law enforcement using UAVs

- The Arlington (Texas) Police Department first received federal authorization in 2013 to fly small helicopters across the city, a program that is still in operation. The department's two small unmanned aircraft systems (or sUAS) have been used for photographing crime scenes, searching for missing persons, and surveying damage after storms; the department also used one to monitor the scene of a seven-hour standoff with a homicide suspect at an Arlington apartment complex in 2013.⁵⁰ The small unmanned aircraft systems are not used for general surveillance, and the department does not plan to use them in police pursuits or to enforce traffic laws.⁵¹
- In Pennsylvania, the Upper Uwchlan Township Police Department purchased a drone in early 2015 and has used it to search for fugitives, monitor traffic, and photograph traffic accidents.⁵²
- As early as 2011, the Grand Forks (North Dakota) Police Department occasionally used unarmed predator drones based at Grand Forks Air Force Base in order to search for potentially armed suspects.⁵³ The Predator drones, which were owned by U.S. Customs and Border Protection, are much larger than the small drones that have typically been used domestically by hobbyists and local governments. North Dakota is one of the FAA's six UAS test sites, and the only test site where drones can be flown up to 1,200 feet above the entire state.⁵⁴

private drones have interfered with wildfire-fighting efforts once firefighting aircraft were forced to leave the area when the drones were spotted.⁵⁹

Rural Ambulances

Drones may be useful as rural ambulances, giving hospitals “eyes and ears” in rural emergency situations or even delivering supplies. Researchers from the Delft University of Technology in the Netherlands have developed a prototype for an ambulance drone “which includes wireless communications technology that would allow emergency personnel to instruct people near a heart attack victim how to use the drone’s defibrillator paddles.” Project creator Alec Momont explained that the drones would be capable of flying over 60 miles per hour, lowering the average ambulance response time from 10 minutes to one minute and increasing survival chances from eight percent to 80 percent. “The drone essentially becomes a flying toolbox for your emergency supplies,” Momont said.⁶⁰



Drones used for inspections

- In February 2015, the city of Somerville, Massachusetts, hired an aerial cinematography and multimedia company to survey municipal buildings for excessive snow buildup, using drones after city officials decided that a drone's live video coverage would be quicker than sending out in-person inspectors.⁶²
- The Tampa (Florida) Port Authority Board of Commissioners is currently in the application process for an FAA waiver allowing the port to use drones to survey Port Tampa Bay properties and construction projects. Port officials estimate that using drones for aerial surveying could save about \$180,000 annually.⁶³
- The city of Davenport, Iowa, purchased a drone in late 2014 for evaluation purposes.⁶⁴ City officials say the drone will not be put into operation until the city receives authorization from the FAA, which the city expects in 2016. A standard use policy has been written establishing guidelines for proper use, safety, and protection of public privacy. Officials say that many city departments are interested in learning about how a drone might be used for public safety, remote field inspections, and property and asset monitoring.⁶⁵

In mid-2015, Google was granted a patent for “providing emergency medical services using unmanned aerial vehicles” that would create a fleet of ambulance drones to provide medical supplies to stranded individuals in an emergency.⁶¹

Inspections

Aerial drone footage has the potential to help cities with time-consuming inspections of utilities or city property, particularly in the wake of extreme weather conditions.

Environmental Monitoring and Disaster Management

Though many small drones currently have difficulty flying in even moderate wind conditions, drones have great potential for surveying storm damage or locating people after natural disasters. They can also be useful for monitoring environmental conditions and mapping terrain.⁶⁶

Brewster Ambulance Service, a private sector emergency medical service provider that owns at least two drones, has contracted with local governments in several cities near Boston to provide aerial services. The drones are used for tasks such as surveying storm damage and monitoring fires.⁶⁷

Overview of Commercial Drone Use

The FAA has granted over five thousand Section 333 exemptions for drone use as of June 2016.⁶⁸ It expects that commercial drone use will increase dramatically over the next five years, with an expected 11 million commercial drones sold by 2020. The drones sold in 2020 alone are estimated to account for 40 percent of that figure.⁶⁹ While some commercial exemption applicants operate in specific industries, many provide aerial photography and data collection services that can be applied to various industries around the county.

Agriculture

Jerry Anderson, regional manager for the Iowa Farm Bureau Federation, told the Des Moines Register that drones represent a “huge potential” for precision farming and general agricultural use. “You can overlay these with the mapping characteristics you can get from soil types and harvest maps, and you can literally farm by the foot and take action as you need to during the growing season and as conditions warrant,” Anderson said.⁷⁰ Using drones to spray and treat crops could save time and money, and result in more precise applications of pesticides and other chemicals, reducing runoff in local waterways.

The use of commercial drones in the U.S. is still in its nascent stage, but countries such as Canada and Japan have already been using drones in agriculture for years, according to the Boston Globe.⁷¹ States will likely see an increase in the use of agricultural drones over the next few years as more companies obtain clearance from the FAA to operate commercially.

Aerial Photography

More than half (512) of the first 1000 commercial exemptions granted by the FAA were for general aerial photography. This sort of aerial imaging has become an important tool for a variety of industries, particularly real estate. An analysis done by the trade group Association for Unmanned Vehicle Systems International (AUVSI) of the first 1000 commercial drone exemptions granted by the FAA found that 350 exemptions mentioned using drones for real estate purposes.⁷²

Another growing sector is likely to be the film and television industry. The previous FAA restrictions on commercial drone use prevented their widespread use in domestic filmmaking, although companies such as Flying-Cam have been experimenting with drone cinematography for many years.⁷³ The television channel CNN has also recently obtained approval from the FAA to use drones for aerial photography and videography.⁷⁴

Package Delivery

Online retailer Amazon first announced that it was testing its Prime Air delivery service in December 2013.⁷⁵ In November 2015, Amazon unveiled new prototypes for drones that would deliver packages weighing up to five pounds to customers within 10 miles in 30 minutes or less.⁷⁶ The prototypes weigh about 50 pounds. The company hopes to be able to begin using the drones in the U.S. within the next three to five years, if FAA regulations allow.⁷⁷ Amazon is not alone; competitors such as Google, Alibaba, and Wal-Mart are developing drone delivery systems as well.⁷⁸

Drone Legislation: Issues and Trends

Major Issues

Privacy issues are one of the biggest concerns that the public has about drones.⁷⁹ As NLC-RISC has noted, the use of a drone for photography or video recordings “may pose no different or greater risk than recordings made through other means such as security cameras, street cameras, license plate readers, or body cameras.” On the other hand, the report notes, “the scope of a drone’s perspective is often much larger with granular detail easily accessible, which could give rise to greater public scrutiny of local government use of drones.”⁸⁰

