

**ONE CENTIMETER OVER MY BACK YARD: WHERE DOES
FEDERAL PREEMPTION OF STATE DRONE REGULATION START?**

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The proliferation of small unmanned aircraft systems (microdrones) invites reconsideration of the limits of exclusive federal authority over aviation, which currently preempts state law. Public reaction to the drone phenomenon is generally adverse, putting pressure on state and local legislators to regulate drones. Many of them have enacted or are considering legislation and ordinances to do so.

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Many of the state and local initiatives are poorly thought out and fail to recognize that microdrones can be quite safe, relying on many internal systems that cause the drone to land immediately or to return to the launching point if something goes wrong. Most of the initiatives ignore federal preemption.

In regulating drones, the challenge is how to strike the right balance between allowing lawless operation and inhibiting the deployment of a promising new aviation technology.

There is room for state and local action. The number of microdrones in the air is already overwhelming the FAA's enforcement resources. State and local law-enforcement agencies must be able to reinforce the emerging regulatory regime and to have clear ground rules for doing so.

State and municipal regulation of commercial operators flying within and according to the limitations of their FAA granted authority is preempted. Organized model aircraft activity under traditional rules of the model aircraft clubs is safe. States and municipalities should focus their regulatory energies on casual hobbyists and on commercial operators who are defying FAA regulations and exemption procedures.

In the long run, a cooperative federal-state regime, modeled on that used for environmental protection and occupational safety and health may be desirable.

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I. INTRODUCTION

You look out your back window and see a small drone (unmanned aircraft system) hovering a few inches over your lawn, driving your dog crazy, and watching you watching it. Do you have to figure out how to report it to the Federal Aviation Administration (“FAA”) and wait for the FAA to send an inspector, or should you call the cops?

Since the ratification of the United States Constitution—creating a paradigmatic federal structure for governing the United States¹—new technologies have consistently raised new issues about the allocation of governing responsibility between the central government and the sovereign states that ceded some of their sovereignty to create the United States of America. Steamboats,² railroads,³ telegraphs and telephones,⁴ motor cars,⁵ wireless communications,⁶ aircraft,⁷ nuclear energy,⁸ the Internet,⁹ and

¹ See *Wesberry v. Sanders*, 376 U.S. 1, 9–10 (1964) (explaining genesis and result of federal constitutional convention).

² See, e.g., *United States v. Locke*, 529 U.S. 89, 99–100 (2000) (reviewing history of federal preemption of state regulation of steam vessels).

³ See, e.g., *Kurns v. R.R. Friction Prods. Corp.*, 132 S.Ct. 1261, 1266 (2012) (reviewing history of federal preemption of state requirements for railroad locomotives).

⁴ See, e.g., *American Tel. & Tel. Co. v. Cent. Office Tel., Inc.*, 524 U.S. 214, 222 (1998) (reviewing the history of “century-old filed rate” doctrine and holding that state damages action was preempted).

⁵ See, e.g., *Geier v. American Honda Motor Co.*, 529 U.S. 861, 869–70 (2000) (explaining federal preemption of state authority to regulate automobile airbags).

⁶ See, e.g., *Louisiana Pub. Serv. Comm’n v. FCC*, 476 U.S. 355, 368–70 (1986) (summarizing history of federal preemption of state regulation of wire and radio communications).

biotechnology¹⁰ each has raised questions anew about whether a more or less uniform body of national law, or a mosaic of different state and local laws, would advance social welfare the most.

The proliferation of commercial drones reignites old controversies over state and federal power. Sold by the thousands by Amazon and other online vendors,¹¹ and flown by hobbyists and for commercial purposes in a variety of industries, drones alarm privacy advocates, enrage anti-government zealots, make pilots fearful of midair collisions, and invite intervention by politically ambitious office holders and aspirants. At the same time, drones excite the entrepreneurial energies of private sector technology enthusiasts who have applied by the hundreds for governmental permission to operate them commercially,¹² and who forecast hundreds of thousands of new jobs and billions in economic growth.¹³

Drone regulation is inevitable, because like other flying objects, drones can be dangerous. Airplanes and helicopters are quite safe statistically, but even they occasionally destroy property

⁷ See *infra* Part III.C.

⁸ See, e.g., *Silkwood v. Kerr-McGee Corp.*, 464 U.S. 238, 257 (1984) (rejecting federal preemption of state punitive damages award involving nuclear power plant).

⁹ See, e.g., *Granholm v. Heald*, 544 U.S. 460, 467 (2005) (noting how Internet technology provoked clash over state regulation of wine sales; holding that state prohibition of out-of-state wine sales violated Commerce Clause).

¹⁰ See, e.g., *Wyeth v. Levine*, 555 U.S. 555, 565 (2009) (reviewing history of federal preemption of state regulation of drug safety).

¹¹ See Jason Reagan, *Drone Sales Figures for 2014 are Hard to Navigate*, DRONE LIFE (Jan. 24, 2015), <http://dronelife.com/2015/01/24/drone-sales-figures-2014-hard-navigate/> (analyzing figures for Amazon drone sales).

¹² See Section 333, FAA, https://www.faa.gov/uas/legislative_programs/section_333/ (reporting that the FAA has granted 1,891 section 333 exemptions as of 19 October 2015); *Snapshot of the First 500 Commercial UAS Exemptions*, AUVSI, <http://auvsilink.org/advocacy/Section333.html> (last visited Sept. 23, 2015).