FAA guidance already states that small drones may not fly over people, except those directly involved with the flight. However, the FAA has also said that, as its primary mission is aviation safety, it lacks the legal authority to issue privacy guidelines. It suggests that city governments should be able to address privacy concerns related to drones flying on private property under “noise and nuisance” laws.⁸¹

Given the popularity of drone-enabled photography, many legislatures have gone a step further, adding specific provisions prohibiting the use of drones for surveillance. For instance, the state of California has prohibited the use of any device (including drones) to record audio, images, or video of “another person engaging in a personal or familial activity under circumstances in which the other person had a reasonable expectation of privacy,” including any activity on residential property.⁸² Other legislation has prohibited the use of drones to surveil specific groups or activities: California banned paparazzi from operating drones over celebrities’ homes to shoot photos or video, and many states have laws prohibiting the use of drones to film or harass hunters and fisherman.⁸³

Another approach is to explicitly ban drones over certain types of structures. The Chicago city council took this approach when it passed an ordinance prohibiting drones from flying over churches, schools, hospitals, police stations, and private property without the owner’s consent.⁸⁴ At the sub-local level, many smaller entities – parks, state fairs, stadiums, and universities – are banning drones on their premises. For example, the University of Michigan at Ann Arbor banned drones from flying over football games at its Michigan Stadium,⁸⁵ and the University of Arkansas banned drones in its air space (without written approval) for the safety and privacy of its students.⁸⁶ In Georgia, a state resolution bans drone use within five miles of the heliport by the state capitol building in Atlanta, as well as near the governors’ mansion.⁸⁷

Most recently, in Part 107, the FAA responded to privacy concerns in their regulations by declining to act, stating that these matters are best addressed by state and local laws. The FAA also deferred to the National Telecommunications and Information Administration (NTIA) Multi-Stakeholder Best Practices document which was concurrently announced by the White House.⁸⁸ The document

recommends operators provide notice to individuals before taking their picture or operating a drone near them, to not harass people with a drone, and to not fly over people's property without permission.

Safety Issues

The devices commonly referred to as “drones” can range in size from a toy that weighs one or two pounds to large 55 pound drones used for movie filming, agricultural spraying or border surveillance. One public safety issue that arises is what happens when drones (of all sizes) fail and fall out of the sky. Cities may have to deal with questions of liability when drones malfunction, crash, are taken over by hackers, or otherwise are rendered beyond the control of their operator; these liability questions are of even more pressing importance regarding cities' own use of drones.

In general, it is not legal for individuals to attack or otherwise disable a drone they feel to be flying too close to them, regardless of whether they are on public or private property (although this did not keep the town of Deer Trail, Colorado, from considering – and ultimately rejecting – a 2014 measure that proposed issuing licenses to allow residents to hunt drones).⁸⁹ The FAA

told TIME magazine that shooting down a drone would be dangerous and “could result in criminal or civil liability, just as would firing at a manned airplane.”^{90 91}

Additionally, as drones become more common in American skies, congested airspace will become of increasing concern.⁹² Currently, almost all drones are prohibited from flying higher than 400 feet unless they are within 400 feet of a building. Small UAS operators are required to avoid manned aircraft, and to discontinue the flight when continuing would pose a hazard to other aircraft, people, or property. The FAA also requires that drone operators notify any airport within five miles, and has banned drones from flying within five miles of military installations.

Although drones are not supposed to fly at heights that would interfere with larger aircraft (and are banned from approaching too close, or in a reckless manner), there have been some sightings of drones near planes at up to several thousand feet.⁹³ Pilots reported close encounters with drones closer than 500 feet to their aircraft 241 times between December 2013 and September 2015.⁹⁴ And in states such as California, drones have interfered with wildfire-fighting efforts because firefighting aircraft had to leave the area when drones were spotted.



Drone technology allows for more expansive use of monitoring technologies, something that can be extremely productive to governments under many circumstances, such as surveying and safety assessment. However, privacy is a concern amongst the public.

To date, there have been no accidents caused by drones' proximity to airplanes, and few drones in use have the capability to fly that high. However, there have been numerous reported incidents involving drones crashing into city streets, injuring pedestrians, and otherwise causing harm on the ground, and in the low altitude airspace that is of greatest concern to cities.

Environmental Impact

The National Park Service (NPS) banned drones from national parks in 2014, in part to protect wildlife from being disturbed and in part to preserve the experience of park visitors.⁹⁵ There is an exception for the NPS to use drones for scientific studies, search and rescue operations, and fire-related situations, among other circumstances.⁹⁶

One of the incidents that prompted the National Park Service's ban on drones occurred in May 2014, when a drone flew close to a herd of bighorn sheep, scattering the herd and separating young sheep from their parents. According to the NPS, however, drones had

been an increasing presence within the park. An NPS statement said that this event "demonstrates the negative impact they can have on the wildlife within Zion National Park, particularly in the spring when many animals are caring for their young," adding that drones may also "prevent birds from successfully nesting or may cause nests to be abandoned if the birds feel harassed."⁹⁷

Park visitors are already prohibited from harassing wildlife, whether they use a drone or not. However, while the impact of drones on animals is only now being studied, it appears that just the presence of drones could be harmful to wildlife. A researcher from the University of Minnesota, for instance, found that the presence of drones consistently caused elevated heart rates in black bears from over 65 meters away, even when the bears did not show visible signs of stress.⁹⁸ Another wildlife biologist adds that drones could cause animals to injure themselves when attempting to avoid the devices, or disrupt animals' patterns and lead to "unnecessary energy expenditures," which could potentially affect some species' survival and reproductive success.⁹⁹

Movement in Congress

The House and the Senate both took action to regulate the use of non-commercial and commercial UAVs in each of their long-term bills to reauthorize the Federal Aviation Administration in 2016.

The House's Aviation Innovation, Reform, and Reauthorization Act of 2016 (H.R. 4441) and the Senate's Federal Aviation Administration (FAA) Reauthorization Act of 2016 (H.R. 636) both seek to address safety and risk concerns, foster innovation, and provide a structured integration of UAVs into the national airspace system. However, Section 2152 ("Effects on Other Laws") of the Senate bill takes the additional step of broadly preempting both states and cities from enacting laws related to the design, manufacture, testing, licensing, registration, certification, operation, or maintenance of an unmanned aircraft system, including airspace, altitude, flight paths, equipment or technology requirements, purpose of operations, and pilot, operator, and observer qualifications, training, and certification. Furthermore, states and cities would be prohibited from specifically including drones in laws related to nuisance, voyeurism, privacy, data security, harassment, reckless endangerment, wrongful death, personal injury, or property damage.¹⁰⁰

Section 2152 provides more explicit statutory preemption than has been provided even for manned flight. Decades of case law have adjudicated conflicts between federal and non-federal interests in manned aviation, and nothing under the Senate language would prevent the FAA from maintaining its authority to protect the safety and the efficiency of our airspace under the Federal

Aviation Act. Under this broad preemption of local authority, local regulators would not have the flexibility to protect local interests, including regulation of drones to protect personal privacy, public safety, and public spaces during large gatherings or special events.