¹³ See *The Economic Impact of Unmanned Aircraft Systems Integration in the United States*, AUVSI, <http://www.auvsi.org/auvsiresources/economicreport> (last visited Oct. 17, 2015).

and kill people.¹⁴ Helicopters and airplanes operate safely most of the time in a century-old web of customary practices and federal regulation. The FAA sets standards for the aircraft, the pilots that fly them, and the procedures of businesses that operate them. That traditional legal framework is ill-suited to drones. The balance struck between safety and economic productivity for airplanes carrying passengers and helicopters performing med-evac missions cannot merely be extended to much smaller air vehicles with no one and, usually, no flammable fuel on board. This article focuses on the allocation of responsibility among different levels of government, recognizing that much civilian drone activity will take place close to the ground and within greatly circumscribed horizontal ranges—matters traditionally regulated by states and municipalities rather than by the federal government. This article provides a framework within which an intergovernmental tug of war among federal aviation regulators, states, and municipalities can be addressed. The author and his frequent co-author, Eliot O. Sprague, have been active in exploring sound drone regulation in

¹⁴ See Matthew Chambers, *Transportation Safety by the Numbers*, UNITED STATES DEPARTMENT OF TRANSPORTATION, http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/by_the_numbers/transportation_safety/pdf/entire.pdf (comparing aviation safety statistics with motor vehicle accident statistics) (last visited Sept. 23, 2015).

other published articles.¹⁵ This article is the final in a series of four articles.¹⁶

II. DRONES

Any regulatory initiatives, whether federal, state, or local, should proceed from a solid understanding of the technology to be regulated. Accordingly, this section provides a basic technical background, explaining benefits and risks of different technologies, before discussing regulatory approaches.

¹⁵ See generally Henry H. Perritt, Jr. & Eliot O. Sprague, *Drones*, 17 VANDERBILT J. ENT. & TECH. L. 673 (2015); Henry H. Perritt, Jr. & Eliot O. Sprague, *Law Abiding Drones*, 16 COLUM. SCI. & TECH. L. REV. 385 (2015); Henry H. Perritt, Jr. & Eliot O. Sprague, *Developing DROP Discipline: Training and Testing Operators of Small Unmanned Aircraft Systems*, 7 HASTINGS SCI. & TECH. L. J. 143 (2015); Henry H. Perritt, Jr. & Eliot O. Sprague, *Seeking Law Abiding Drones: What to Tell Clients That Want to Use Drones in Their Business*, BUS. LAW TODAY, Oct. 2014, available at http://www.americanbar.org/publications/blt/2014/10/01_perritt.html. These articles assume, for the most part, that whatever regulation emerges will be federal and that drone-operator (“DROP”) behavior will be limited by restrictions imposed by private liability insurers and the prospect of tort liability for negligent operation. See Henry H. Perritt, Jr. & Eliot O. Sprague, *Law Abiding Drones*, 16 COLUM. SCI. & TECH. L. REV. 385, 439–44, 449–50 (2015).

¹⁶ This is the fourth in a series of articles about civilian drones, what the FAA calls “small Unmanned Aircraft Systems (“sUAS”). The first article explores the subject generally, introducing the important distinction between microdrones and machodrones and focusing on the engineering choices that are made that produce actual designs of aircraft in these distinct markets. Henry H. Perritt, Jr. & Eliot O. Sprague, *Drones*, 17 VANDERBILT J. ENT. & TECH. L. 673 (2015). The second article focuses more closely on vehicle design and explains that most of the rules contemplated by the FAA to ensure safe operation can be built into onboard systems. If drones may be sold only when they internalize aviation safety rules, the burden of enforcing traditional rules on hundreds of thousands of operators is eased considerably. Henry H. Perritt, Jr. & Eliot O. Sprague, *Law Abiding Drones*, 16 COLUM. SCI. & TECH. L. REV. 385 (2015). The third article focuses on human capital. It proposes that bureaucratic burdens be eased by delegating much of the responsibility for drone operator (“DROP”) training and certification to private organizations, extending the model traditionally used for civilian pilots in the United States. Henry H. Perritt, Jr. & Eliot O. Sprague, *Developing DROP Discipline: Training and Testing Operators of Small Unmanned Aircraft Systems*, 7 HASTINGS SCI. & TECH. L. J. 143 (2015).

More important, regulatory initiatives should focus on actual, rather than imagined, risks posed by the technology, quantified as much as possible. In other words, risk-based regulation should be the norm. Drone regulation also should impose performance standards rather than detailed engineering standards,¹⁷ which freeze technology at a particular point in time and discourage innovation. Finally, the burdens of any particular regulatory approach should be weighed against the benefit it produces to the public interest. All regulation necessarily excludes some low-probability risks with modest costs, when the burden of eliminating them is too high.¹⁸ The FAA has embraced all three of these principles in its NPRM,¹⁹ in its approach to the section 333 process.

A. *Drone Classification*

Drone technologies are embedded in two distinct groups of vehicles: microdrones and machodrones.²⁰ The boundary between the two groups is statutorily defined—anything weighing more than fifty-five pounds is a machodrone.²¹ The most popular small

¹⁷ See Henry H. Perritt, Jr. & Albert J. Plawinski, *Making Civilian Drones Safe: Performance Standards, Self-Certification, and Post-Sale Data Collection*, 14 NW. J. TECH. & INTEL. PROP. 13–17 (forthcoming Fall 2015) (explaining why performance standards are better than engineering design standards).

¹⁸ See *id.* at 14–17 (citing sources on risk-based regulation).

¹⁹ FAA, Operation and certification of small unmanned aircraft systems, 80 Fed. Reg. 9544, 9552, 9561 (proposed Feb. 23, 2015) (referring to risk-based and performance-based approach) [hereinafter “NPRM”].

²⁰ The article ignores altogether toy drones, those costing less than \$100, weighing only an ounce or two, and intended mainly to be flown inside.

²¹ The range from zero to fifty-five pounds is too large; a five-pound 3Drobotics Solo presents vastly different risks from a fifty-pound aircraft. An appropriate boundary between small microdrones and big ones—which might be called “mididrones” has not been defined, however. Maybe it should be the 3 kilogram/4.3 pounds that the UAS America Fund proposed for a special regulatory category known as micro sUAS. Petition of UAS America Fund, LLC (“UAS Fund”) to Adopt 14 C.F.R. Part 107 to Implement Operational Requirements for Micro Unmanned Aircraft Systems, <http://www.uasamericafund.com/assets/uas-america-fund-petition-rulemaking.pdf> (filed Dec. 18, 2014). In the NPRM, the FAA explicitly invited comment on this proposal. NPRM, 80 Fed. Reg. at 9556–57 (inviting comment on micro-sUAS idea). Maybe it should be eight pounds or twenty pounds.

drones fall at the low end of this range, including the various DJI Phantom models²² and the DJI Inspire 1, all of which weigh less than eight pounds. The DJI Spreading Wings S800, S900 and S1000, the FreeFly Cinestar 8, and many others are a little heavier, ranging from ten to twenty-five pounds with their payloads of more sophisticated cameras and gimbals.²³ DJI Phantoms account for more than fifty percent of the first 500 exemptions.²⁴

To facilitate navigation, virtually all drones have electronic magnetic compasses (magnetometers), altimeters, and GPS navigation.²⁵ Most drones have autonomous safety features, usually including automatic take off, landing, and hover; automatic return to home at the command of the drone operator (“DROP”) or if the control link is interrupted; and geo-fencing, which keeps the drone within a certain distance of the DROP, below a certain altitude,

²² *About DJI*, DJI TECHNOLOGY, <http://www.dji.com/company> (last visited Sept. 23, 2015). See *Snapshot of the First 500 Commercial UAS Exemptions*, AUVSI, <http://auvsilink.org/advocacy/Section333.html> (last visited Sept. 23, 2015).

²³ The most popular microdrone is the DJI Phantom, which comes in various models with prices clustered around \$1,000. Options include a built-in gimbaled camera or a gimbal for a GoPro camera. The DJI Phantom, <http://www.dji.com/product/phantom>, is a quadcopter, with a diagonal size of 14 inches. It has a maximum gross weight of 2.6 pounds. A close competitor is the 3drobotics Solo, <http://3drobotics.com/solo-gopro-drone-specs/>, also a quadcopter, with a diagonal size of 23 inches. It has a maximum gross weight of 3.3 pounds. Larger vehicles in the microdrone category include the SJI S1000, <http://www.dji.com/product/spreading-wings-s1000/spec>, an octocopter, with a diagonal size of forty-eight inches and maximum gross weight of twenty-four pounds, and the similarly sized Cinestar 8. See http://www.quadrocopter.com/CineStar-8-MK-Heavy-Lift-RTF_p_1156.html (describing Cinestar 8 HL). All of them have maximum endurance of about 20 minutes and autonomous flight control and navigation features, including automatic hover, automatic return to home, and the ability to fly among pre-programmed waypoints. The smaller ones carry GoPro-sized cameras on 2- or 3-axis gimbals with the ability to downlink video. The larger ones can carry larger camera packages up to and including the Red camera used by professional cinematographers, and more sophisticated gimbals.

²⁴ AUVSI, *supra* note 22.

²⁵ See, e.g., *DJI*, DJI, <http://www.dji.com> (last visited Oct. 17, 2015); 3D ROBOTICS, <http://3drobotics.com> (last visited Oct. 17, 2015).

and excludes it from airports and other controlled airspace.²⁶ Most of them can autonomously fly a flight plan defined in advance by entering waypoints, and modifiable in flight.²⁷

Microdrones share many basic characteristics. They are typically multicopters—quadcopters for the smaller products, and hexacopters or octocopters for the bigger ones.²⁸ They all have electrical propulsion systems, powered by batteries driving a motor on each rotor.²⁹ Sophisticated electronic control systems adjust vehicle attitude and orientation by varying rotor RPM differentially, obviating the need for most of the mechanical complexity on helicopters.³⁰ Most microdrones have endurance within the fifteen to twenty minute range, and few have endurance greater than thirty minutes.³¹ With maximum speeds of about forty knots, their theoretical range is ten to twenty miles.³² As a practical matter though, the spread-spectrum wireless technologies used for their control links limit them to less than a mile.³³ Microdrones

²⁶ *No FLY Zones*, DJI, <http://www.dji.com/fly-safe/category-mc> (last visited Sept. 26, 2015).

²⁷ 3D Robotics, *Mission Planner*, 3D ROBOTICS, <http://3drobotics.com/kb/mission-planning/> (last visited Oct. 15, 2015).

²⁸ *See All Products*, DJI, <http://www.dji.com/products> (last visited Oct. 15, 2015) (providing overview of product line, ranging from quadcopter Phantom series to hexacopter Spreading Wings S900 and octocopter Spreading Wings S1000); *Ready to Fly*, QUADROPTER.COM, http://www.quadrocopter.com/Ready-To-Fly_c_70.html (last visited Oct. 15, 2015) (summarizing available models, ranging from quadcopter Blade 350 QX3 RTF to octocopter CineStar-8 Heavy Lift RTF).

²⁹ *See Aurelian lordache, TED - Drones, how do they work? The basics explained*, YOUTUBE (June 13, 2013), <https://www.youtube.com/watch?v=d250ixtyew> (demonstrating and explaining basic microdrone subsystems).

³⁰ DJI, *supra* note 28.

³¹ 3D Robotics, *Solo Specs: Just the Facts*, 3D ROBOTICS (May 4, 2015), <http://3drobotics.com/solo-gopro-drone-specs/>.