While a bipartisan amendment (S.Amdt.3650) was offered to strike Section 2152 by Senators Dianne Feinstein (D-Calif.), Thom Tillis (R-N.C.), Richard Blumenthal (D-Conn.), David Perdue (R-Ga.), Ed Markey (D-Mass.), and Mike Lee (R-Utah), and had garnered the support of Senate leadership, votes on amendments to the bill were blocked for unrelated, procedural reasons and the Federal Aviation Administration Reauthorization Act of 2016 was ultimately passed in the Senate with Section 2152 intact.¹⁰¹

On July 13, 2016, Congress approved a short-term FAA extension that will continue funding for the agency through September 30, 2017. The extension includes a number of policy provisions related to aviation safety, security, and the operation of drones. However, the preemption language found in Section 2152 of the Senate bill was not included in the short-term extension. While this action provides an additional year of certainty for cities on this issue, it remains unclear whether or not either chamber will revisit preemption in 2017.

States Set Down Drone Laws in Absence of FAA Action

Much of the legislative activity that has taken place around regulation of unmanned aerial vehicles has been at the state level. Nineteen states passed some form of drone regulation in 2015, according to the National Conference of State Legislatures (NCSL), and 45 states were considering some form of legislation that year.¹⁰²

Guidelines on drone use by public entities, particularly law enforcement, are most common; as the Brookings Institution notes, one of the issues most frequently addressed by state laws is “limiting police usage of drones by requiring probable cause warrants,” often with exceptions for terrorist attacks, natural disasters, and other emergencies.¹⁰³ States such as Nevada¹⁰⁴ and Oregon¹⁰⁵ require registration of drones operated by public agencies, and a 2015 Maryland law declares that only the state (not cities or municipalities) can regulate drone usage within its borders.¹⁰⁶ State actions to strip cities of the right to regulate these devices leaves a significant enforcement gap. In the future, cities should be prepared to assert their authority if state lawmakers move to preempt it, and should advocate that lawmakers allow cities to reclaim their rights to protect their communities.

Few states have laws specifically addressing the commercial use of drones, and among laws addressing drone use by individuals, privacy and anti-surveillance concerns appear to be most common. Some are quite specific: several states also have laws that make it illegal to harass or take video surveillance of hunters and fishermen, and at least two ban hunting with a drone itself.¹⁰⁷



City Drone Policies

Local Governments Have Been Slow to Act

Though there is no comprehensive list of local legislation around drones, it is clear that there has been relatively little movement at the city level compared with action by the states, despite the fact that cities are most directly impacted by drone usage.¹⁰⁸

The Brookings Institution has described non-federal drone regulation as the “Wild West”,¹⁰⁹ and city officials are often hesitant to act unless compelled to by incidents in their communities.¹¹⁰ Many city leaders have said that they are waiting for additional guidance from the FAA on how to regulate drone usage by individuals and corporations.¹¹¹ With the release of Part 107, it is clear that the FAA is taking a hands-off approach to regulating drones. Appendix A presents issues raised by Part 107, and opportunities for cities to act.

Several cities, such as Santa Clara¹¹² and San Jose,¹¹³ have passed laws limiting drone use near special events such as the Super Bowl. Los Angeles passed an ordinance that reinforces an existing FAA prohibition against flying drones near airports without permission.¹¹⁴ Chicago and Miami were two of the first major cities to pass major drone legislation, as discussed further below. To date, none of these ordinances have faced preemption challenges from the FAA.

Given the general state of uncertainty, some cities have simply banned drones completely. For instance, in November 2015, the City Council of Ocean City, New Jersey, passed an ordinance banning drones for nine months (until September 2016) in order to allow the council time to consider the issue more thoroughly.¹¹⁵

Chicago's "Smart Regulations"

In November 2015, Chicago's city council made it the first major American city to pass a comprehensive drone ordinance.¹¹⁶ Ald. Edward Burke (14th), co-sponsor of the ordinance, said that "notwithstanding those proposals being discussed in Washington, Chicago simply needs local laws in place to authorize the city to take action against those who operate drones recklessly and threaten public safety."¹¹⁷

Colin Hinkle, the owner of a Chicago aerial photography company, told the Chicago Sun Times newspaper that, while he has already programmed his drones to follow existing restrictions such as staying below 400 feet and avoiding the city's Soldier Field stadium, he frequently works with clients who are unaware of the existing regulations on drone

usage. Hinkle said that compounding the general ignorance around national regulations is the willingness of some commercial operators to violate FAA regulations for a competitive advantage.¹¹⁸

In addition to codifying some guidelines already set down by the FAA, such as not flying out of sight of the operator or above 400 feet, Chicago's ordinances prohibits drones from flying within five miles of an airport, above open-air stadiums, within 500 feet of any electric generation facility or substation, or "directly over" a person or private property without consent.¹¹⁹ Furthermore, the ordinance essentially creates "no-fly zones" over schools, hospitals, police stations, or places of worship.

Miami, Florida

The Miami city council passed an ordinance in late 2015 limiting the use of recreational drones within a half-mile of events in parks, stadiums, open spaces, plazas, and streets that attract large groups, or over sporting or large-venue special events. The ordinance states that it "is not intended to preempt FAA rules, but to operate in conjunction with those rules to promote public safety while recognizing the limitations in the FAA's enforcement capabilities."¹²⁰ Similar language around special events has been used in ordinances in other cities such as Santa Clara¹²¹ and San Jose.¹²²

In addition to being one of the few pieces of city drone legislation passed to date, Miami's ordinance is notable for its role in highlighting tensions between local governments and the FAA. The New York Times reports that lawyers from the FAA called the city council to request changes to the ordinance specifying that the FAA is the ultimate authority of national airspace.¹²³ The council removed a permitting requirement for hobbyists that would have duplicated recent efforts by the FAA before approving the ordinance.

What's Next

The technology for commercial and hobbyist drones is still developing, and new technologies to allow cities to embrace and control drones are rapidly becoming available.

At present, many drones rely solely on the skill and knowledge of the drone operator to prevent them from flying where they should not. Some drone manufacturers offer geo-fencing systems, which can let an operator know that they are about to fly near restricted airspace, or simply prevent them from flying in certain areas. This type of geo-fenced information can include standard no-fly zones (such as near an airport or military base), temporary restrictions due to forest fires or major stadium events, or other sensitive areas such as prisons or power plants.¹²⁴ However, geo-fencing systems are neither required nor universal, and restricted airspace may still be violated due to technological malfunctions, pilot error, or deliberate malicious intent.