³² DJI, *Inspire 1*, <http://www.dji.com/product/inspire-1/spec> (last visited Oct. 15, 2015) (specifying maximum speed as twenty-two meters-per-second, or forty-three knots). A speed of forty-three knots, multiplied by a flight time of 0.5 hour, results in range of 21.5 miles.

³³ *See* DJI, *Phantom 3 Professional*, WIKI.DJI, http://wiki.dji.com/en/index.php/Phantom_3_Professional (last visited Sept. 26, 2015).

have enough thrust to fly up to several thousand feet above sea level.³⁴

Only a few machodrones have entered the market.³⁵ Their design will not crystallize until users gain more experience with widely varying configurations. Machodrones are, by definition, heavier, approaching the weight of small airplanes and helicopters.³⁶ They are more likely to have gasoline, diesel, or turboshaft propulsion systems to allow greater endurance and range than is available from the smaller vehicles.³⁷ To justify their cost, they will have to fly beyond line of sight and at altitudes that will cause them to intermingle with manned aircraft. It is far from clear whether their capabilities will justify their higher cost, which is likely to be comparable to, or to exceed that of airplanes and helicopters in similar weight classes.

B. *Benefits*

The explosion of interest in civilian drones is fueled by an appreciation of their utility. Reporter Charlie Rose's November, 2013 interview with Amazon CEO Jeff Bezos accelerated public interest in drones.³⁸ The reasons for the interest are clear. Microdrones can make aviation support—especially aerial imagery—available where it previously was impractical due to cost or risk of using manned aircraft.³⁹ Microdrones have acquisition

³⁴ *Id.*

³⁵ See, e.g., AVINC, http://www.avinc.com/uas/small_uas/ (last visited Oct. 17, 2015)

³⁶ See *Kaman K-MAX Aerial Truck: Built to Lift*, KAMAN, <http://www.kaman.com/files/file/PDFs/Helicopter%20PDFs/KMAXBTLProductCard.pdf> (last visited Oct. 15, 2015) (providing specifications for this particular model of machodrone).

³⁷ See generally *High Altitude Long Endurance UAV*, AVINC.COM, https://www.avinc.com/glossary/high_altitude_long_endurance_uav (last visited Sept. 26, 2014).

³⁸ *Amazon's Jeff Bezos looks to the future*, CBS NEWS, <http://www.cbsnews.com/videos/amazons-jeff-bezos-looks-to-the-future/> (last visited Sept. 24, 2015) (video recording of interview).

³⁹ NPRM, 80 Fed. Reg. 9544 (proposed Feb. 23, 2015) (summarizing benefits of microdrones).

costs two-to-three orders of magnitude less than helicopters and airplanes.⁴⁰ Their operating costs are similarly lower, although crew costs may turn out to be comparable, if DROP compensation resembles that for pilots—the labor market for DROPs is in its infancy.

The limited payload capability of the smaller drones means that they are primarily useful for aerial imaging. Typical applications include: event photography; aerial photography and videos for marketing of real estate and boats; aerial inspection of utility infrastructure, such as pipelines, powerlines, railroads, and bridges; traffic and breaking news coverage for television; assessment of damage from natural disasters; motion picture and television production; and crop inspection for precision agriculture.⁴¹

Such applications have provided incentives for more than 2,500 individuals and business entities to apply for permits to operate commercially.⁴² More than 1,900 of the applications have been granted, at the rate of 50 or so per week.⁴³

In the future, drones may be able to deliver packages and disaster relief supplies. Drone proponents project creation of 100,000 jobs and \$82 billion in contributions to economic growth.⁴⁴ While this is likely overblown, the potential contribution to economic growth and employment is undoubtedly substantial.

⁴⁰ A DJI Phantom 3 Professional with accessories retails for \$1259. *DJI Phantom 3 Professional Quadcopter Drone with 4K UHD Video Camera*, AMAZON.COM, http://www.amazon.com/DJI-Phantom-Professional-Quadcopter-Camera/dp/B00VSITBJO/ref=sr_1_2?ie=UTF8&qid=1443147126&sr=8-2&keywords=dji+phantom (last visited Sept. 25, 2015). A light helicopter, such as the Airbus AS350 retails for about \$2 million. AIRCRAFTCOMPARE.COM, <http://www.aircraftcompare.com/helicopter-airplane/Eurocopter-AS350-B3/233> (last visited Sept. 24, 2015).

⁴¹ AUVSI, *supra* note 22.

⁴² Refers to section 333 exemptions, see *infra* Part IV.A.

⁴³ Authors calculated this number through observation of new applications granted each week.

⁴⁴ Darryl Jenkins & Dr. Bijan Vasigh, *The Economic Impact of Unmanned Aircraft Systems Integration in the United States*, AUVSI (Mar. 2013), <http://www.auvsi.org/econreport>; see also Marcelo Ballvé, *The Drones Report: Market Forecasts For Commercial Applications, Regulatory Process, And*

C. Risks

Because microdrones are lighter than helicopters and airplanes, the safety risks of using microdrones are lower.⁴⁵ In the event of a crash, the kinetic energy to be absorbed is minuscule compared to that of a traditional manned aircraft crash.⁴⁶ Drones also do not carry fuel—thus presenting a *de minimis* fire risk—and cannot carry people—removing the risks to aircrews and passengers that drive so much of traditional aviation regulation.⁴⁷

Operating a microdrone is not without risk, however. Even a smaller model such as a Phantom⁴⁸ can cut someone badly with its blades, or create a panic if it approaches a crowd. Even small models can be quite heavy—a Phantom weighs about as much as a pigeon, and Cinestar 8 weighs about as much as a goose.⁴⁹ Such a model could probably cause damage to helicopter bubbles (windshields) and airplane engines similar to the damage resulting from a bird collision.⁵⁰ Microdrones can also distract people

Leading Players, BI INTELLIGENCE (Feb. 26, 2015), <http://www.businessinsider.com/aerial-drones-market-forecasts-regulatory-barriers-and-leading-commercial-applications-2015-1> (forecasting \$13 billion in annual spending by 2024, up from \$6 billion in 2014).

⁴⁵ A DJI Inspire has a gross weight of 6.5 pounds (2935 grams). *Inspire 1*, DJI, <http://www.dji.com/product/inspire-1/spec> (last visited Oct. 15, 2015). An AS350 helicopter has a gross weight of 5,666 pounds. *Eurocopter AS350 B3*, AIRCRAFT COMPARE, <http://www.aircraftcompare.com/aircraft-specification/Eurocopter-AS350-B3/233/spec> (last visited Oct. 15, 2015).

⁴⁶ See Henry H. Perritt, Jr. & Eliot O. Sprague, *Drones*, 17 VAND. J. ENT. & TECH. L. 673, 713 (2015) (explaining the relationship between weight and kinetic energy).

⁴⁷ See *supra* note 18 and accompanying text (assessing risks posed by microdrones).

⁴⁸ See AUVSI, *supra* note 22

⁴⁹ See *supra* notes 22–23 and accompanying text.

⁵⁰ The resistance to bird strikes is tested extensively before any airplane or helicopter receives an airworthiness and type certificate. 14 C.F.R. § 33.76 (2007) (bird-strike test requirements). The large LiPo batteries and metal structural components on microdrones, however, absorb energy differently from bird bodies, and therefore testing beyond birds is necessary. See C. Fremgen et al, *Modeling and testing of energy absorbing lightweight materials and structures for automotive applications*, 6 SCIENCE AND TECHNOLOGY OF ADVANCED MATERIALS 883 (2005), available at <http://iopscience.iop.org/article/>

performing potentially dangerous activities such as driving. A driver seeing a small drone in front of her might be inclined to swerve and apply the brakes, potentially causing an accident.

Additionally, the autonomous safety features of microdrones have limitations. The control links and GPS communications necessary for most of them are unreliable. It is common for a drone to fly away—a situation in which the drone ignores DROP commands and ascends beyond desired heights or flies beyond programmed or commanded distances from the DROP.⁵¹

Machodrones create far greater risk than microdrones—a risk similar to or greater than manned aircraft. Because machodrones are heavier, they must dissipate more kinetic energy in a crash. Additionally, machodrones are more likely to carry combustible fuel. Their occupancy of higher levels of airspace magnifies the risk of mid-air collisions. The fact that their DROPs are on the ground makes it more difficult for them to honor the see-and-avoid principle⁵² that is the mainstay of traditional flight rules.

D. Regulatory Approaches

Risk-based regulation should be the norm. Drone regulation should focus on actual, quantified risks posed by the technology, rather than imagined risks, and should impose performance standards, rather than detailed engineering standards.⁵³ Engineering standards freeze technology at a particular point in time and discourage innovation. Finally, the burdens of any particular regulatory approach should be weighed against the benefit it produces to the public interest. All regulation necessarily excludes

10.1016/j.stam.2005.07.007/pdf;jsessionid=88323AD4366831CC573894B3D5C7E018.c1 (explaining analysis of energy absorption capability of different materials); Pizhong Qiao, *et al*, *Impact Mechanics and High-Energy Absorbing Materials: Review* (2008), <http://digitalcommons.unl.edu/engineeringmechanicsfacpub/62/>.

⁵¹ Perritt & Sprague, *Drones*, 17 VAND. J. ENT. & TECH. L. at 692 (describing flyaway).

⁵² See 14 C.F.R. § 91.113(b) (imposing obligation to see and avoid other aircraft).

⁵³ See Perritt & Plawinski, *supra* note 17 (explaining why performance standards are better than engineering design standards).

some low-probability risks with modest costs, when the burden of eliminating them is too high.⁵⁴ The FAA has embraced all three of these principles in its Notice of Proposed Rulemaking (NPRM).⁵⁵

The FAA has been studying civilian drones since at least 2007, when it published a Federal Register notice on drones.⁵⁶ The notice described a process for obtaining approval for civilian flight through special airworthiness certificates. The process was extremely cumbersome, and mandated data submissions borrowed irrationally from the requirements for experimental airplanes and helicopters. Until 2012, the agency relied mostly on its slow moving advisory committee process to tell it how to proceed.⁵⁷

In 2012, Congress enacted the 2012 FAA Reauthorization and Revitalization Act (“2012 Act”),⁵⁸ which contained several explicit sections requiring the FAA to move faster and ultimately to integrate civilian drones into the National Airspace System. The law requires the FAA to develop a comprehensive plan and a roadmap,⁵⁹ propose rules, and then finalize them,⁶⁰ following an incremental approach. It encourages the FAA to allow lower risk drones to be flown commercially while more complex issues relating to high-risk, heavier drones are being worked out.⁶¹ In section 333, it also authorizes interim procedures that would allow

⁵⁴ See *id.* at 6 (citing sources on risk-based regulation).

⁵⁵ See *supra* note 21 and accompanying text (referring to risk-based and performance-based approach).

⁵⁶ Unmanned Aircraft Operations in the National Airspace System, 72 Fed. Reg. 6689 (Feb. 13, 2007) (to be codified at 14 C.F.R. pt. 91).

⁵⁷ See Aviation Rulemaking Advisory Committee (ARAC), FAA, http://www.faa.gov/regulations_policies/rulemaking/committees/documents/index.cfm/committee/browse/committeeID/1. (last visited Oct. 15, 2015). The most recent posting of the Unmanned Aerospace Vehicles (UAV) Operations Working Group (WG) is dated 1991.