At the same time, most non-military drones used by consumers and commercial operators are fairly small, with short battery lives. Many highly-rated consumer drones have flight times of around 20 minutes.¹²⁵ Therefore, while current FAA regulations require that drones be operated within the line of sight of the operator, few would be capable of prolonged flight, such as between cities.

However, future advances in drones' guidance systems, such as geo-fencing or see-and-avoid technology, as well as improvements in drones' speed, size, and battery life could drastically alter what drones are capable of and how they are used. Established geo-fencing protocols could prevent drones from accidentally going where they

should not (although the protocols may not affect determined actions by people who want to break the law). Sense-and-avoid technology and other forms of automation could reduce the reliance on the operator's knowledge and skill. In addition, increased range and battery life means that drones could fly much greater distances than they can today. Taken together, this means that a drone could be programmed to fly from City A to City B, perhaps on a designated "drone highway" section of airspace, avoiding obstacles both expected (tall buildings, airplanes on predetermined flight path, other networked drones) and unexpected (birds).

As cities consider how to regulate drones, they should be aware of the present capabilities of drones as well as potential future developments. Cities should recognize that drones can bring enormous potential benefits, and that most of the possible harm drones pose can be ameliorated by (a) using land use and zoning power to define areas where drones may operate, and (b) punishing reckless operators.



A civilian-operated drone captures an image of the Miami, Florida skyline.

What's Steps Can Cities Take?

While the FAA is vested by Congress with “intensive and exclusive” responsibility over national airspace, the agency seeks to work with local governments in crafting local ordinances concerning drones. To this end, the FAA has released a fact sheet¹²⁶ considering the legal framework for local and state regulation of drones. While careful to stake its federal authority, the FAA expects complimentary and ever-evolving local laws and ordinances to be put in place.

While local laws cannot contradict any of the registration or operational statutes that the FAA has introduced, as of this writing they may still mandate added equipment or training and operational limitations or bans. The FAA requests that local governments consult with its Washington, D.C. office before drafting these laws.

While the FAA has no formal authority to influence local legislation, its own statutes may supersede local laws when the two conflict. Recent events, such as the city of Miami’s process of crafting drone legislation, show that the FAA expects to be consulted and may informally request changes to considered legislation.¹²⁷

There are three spheres of drone activity which city officials must by necessity deal with separately. Below is a list of issues which local governments may consider for future legislation, adapting for possible technological innovations with maximum flexibility.

Private Use

The main concerns over private drone use have to do with public safety and privacy. There are two broad methods of confronting this challenge.

Technology-Neutral Laws – These laws prohibit the act rather than the method, imposing similar

penalties on voyeurism or harassment whether accomplished with binoculars or drones. These laws can be strengthened locally and publicized in order to assure the public that its safety and privacy is still protected, regardless of new technological capabilities. These types of laws require no consultation with the FAA.

Technology-Specific Laws – These laws specifically curtail or prohibit the use of drones in certain locales or for certain purposes. Examples include laws prohibiting the use of drones over public monuments and buildings, places of worship, and schools. These laws are less flexible than their technology-neutral counterparts, and may need to be changed as technological advances see an increasing reliance on drones for private uses. Consultation with the FAA is recommended.

Commercial Use

The main concerns over commercial drone use have to do with legal liability, public safety, and negative externalities such as noise pollution and disturbing plant and animal life. While commercial drone usage may present new economic opportunities for cities, local leaders should begin to think about how and when they want to see widespread commercial drone use.

Zoning-Specific Laws – These laws use zoning to restrict the commercial use of drones. An example may be allowing commercial use of drones in a residential zone only between restricted times.

City-Wide Laws – These laws seek to impose greater restrictions and clear local expectations for the use of commercial drones. They could require additional registration for commercial drones operated within city limits, or require commercial drone permits. These types of laws require consultation with the FAA, as they are complementary to existing FAA requirements.

Public Use

The main concerns over the use of drones by public institutions have to do with privacy and civil rights. This is also a sphere where drones offer a great public utility and are likely to be increasingly employed.

Case-by-Case Basis – Requiring public agencies to submit requests for drone usage describing exactly how and when these drones will be used, and what internal agency rules will be drafted for their use, is a way of approaching public usage of drones with maximum flexibility and transparency. This type of approach does not require prior consultation with the FAA and mirrors the FAA's own public operator COA requirement.

Agency-wide Legislation – An example of this would be legislation curtailing the use of police drones for surveillance, or requiring prior approval. This type of legislation focuses on specific usages of drones by specific public agencies. While it has minimal flexibility, the legislation provides welcome assurances to the public. If the agency is a local agency such as a police department, no prior consultation with the FAA is necessary.

Conclusion

In the near future, our city airspace will certainly become more crowded and more automated. Drones of all sizes could begin providing emergency medical response, commercial package delivery, and private security services to households. While the FAA is expected to set national standards for any entity operated in navigable airspace, local governments will likely still be responsible for the bulk of enforcement. Cities have a significant role to play in developing their own regulations regarding drone usage.

The Law Enforcement Guidance Card¹²⁸ that the FAA has released for local enforcement use expects local protocols to be in place regarding the usage of drones. The FAA's fact sheet¹²⁹ for local and state regulation of drones is another helpful resource in determining how best to craft legislation over drone use. Ultimately, local governments should be aware that the terrain in this arena is always shifting, and that federal policy surrounding drones is likely to change in the near future. To best influence the development of drone related laws, cities should coordinate with State and Federal policymakers. Regardless of whether cities follow the suggestions in this municipal action guide or chart their own course, local leaders should consider the technological horizon and set clear expectations regarding the approved usages and limitations of drones in their communities.

Appendix A - Issues, Opportunities and Excerpts From Part 107

Overview

On Tuesday June 21, 2016, the FAA released regulations to govern the use of small unmanned aircraft, also known as drones. The regulations create low barriers to entry for anyone who wants to operate a drone for any purpose (whether commercial or recreational). The regulations focus exclusively on federal aviation safety concerns and leave open wide swaths of unregulated areas that are squarely within the purview of state and local officials. This document will provide an overview for state and local officials regarding the key areas in which the FAA has signaled to localities that they have an opportunity to act. It is important to note at the outset that the FAA explicitly and clearly rejected a call to generally preempt state and local governments, finding that local laws are important and oftentimes preferable to federal regulations.

As a threshold matter, it is important to make a terminology point. The new regulations are appropriately referred to as Part 107. In the past, the regulations have been incorrectly referred to as the rules for “commercial drone operators.” Part 107 has been incorrectly termed “commercial rules” because one of the benefits that those holding a Part 107 certificate gain is that they will be permitted to operate commercially. However, Part 107 certificate holders are not restricted to commercial operations; those holding a Part 107 certificate may operate for any reason whether recreational or commercial. As the following discussion will make clear, there are good reasons to believe that most drone pilots will choose to be Part 107 drone pilots.