⁵⁸ FAA Modernization and Reform Act of 2012, Pub. L. 112-95, 126 Stat. 11) [hereinafter “2012 Act”].

⁵⁹ *Id.* § 332(a) (1) (comprehensive plan); *id.* § 332(a)(5) (roadmap).

⁶⁰ *Id.* § 332(b).

⁶¹ *Id.*

commercial drone flight in specific cases even before the FAA develops more general regulations.⁶²

The FAA issued the required comprehensive plan⁶³ and roadmap in 2013,⁶⁴ began a section 333 exemption process in late 2014,⁶⁵ and published a notice of proposed rulemaking for microdrones and mididrones in early 2015.⁶⁶ The exemption process resulted in the grant of more than 1,200 section 333 exemptions by mid-2015.⁶⁷ Pursuant to the statute,⁶⁸ the FAA established six test ranges around the country.⁶⁹ The ranges were slow to take off for two reasons: needlessly cumbersome application and approval requirements were initially imposed for every drone flight on the test ranges; and the FAA was initially reluctant to give guidance on the research and demonstration activities that would be most relevant to its regulatory development.⁷⁰ Under considerable congressional pressure, the

⁶² *Id.* § 333.

⁶³ *Unmanned Aircraft Systems (UAS) Comprehensive Plan*, FAA (Sept. 2013), http://www.faa.gov/about/office_org/headquarters_offices/agi/reports/media/uas_comprehensive_plan.pdf (last visited Oct. 15, 2015).

⁶⁴ *Integration of Civil Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) Roadmap*, FAA (2013), http://www.faa.gov/uas/media/uas_roadmap_2013.pdf (last visited Oct. 15, 2015).

⁶⁵ *Unmanned Aircraft Systems*, FAA, https://www.faa.gov/uas/legislative_programs/section_333/ (last visited Oct. 15, 2015); see *Astraeus Aerial - Exemption Rulemaking*, FAA-2014-0352, <http://www.regulations.gov/#!docketDetail;D=FAA-2014-0352> (Sep. 25, 2014).

⁶⁶ *Supra* note 21 and accompanying text.

⁶⁷ *Section 333*, FAA, https://www.faa.gov/uas/legislative_programs/section_333/ (last visited Sept. 25, 2015) (summarizing number of exemptions granted).

⁶⁸ 2012 Act, Pub. L. 112-95, § 332(c), 126 Stat. 11 (requiring establishment of “pilot projects”).

⁶⁹ *Test Sites*, FAA, https://www.faa.gov/uas/legislative_programs/test_sites/ (last visited Sept. 25, 2015) (announcing test sites).

⁷⁰ *Unmanned Aerial Systems: Efforts Made toward Integration into the National Airspace Continue, but Many Actions Still Required* UNITED STATES GOVERNMENT ACCOUNTABILITY OFFICE (Dec. 10, 2014), <http://gao.gov/assets/670/667346.pdf>; *FAA Faces Significant Barriers to Safely Integrate Unmanned Aircraft Systems into the National Airspace System*, Report Number: AV-2014-061, OFFICE OF INSPECTOR GENERAL (June 26, 2014),

FAA began to allow the test ranges to become more useful in early 2015, by steering drone demonstration and experimentation activities to the test centers and by articulating more clearly the data needs for regulatory action.⁷¹

The agency also has entered into a handful of cooperative ventures with industry to facilitate technology development which would enable broader use of machodrones. In particular, the measures helped facilitate technologies that would provide collision avoidance through automated sense-and-avoid systems.⁷² NASA has undertaken a cooperative research effort to accelerate this technology development.⁷³

The content of the NPRM and the section 333 exemptions essentially make non-binding guidelines for model aircraft flight mandatory for commercial drones. The proposed rules include weight limits and height restrictions (below five hundred feet).⁷⁴ The rules also prohibit operation beyond the line of sight of the operator⁷⁵ and the exemptions allow flights only over property as to which an operator has permission.⁷⁶ The rules mandate avoidance

www.oig.dot.gov/sites/default/files/FAA%20Oversight%20of%20Unmanned%20Aircraft%20Systems%5E6-26-14.pdf.

⁷¹ See Gerald L. Dillingham, Statement Before House Subcommittee on Aviation, *Unmanned Aerial Systems: Status of Test Sites and International Developments*, UNITED STATES GOVERNMENT ACCOUNTABILITY OFFICE (Mar. 24, 2015), <http://www.gao.gov/assets/670/669214.pdf> (raising questions about whether test sites are being used effectively).

⁷² *Press Release – FAA-Industry Initiative Will Expand Small UAS Horizons*, FAA (May 6, 2015), https://www.faa.gov/news/press_releases/news_story.cfm?newsId=18756 (announcing Pathfinder project).

⁷³ *NASA Armstrong Fact Sheet: Unmanned Aircraft Systems Integration in the National Airspace System*, NASA (Feb. 28, 2014), <http://www.nasa.gov/centers/armstrong/news/FactSheets/FS-075-DFRC.html>.

⁷⁴ Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. 9544, 9557 (proposed Feb. 23, 2015) (to be codified at 14 C.F.R. pt. 21, 43, 45, 47, 61, 91, 101, 107, and 183) (hereinafter “NPRM”) (summarizing proposed U.S. rules, compared with those of Canada).

⁷⁵ NPRM 80 Fed. Reg. at 9544, 9560.