Part 107 will allow individuals to fly for any purpose, whether commercial or recreational. A person who buys a drone will be faced with two options:

- 1) Take and pass the Part 107 required knowledge test and TSA background check and fly for any purpose (whether commercial or recreational) in nearly any location, or
- 2) Elect not to take the test and be limited to recreational and model aircraft rules (which will require the operator follow a restrictive set of community based guidelines and satisfy other restrictive criteria).

Because Part 107 is far more permissive than the statutory exemption for model aircraft and recreational operators, most recreational operators will likely choose to become Part 107 drone pilots. To become a Part 107 drone pilot, an approved individual must pass a knowledge test, TSA background check, and be 16 years of age or older. By its own admission, the FAA does not see the test as a significant barrier to the use of drones – the FAA predicts a 90% pass rate for first time test takers and that all test takers will pass on the second attempt.

Part 107 sets the bare minimum federal rules regarding the operation of drones. The FAA has made clear, and this appendix will highlight, the substantial areas in which state and local governments can act. This appendix will also suggest ways that state and local officials can supplement the FAA’s regulations with common sense, locally driven laws that ensure the safety of the public while enabling and encouraging drone operations.

The FAA was asked to use its regulatory authority to preempt state and local rules regarding drones. The FAA flatly rejected such calls for preemption, stating “The FAA is not persuaded that including a preemption provision in the final rule is warranted at this time.” The FAA even went so far as to say “certain legal aspects concerning small UAS use may be best addressed at the state or local level.”¹³⁰

The FAA declined to use its own regulatory authority to assert preemption, stating “specific regulatory text addressing preemption is not required.”¹³¹ Instead, the agency declared that “the FAA will address preemption issues on a case-by-case basis rather than doing so in a rule of general applicability.”¹³²

In reviewing the comments to its interim rule, the FAA considered and rejected claims that regulation at the state and local level would be confusing for drone operators, such that local regulations would likely result “in potentially conflicting rules” and “conflicting rules may lead to confusion, litigation costs, increased operational limitations, burden on UAS users, and delay in the adoption of UAS technology.”¹³³ The FAA also considered and rejected the comment that raised concerns about “a flood of legislation that might very well be more restrictive and controlling than that of the §336 community-based organizations.”¹³⁴

The FAA instead identified numerous areas in which state and local authorities may act. Specifically, the FAA said “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.”¹³⁵ Moreover, when it comes to regulating “flight altitude, flight paths; operational bans; or any regulation of the navigable airspace” the FAA did not say that

such laws are preempted, rather the agency said “consultation with FAA is recommended.”¹³⁶

Opportunity

The FAA has sent a clear signal to Congress and to State and local officials that preemption is not warranted. The FAA affirmed the substantial land use, zoning, trespass, privacy, and police powers of state and local officials that can be used to address the use of drones in their jurisdictions.

State and local officials can and should use their traditional powers to designate certain areas where take off, landing, and operation of drones is (a) permitted, (b) permitted subject to certain requirements (such as by electronic or telephonic notice, permits, signage, etc.), or (c) not permitted without some type of special exemption. State and local authorities should be careful to draft ordinances that fall within their traditional authority, and be wary of federal preemption in cases of imposing what might be interpreted as unnecessary burdens on drone operators, and duplicating or negating FAA regulations. Similarly, when regulating airspace, state and local authorities should stay within their land use and zoning powers focusing on the very low altitude airspace (adjacent to land, buildings, structures, trees, etc.) that is otherwise not navigable by manned aircraft. Legislating in this manner will avoid creating laws that may implicate the “navigable airspace”¹³⁷ and will minimize the need to consult with FAA officials.

Quotations from the FAA

*Adjudicating private property rights is beyond the scope of this rule. However, the provisions of this rule are not the only set of laws that may apply to the operation of a small UAS.*¹³⁸

the FAA will address preemption issues on a case-by-case basis rather than doing so in a rule of general applicability.¹³⁹

This rule does not address preemption issues because those issues necessitate a case-specific analysis that is not appropriate in a rule of general applicability. The FAA notes, however, that state governments have historically been able to regulate the takeoffs and landings of aircraft within their state boundaries.¹⁴⁰

The FAA is not persuaded that including a preemption provision in the final rule is warranted at this time. Preemption issues involving small UAS necessitate a case-

specific analysis that is not appropriate in a rule of general applicability. Additionally, certain legal aspects concerning small UAS use may be best addressed at the State or local level. For example, State law and other legal protections for individual privacy may provide recourse for a person whose privacy may be affected through another person's use of a UAS.¹⁴¹

The Fact Sheet also notes that 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.¹⁴²

Issue #2

Privacy

The FAA was asked to address privacy concerns in their regulations. The FAA declined to act, stating that these matters are best addressed by state and local laws. The FAA also deferred to the [NTIA Multi-Stakeholder Best Practices](#) document which was concurrently announced by the White House.

Opportunity

The drone industry participated in an NTIA process and overwhelmingly endorsed the document's best practices. The document recommends operators provide notice to individuals before taking their picture or operating a drone near them, to not harass people with a drone, and to not fly over people's property without permission.

Quotations from the FAA

Recognizing the importance of addressing privacy concerns in the proper forum, the FAA has partnered with other Federal

agencies with the mandate and expertise to identify, develop, and implement appropriate mitigation strategies to address privacy concerns.¹⁴³

State law and other legal protections may already provide recourse for a person whose individual privacy, data privacy, private property rights, or intellectual property rights may be impacted by a remote pilot's civil or public use of a UAS.¹⁴⁴

in light of the FAA's long-standing mission and authority as a safety agency, it would be overreaching for the FAA to enact regulations concerning privacy rights.¹⁴⁵

Commenters told the FAA that restricting where drones may operate and how they may operate implicates the First Amendment. The FAA rejected these claims and explained the basic principles of First Amendment doctrine as applied to drones.

Opportunity

The FAA's First Amendment analysis will be helpful for state and local officials crafting drone related laws. Local and state authorities should be aware that the FAA has reinforced its traditional purview over navigable airspace, including recreational drones, and they have specified that these regulations do not obstruct first amendment rights.

Quotations from the FAA

Under intermediate scrutiny, a restriction on speech must advance a “significant,” “substantial,” or “important,” (but not necessarily “compelling”) government interest, and the restriction must be narrowly tailored to achieve that interest.¹⁴⁶

This rule fulfills several legitimate needs, the most important of which is providing the safest, most efficient aerospace system in the world. The provisions at issue all align with that principle. As such, this rule (which does not discriminate based on the time, place or manner of any expressive conduct) is narrowly tailored to achieve a significant, substantial, and important government interest.¹⁴⁷

The flight of a small UAS is not speech—it is conduct other than speech which may incidentally restrict speech (e.g., news reporting, commercial speech, or aerial photography). However, for the reasons

discussed below, even if this rule were to be analyzed using the more stringent time, place, manner framework, the provisions of this rule would still be consistent with the First Amendment.¹⁴⁸

Similarly, this rule is directed at aviation safety and does not directly regulate reporting or other expressive activity. Anyone seeking to use a small UAS for photography or videography in a manner not permitted under this rule is free to utilize another method of photography or videography by, for example, using a manned aircraft, filming from a tall structure or landmark, filming from the ground, or using specialized equipment. Thus, the provisions of this rule meet the constitutional standard for an incidental restriction on speech, and enforcement would not implicate the First Amendment.¹⁴⁹

Issue #4

The Commercial-Recreational Distinction Is No Longer Acknowledged at the Federal Level

State and local officials should not think of the Part 107 Rule as the rule for “commercial operators”, as that distinction will become mostly an anachronism. The FAA has made clear that under their Part 107 regulations, the only requirement to operate drone aircraft weighing up to 55 pounds is that an individual become a Part 107 operator. Once an individual has a Part 107 certificate they may operate for any reason, whether commercial or recreational.

Opportunity

An opportunity exists for cities and states to determine whether they want to make a distinction within their jurisdiction between commercial and recreational drone usage. While there is no longer a distinction at the Federal level, cities and states should consider how to best regulate commercial drones in their communities. Examples of this include instituting additional commercial drone regulations and accountability mechanisms. Cities and states should consult with the FAA before instituting additional requirements for certain drone operations.

Quotations from the FAA

To qualify for a remote pilot certificate, a person must: Demonstrate aeronautical knowledge by...:

- *Passing an initial aeronautical knowledge test at an FAA-approved knowledge testing center [unless a person is already a manned pilot]*
- *Be vetted by the Transportation Security Administration.*
- *Be at least 16 years old¹⁵⁰*

To become certificated as remote pilot with a small UAS rating, an individual is only required to pass a knowledge test. The certification does not require an individual to attend ground school or to pass a practical skills exam, both of which are required to receive an airmen’s certification for sport pilot and above.¹⁵¹

The FAA estimates that a small UAS remote pilot applicant will expend 20 hours of self-study in preparation for taking the initial knowledge test.¹⁵²

The FAA assumes that the failure rate of applicants taking the small UAS initial and recurrent knowledge based test is 10% percent. However, applicants that fail are assumed to pass the knowledge test on their second attempt.¹⁵³

The FAA was asked to require that drone pilots notify non-participants of nearby drone flights. The FAA declined to regulate in this area, shouldering drone pilots with the responsibility for the safety of non-participants but leaving specific operational mandates concerning safety to local and state governments. The FAA was also asked to create safety procedures related to flights over public streets and sidewalks. The FAA decided to not regulate in this area, and is leaving it to drone pilots to determine how they want to structure their flights and whether or not they want to cease their flight when there is a potential safety risk. Because the FAA has said “it is up to the remote pilot in command to choose,” local officials may face individuals who believe they have a federal right to do as they please without regard to the instructions of local law enforcement.

Opportunity

State and local officials now have an opportunity to protect non-participants and passersby who may be injured, disturbed, annoyed, or troubled by drones operated in certain areas or at certain times of the day. The FAA has left unregulated an area that is squarely within the police power of state and local officials. Decisions about activities that may jeopardize pedestrians, street traffic, and public gatherings have been traditionally regulated by state and local officials. State and local officials should consider laws related to preventing careless and reckless operation, and requiring permits or notification to government officials prior to operations in certain areas (for example over crowded shopping districts, parades, large public gatherings, etc.) Ordinances considered should include enforcement infrastructure which enable the real-time prevention of violations.

Quotations from the FAA

This rule will not require that notice be given to non-participants prior to the operation of a small unmanned aircraft. Likewise, the rule will not prohibit the remote pilot from employing whatever means necessary to ensure that the small unmanned aircraft does not endanger the safety of bystanders, such as providing prior notice of operations. Providing notice to bystanders is simply one method that a remote pilot in command can utilize to clear the operating area (assuming that non-participants comply with the notice). However, providing such notice will not relieve the remote pilot in command of his or her duty to ensure the safety of non-participants.¹⁵⁴

...it is up to the remote pilot in command to choose the best way to structure his or her small UAS operation to ensure that prohibited flight over a person does not occur and that the small unmanned aircraft will not impact a person if it should fall during flight. The FAA anticipates that the remote pilot in command will need to determine an appropriate stand-off distance from nearby persons in order to comply with this requirement. With regard to the specific examples provided by the commenters, the FAA notes that the remote pilot in command is not required to cease small UAS flight if he or she can continue operating in a manner that ensures that the small unmanned aircraft will not fly over an unprotected non-participant.¹⁵⁵

Issue #6

The FAA Deferred to State and Local Trespassing Laws

The FAA was asked to address trespassing and drone flights over personal property without the permission of the property owner. The FAA admitted that property rights are beyond the scope of their rulemaking authority, and deferred to state and local trespassing laws.

Opportunity

State and local officials may want to examine how local trespassing laws may address drones. But, to ensure those laws are not Federally preempted, the trespassing laws should be focused on areas traditionally within the land use and zoning power of cities (i.e., operations taking place upon the land itself, and operations in the very low altitude airspace below building and treetop height).

Quotations from the FAA

“Property rights are beyond the scope of this rule. However, the FAA notes that, depending on the specific nature of the small UAS operation, the remote pilot in command may need to comply with State and local trespassing laws.”¹⁵⁶

Issue #7

The FAA Deferred to State and Local Laws Regarding Overflight of Key Facilities

The FAA was asked to create restrictions prohibiting drones from flying over amusement parks without permission. The FAA declined to act, deferring to state and local laws.

Opportunity

State and local officials may want to designate certain areas where UAS take off, landing, and operations are not permitted, or are not permitted without some steps being taken such as telephonic or electronic notice to a government official, receipt of a permit, and/or permission of a landowner.

Quotations from the FAA

The FAA also notes that hobbyists or other third parties who do not have the facility owner’s permission to operate UAS near or over the perimeter or interior of amusement parks and attractions may be violating State or local trespassing laws.¹⁵⁷

Issue #8

The FAA Failed to Act to Protect Critical Infrastructure

The FAA was asked to create restrictions on drones flying above and in proximity to power plants, prisons, refineries and other facilities. The FAA declined to create a prohibition, merely restating their unenforceable advisory that individuals should not fly near or above these facilities.

Opportunity

Drones have caused blackouts in cities by crashing into power lines, raising public safety concerns within the purview of police powers belonging to state and local government. Cities should consider restrictions or operational bans around and over critical infrastructure.