⁷⁶ FAA Exemption No. 11310, Docket No. FAA-2014-0608 (Colin Hinkle) ¶ 27 (limiting commercial drone flight to property with permission for each flight from the property owner/controller or authorized representative), *available at*

of manned aircraft, exclude drone flights from airports and other controlled airspace, mandate careful pre-flight inspection and conformity to manufacturer instructions, and specify qualification requirements for DROPs.⁷⁷

Some of the proposed rules are controversial. The greatest controversies involve requirements that DROPs have a new category of airman license, maintain visual contact as opposed to video aided (first person view or “FPV”) control, and the exclusion of night flights and operation from moving vehicles. These requirements are consistently imposed in the section 333 exemptions.⁷⁸ The proposed rules eliminate the requirement for a traditional pilot’s license and substitute a new airman certificate called “sUAS operator.”⁷⁹ This certificate can be acquired by passing a knowledge test tailored to drone operation instead of manned aircraft flight.⁸⁰ Based on some comments received on DROP qualification, the final rule is likely to add an experience requirement and a flight test to the drone qualification requirements.⁸¹

The higher risks associated with machodrone flight justify the FAA’s incremental approach. Beyond line of sight operations at higher altitudes are likely to await the results of research and development on new technologies for collision avoidance. International competitiveness adds to the pressure to get an appropriate regulatory regime in place. For example, Canada has moved much more quickly than the United States to provide flexible regulations allowing low risk commercial drone

https://www.faa.gov/uas/legislative_programs/section_333/333_authorizations/media/Colin_Hinkle_11310.pdf.

⁷⁷ NPRM § 107.11, 80 Fed. Reg. at 9544, 9586–9588 (proposed operating rules); FAA Exemption No. 11310, Docket No. FAA 2014-0608 (Colin Hinkle) at 5–9 (imposing operating limitations).

⁷⁸ See *generally Authorizations Granted Via Section 333 Exemptions*, FAA, https://www.faa.gov/uas/legislative_programs/section_333/333_authorizations/ (last visited Sept 26, 2015).

⁷⁹ See NPRM 80 Fed. Reg. 9544.

⁸⁰ *Id.* at 9567–74 (discussing UAS operator rating).

⁸¹ Based on the authors’ analysis of comments filed on the NPRM.

operations.⁸² Amazon stresses in Congressional hearings and other public forums that it had to go overseas to conduct research and do demonstrations of package delivery by drones.⁸³ Without prompt FAA action to get rules in place, drone design and manufacture are likely to move offshore.

General rules proposed in the NPRM are unlikely to be in place before 2016 or 2017. Increasingly, state and municipal policymakers ask if they can do the regulatory job themselves. The answer to that question depends on whether state and local regulation of this new type of aviation activity is preempted by federal law.

Meanwhile, hundreds of section 333 exemption holders are beginning to fly commercially. In addition, hundreds, maybe thousands, of others are flying drones for pleasure or commercially in ignorance or defiance of the FAA's regulatory regime. This is the most serious public safety threat. The FAA has brought no enforcement proceedings for illegal commercial flight,⁸⁴ and its resources will never permit comprehensive enforcement against drone outlaws. Supplementing FAA resources with state and local law-enforcement resources might help, but if legal restrictions are too far out of line with what is possible and safe, noncompliance will become an even greater problem, exceeding the enforcement resources of all levels of government.

⁸² See NPRM Fed. Reg. at 9544, 9557 (table comparing Canadian microdrone rules with those proposed in NPRM).

⁸³ Ruth Reader, *Amazon Spurns Slow FAA, Reveals It's Been Testing Drones Abroad*, VENTUREBEAT (Mar. 24, 2015), <http://venturebeat.com/2015/03/24/amazon-spurns-slow-faa-as-it-tests-drones-abroad/>.

⁸⁴ John Goglia, *FAA Says Commercial Drone Operators Need Exemption. But Doesn't Prosecute Those Flying Without One*, FORBES, Feb. 13, 2015, <http://www.forbes.com/sites/johngoglia/2015/02/13/faa-says-commercial-drone-operators-need-exemption-but-doesnt-prosecute-those-flying-without-one/> (reporting that FAA policy provides "that legal enforcement action is to be taken only for 'a violation that poses a medium or high actual or potential risk to safety,' such as 'when a UAS operation has a medium or high risk of endangering the operation of another aircraft or endangering persons or property on the ground.'").

III. CONSTITUTIONAL FRAMEWORK

The Commerce and Supremacy Clauses of the United States Constitution limit the states' power to regulate drones, but do not entirely eclipse it. This section explains the Commerce and Supremacy Clauses of the US Constitution, then analyzes some of the case law relating to the interplay between federal and state law of aviation.

A. *The Commerce Clause*

The Commerce Clause prohibits states from interfering with interstate commerce, while also limiting the scope of federal power.⁸⁵ Because drones operate in interstate commerce, the federal government may regulate their use under the authority of the Commerce Clause. Therefore, the clause draws a rough dividing line between what drone regulatory powers lie within federal authority and what lie within state authority.

Article One of the United States Constitution gives the Congress of United States the power “to regulate commerce with foreign nations, and among the several states”⁸⁶ This provision, known as the Commerce Clause, grants federal legislative power and simultaneously limits the states. Under the “dormant commerce clause” doctrine, the states may not interfere with interstate commerce.⁸⁷

The Supreme Court has interpreted interstate commerce broadly. Interstate commerce encompasses commercial activities that have effects on interstate commerce, as well as those that

⁸⁵ See *United States v. Lopez*, 514 U.S. 549, 551 (1995) (holding that federal statute prohibiting possession of firearms near schools exceeded Congressional power under Commerce Clause); *United States v. Morrison*, 529 U.S. 598, 601 (2000) (applying *Lopez* to find that remedy provisions of Violence Against Women Act exceeded Congressional power under Commerce Clause).

⁸⁶ U.S. CONST., art. I, § 8.