Quotations from the FAA

The FAA emphasizes FDC NOTAM 4/0811, which states that “...to the extent practicable, pilots are strongly advised to avoid the airspace above, or in proximity to such sites as power plants (nuclear, hydro-electric, or coal), dams, refineries, industrial complexes, military facilities and other similar facilities. Pilots should not circle as to loiter in the vicinity over these types of facilities.”¹¹³ This NOTAM applies with equal force to pilots of manned and unmanned aircraft. In response to EEI’s concern, the FAA notes that FDC NOTAM 4/0811 is advisory and thus, does not constitute a regulatory prohibition.¹⁵⁸

Issue #9

Under Part 107, Operators May Fly Close to Municipal Airports, Jeopardizing the Safety and Security of Those Facilities.

Many municipalities and local police departments have concerns about the safety of their local airports. Cities and airports asked the FAA to require Part 107 operators to coordinate with airports prior to operating in close proximity to those airports. The FAA has determined that they will not prohibit Part 107 operators from flying near the vast majority of airports, and that these operators can fly near large tower controlled airports with authorization.

Opportunity

Using their land use and zoning authority, state and local governments may designate areas where the takeoff, landing, and operation of drones is not

permissible without the operator first satisfying some criteria such as providing telephonic or electronic notice to the airport, the city, or otherwise obtaining permission or a permit of some type. State and local governments can leverage the low cost electronic notice tools that are already deployed at municipal airports to handle recreational operator notifications.

Quotations from the FAA

As an initial matter, the FAA notes that this rule will not prohibit any small UAS (including micro UAS) from operating near airports.¹⁵⁹

Because the NPRM did not contemplate prohibiting operations within the vicinity of an airport in class G airspace, the FAA will not restrict small UAS operations within a specified distance from an airport. Rather, in response to concerns regarding the integration of small UAS and manned aircraft, this rule will prohibit remote pilots from operating their small unmanned aircraft in a manner that interferes with operations and traffic patterns at airports, heliports, and seaplane bases.¹⁶⁰

The FAA expects that most remote pilots will avoid operating in the vicinity of airports because their aircraft generally do not require airport infrastructure, and the concentration of other aircraft increases in the vicinity of airports.¹⁶¹

Like ballooning, skydiving, banner towing, and other non-traditional aeronautical activities, the FAA expects that remote pilots will work with airport operators to identify ways to safely integrate small UAS operations into the flow of other operations at the airport.¹⁶²

In an effort to safely integrate small unmanned aircraft and manned aircraft at an airport, airport operators may recommend certain areas where small UAS operate, in order to avoid conflicts with manned aircraft.¹⁶³

Issue #10

The FAA Lacks the Resources to Enforce Drone Related Laws

The FAA was asked to delegate its compliance and law enforcement authority to local law enforcement officers. The FAA cannot delegate its authority, so it has asked state and local law enforcement to participate in helping with enforcement. However, state and local law enforcement generally cannot enforce Federal laws. In fact, from 2012 until 2016, the FAA only took enforcement action against 23 drone operators, despite a near prohibition on operations unless an individual had a manned pilots certificate.

Opportunity

State and local officials should craft laws designed to ensure that drones are operated in a safe manner by prohibiting careless and reckless operation of drones. It is important while crafting

legislation to consider channels of effective enforcement such as accountability infrastructure and building an enforcement capability within local police departments.

Quotations from the FAA

The FAA notes, however, that even though it cannot delegate its formal enforcement functions, it has worked closely with outside stakeholders to incorporate their assistance in its oversight processes. For example, the FAA has recently issued guidance to State and local law enforcement agencies to support the partnership between the FAA and these agencies in addressing unauthorized UAS activities. The FAA anticipates continuing its existing partnerships to help detect and address unauthorized UAS activities, and

the agency will consider other stakeholders' requests to be part of the process of ensuring the safe and lawful use of small UAS.¹⁶⁴

The FAA has long-established relationships with law enforcement and values the assistance that law enforcement provides

during accident/incident investigations. However, as discussed earlier, the FAA cannot delegate its formal enforcement authority to other entities such as local law enforcement personnel.¹⁶⁵

Issue #11

Accidents, Even Those Involving Significant Injuries Will Be Ignored by the FAA If They Don't Meet Certain Threshold Requirements

The FAA was asked to increase the reporting threshold for accidents. The agency created a rule that only accidents involving serious injury, loss of consciousness, or damage to property exceeding \$500 raise federal regulatory concerns that require reporting to the FAA. For example, the agency rejected a reporting requirement for injuries that might result in “a minor bruise” or would require medical attention short of hospitalization. Thus, an accident involving a UAS that required stitches, but not hospitalization, would not meet the FAA’s accident reporting threshold. The FAA felt such reporting would be a “burden on the remote pilots.” Because the FAA cannot delegate its enforcement authority, and because the FAA lacks enforcement resources, the agency has decided to set a high threshold for investigations. This will create a significant enforcement gap whereby accidents with injuries requiring medical treatment, but not hospitalization, or property damage up to \$499 will not be acknowledged by the FAA.

Opportunity

It is clear that the FAA’s threshold for accident reporting and investigations, their limited resources, and their focus on what might be a “burden on remote pilots” is not consistent with the types of public safety issues of concern to state and local officials. State and local officials should codify rules that (a) prohibit careless and reckless operation, (b)

prohibit leaving the scene of an accident involving a UAS, and (c) institute liability and insurance requirements.

Quotations from the FAA

Requiring remote pilots in command to report minimal injuries (such as a minor bruise from the unmanned aircraft) or minimal property damage (such as chipping a fleck of paint off an object) would impose a significant burden on the remote pilots. This burden would not correspond to a safety/oversight benefit because an operation resulting in minimal injury or minimal property damage may not correspond with a higher likelihood of a regulatory violation¹⁶⁶

Endnotes

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- 2** An Ordinance of the City of San Jose, Retrieved from http://sanjose.granicus.com/MetaViewer.php?view_id=2&event_id=1475&meta_id=544324
- 3** Ordinance Rule Number 15-01513, City of Miami, Retrieved from <http://egov.ci.miami.fl.us/Legistarweb/Attachments/83177.pdf>
- 4** Drones can be remotely piloted or fully autonomous, with most hobbyist drones falling into the former category. For more information, see the New York Times' brief guide to civilian drones: <http://www.nytimes.com/interactive/2015/technology/guide-to-civilian-drones.html>
- 5** Small toy helicopters have been used by hobbyists for years, and small "stunt drones" weighing less than one pound can be purchased in major department stores for under \$100; they are generally too small to carry a camera, and may be too small to be flown outside. The FAA considers drones weighing less than half a pound to be toys, and therefore does not require them to be registered.
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- 11** Federal Register / Vol. 81, No. 124 / 28 June 2016 / Rules and Regulations p42079. Retrieved from <https://www.gpo.gov/fdsys/pkg/FR-2016-06-28/pdf/2016-15079.pdf>
- 12** "Public entity" is broadly defined; the FAA says that if you receive funding from the federal government at some level, you are probably a public agency. Whether an operation qualifies as a public aircraft operation is determined by the FAA on a flight-by-flight basis, and takes into account factors such as who owns the drone, who operates it, and what the purpose of the flight is.
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- 14** *Ibid.*
- 15** *Ibid.*
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- 22** *Ibid.*, p.284
- 23** *Ibid.*, p.545
- 24** State and Local Regulation of Unmanned Aircraft Systems (UAS) Fact Sheet, citing Skysign International, Inc. v. City and

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- 25** Micro Unmanned Aircraft Systems Aviation Rulemaking Committee (ARC) Recommendations and Final Report (April 1, 2016). Retrieved from <http://uas.usgs.gov/pdf/FAA/FAA%20Micro-UAS-ARC-FINAL-Report.pdf>
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- 27** *Village of Euclid v. Ambler Realty Co.*, 272 U.S. 365, 385 (1926); *Cook v. Gates*, 528 F.3d 42, 62 n. 12 (1st Cir. 2008); *Smith v. City of Chicago*, 457 F.3d 643, 652 (7th Cir. 2006).
- 28** *Koscielski v. City of Minneapolis*, 435 F.3d 898, 902 (8th Cir. 2006).
- 29** *Grace United Methodist Church v. City Of Cheyenne*, 451 F.3d 643, 659 (10th Cir. 2006).
- 30** *Restigouche, Inc. v. Town of Jupiter*, 59 F.3d 1208, 1214 (11th Cir. 1995).
- 31** *Grace United*, 451 F.3d at 659.
- 32** See also FAA Docket No. 16-04-01 (Dec. 15, 2005), Aircraft Owners & Pilots Ass'n (Aopa) Members: Bill Bahlke, Reagan L. Dubose, Howard G. Soloff, Laurence K. Mellgren, David Watkins, Joseph Haughey, Robert Kwass, Herbert Jacobs, & Levent Erkmen, *Complainants*, 2005 WL 3722717, at *9 ("An airport may limit any given type, kind, or class of aeronautical use of the airport if such action is necessary for the safe operation of the airport or necessary to serve the civil aviation needs of the public.");
- 33** See, e.g., *Gustafson v. City of Lake Angelus*, 76 F.3d 778, 791 (6th Cir. 1996) (city's prohibition on landing seaplanes on lake within city limits did not violate riparian owner's equal protection rights, since all similarly situated persons were similarly regulated, and ordinance was rationally related to legitimate land use concerns over noise, danger, apprehension of danger, destruction of property values, and interferences with other lawful uses of lake); *Casciani v. Nesbitt*, 659 F. Supp. 2d 427, 439 (W.D.N.Y. 2009), *aff'd* 392 F. App'x 887 (2d Cir. 2010) (finding ordinance that permitted ultralight aircraft but not helicopters "quite plainly, rationally related to the protection of the health, safety and welfare of [the municipality's] residents"); *Caswell v. City of Bloomington*, 430 F.Supp.2d 907, 914 (D. Minn. 2006) (city's zoning ordinance regulating land use surrounding a newly constructed runway at municipal airport passed rational-basis test, since it was rationally related to legitimate government interest of protecting public safety).
- 34** See Rev. Ord. of Honolulu § 40-6.1 (prohibiting the use of "any type of aircraft or other self-propelled or buoyant airborne object" to "display in any manner or for any purpose whatsoever any sign or advertising device."); *Skysign Int'l*, 276 F.3d at 1117. But see *Banner Advertising, Inc. v. People of City of Boulder By and on Behalf of People of State of Colo.*, 868 P.2d 1077, 1083 (Colo. 1994) (en banc) (finding City of Boulder's ordinance regulating aircraft banner towing impermissible and preempted by federal law).
- 35** *City of Ham, Minnesota Ord. 9-470* ("It shall be unlawful for any person operating a Regulated Aircraft to take-off from or land upon any land in the City of Ham Lake except as provided herein."); *City of Ham, Minnesota Ord. 9-470.1* ("Regulated Aircraft are prohibited from landing or taking off in the R-1, R-2, R-M, ML-PUD, PUD, RS-1, and RS-2 zoning districts.");
- 36** N.Y. Gen. Bus. Law § 249 (providing in part that "[n]o person shall . . . establish a privately-owned airport . . . except by authorization of the governing body of the city, village or town in which such airport or any part thereof is proposed to be established or improved." For purposes of the statute, an "airport" is "any locality . . . which is used or intended to be used for the landing and take-off of aircraft . . ." See N.Y. Gen. Bus. L. § 240(4), (5) (incorporated by reference in § 249)).
- 37** Fla. Stat. Ann. § 330.30 (regulating the placement of airports, which are defined in § 330.27 as "an area of land or water used for, or intended to be used for, landing and takeoff of aircraft, including appurtenant areas, buildings, facilities, or rights-of-way necessary to facilitate such use or intended use.").

- 38** Cal. Pub. Utilities Code § 21663 (“It is unlawful for any political subdivision, any of its officers or employees, or any person to operate an airport unless an appropriate airport permit required by rule of the department has been issued by the department and has not subsequently been revoked.”).
- 39** 620 ILCS 5/42(b)(2) (permitting the State to “classify and approve airports and restricted landing areas and any alterations or extensions thereof” and defining airport in 620 ILCS 5/6(6) as “any area of land, water, or both, except a restricted landing area, which is designed for the landing and take-off of aircraft . . . and all appurtenant areas used or suitable for airport buildings or other airport facilities, and all appurtenant rights of way.”).
- 40** Oregon Rev. Stat. § 215.416(4) (county can impose conditions of approval); Skydive Oregon, Inc. v. Clackamas Cnty., 857 P.2d 879, 881–82 (Or. Ct. App. 1993) (citing Eighth Circuit opinion to find that federal preemption does not prohibit § 215.416(4) from applying to zoning regulations to aviation-related activities, such as take-offs and landings).
- 41** Tex. Code Ann. § 24.021 (penalizing anyone who “takes off, lands, or maneuvers an aircraft, whether heavier or lighter than air, on a public highway, road, or street, except [in emergencies].”).
- 42** See, e.g., Tex. Code Ann. § 24.021 (penalizing anyone who “takes off, lands, or maneuvers an aircraft, whether heavier or lighter than air, on a public highway, road, or street, except [in emergencies].”); Harrison, 572 A.2d at 534; Skydive Oregon, 857 P.2d at 882; Condor Corp., 912 F.2d at 219 (8th Cir. 1990).
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