⁸⁷ *Wardair Can., Inc. v. Fla. Dept. of Revenue*, 477 U.S. 1, 7–9 (1986) (explaining dormant commerce clause analysis and holding that state tax on aviation fuel did not interfere with foreign commerce with Canada).

directly involve intercourse among the states.⁸⁸ Therefore, it is likely that the sale and distribution of even the smallest toy drone affects interstate commerce, because such products are sold online.

In two recent decisions, however, the Supreme Court emphasized that the United States Congress's power under the Commerce Clause is limited. In *United States v. Morrison*,⁸⁹ the Supreme Court held unconstitutional a federal statute that provided a civil remedy for victims of gender-motivated violence. In so doing, the *Morrison* Court reiterated three categories of activity that fall within the commerce power: "(1) channels of interstate commerce, (2) the instrumentalities, . . . persons or things in interstate commerce . . . (3) those activities . . . that substantially affect interstate commerce."⁹⁰

Focusing on the third category, activities that substantially affect interstate commerce,⁹¹ the Court noted that federal regulation of intrastate economic or commercial activity has usually been held to be within the commerce power.⁹²

Because the violence addressed by the statute was not commercial in character, however, the Court found it outside the commerce power.

The *Morrison* Court relied heavily on *United States v. Lopez*.⁹³ In *Lopez*, the Court held unconstitutional a federal statute criminalizing possession of firearms near schools, because it exceeded Congress's authority under the Commerce clause. In reviewing the history of Commerce Clause jurisprudence, the

⁸⁸ *NLRB v. Jones & Laughlin Steel Corp.*, 301 U.S. 1 (1937) (holding application of NLRA to local steel production labor relations to be within federal authority under Commerce Clause because of indirect effects on interstate commerce). "Although activities may be intrastate in character when separately considered, if they have such a close and substantial relation to interstate commerce that their control is essential or appropriate to protect that commerce from burdens and obstructions." *Id.* at 36.

⁸⁹ 529 U.S. 598 (2000).

⁹⁰ *Id.* at 608–09.

⁹¹ *Id.* at 609.

⁹² *Id.* at 612.

⁹³ 514 U.S. 549 (1995).

Lopez court noted *Wickard v. Filburn*,⁹⁴ which held that the commerce power extended to homegrown wheat because of its economic effect on the national market for wheat. But neither in *Lopez* nor *Wickard* has the Court “declared that Congress may use a relatively trivial impact on commerce as an excuse for broad general regulation of state or private activities.”⁹⁵ The Court concluded that “the proper test requires an analysis of whether the regulated activity ‘substantially affects’ interstate commerce.”⁹⁶ Applying that test, the *Lopez* court rejected the argument that gun violence might have an effect on interstate commerce.⁹⁷

Even though the *Morrison* and *Lopez* cases involved constitutional challenges to statutes, the limitations imposed by the Court also apply to administrative agency actions. Administrative agencies have no power not validly delegated to them by statute,⁹⁸ and that power must be constitutionally granted to Congress in the first place. A statute purporting to delegate a power the Congress does not have is a legal nullity. Therefore, if a federal agency attempts to regulate an activity outside the Congress’s commerce power, the agency action is unconstitutional, just like a statute directly regulating the same activity.

⁹⁴ 317 U.S. 111, 121 (1942).

⁹⁵ *United States v. Lopez*, 514 U.S. 549, 558 (1995) (quoting *Maryland v. Wirtz*, 392 U.S. 183 (1968)).

⁹⁶ *Id.* at 559.

⁹⁷ The *Lopez* court held:

The possession of a gun in a local school zone is in no sense an economic activity that might, through repetition elsewhere, substantially affect any sort of interstate commerce. Respondent was a local student at a local school; there is no indication that he had recently moved in interstate commerce, and there is no requirement that his possession of the firearm have any concrete tie to interstate commerce. To uphold the Government’s contentions here, we would have to pile inference upon inference in a manner that would bid fair to convert congressional authority under the Commerce Clause to a general police power of the sort retained by the States.

Id. at 567.

⁹⁸ *Whitman v. American Trucking Associations*, 531 U.S. 457, 472–73 (2001) (holding that agency must demonstrate that Congress validly delegated power to it).

Together, *Morrison* and *Lopez* suggest that federal power over drones is limited. For commercial activity that does not fall within the commerce power, *per se*, the federal regulator must demonstrate a substantial relationship to interstate commerce. Merely because an activity is commercial does not mean that it is within the commerce power. To be within the commerce power, local commerce must substantially affect interstate commerce. The same touchstones for evaluating effects are expressed in the *Lopez* and *Morrison* cases; only the level of scrutiny is different.

Federal restrictions on the kinds of drones that may be sold would involve interstate commerce; regulation of localized drone flight at low levels above the ground does not. Localized flight does not involve commerce that crosses state lines; it usually involves activity within the scope of no more than a mile. Any safety hazards are local—to persons or property nearby. Safety hazards to airliners carrying interstate passengers or freight are minimal, given the autonomous limitations installed on the vehicle's control systems that keep them away from where most commercial manned aircraft fly.

B. *The Supremacy Clause*

The Supremacy Clause is the source of the FAA's authority to preempt state and municipal drone regulation. The Supremacy Clause⁹⁹ nullifies state law that conflicts with federal law. Federal preemption is of three types: express preemption, conflict preemption, and field preemption. Express preemption occurs when Congress expressly forecloses state law in a statute. Implied preemption consists of two variants: conflict preemption and field preemption. Conflict preemption occurs when a state law or regulation directly conflicts with federal law. Finally, field preemption arises when the pervasiveness of federal regulation leaves no room for state regulation. Usually a presumption against preemption operates, but not with respect to aviation safety regulation:

⁹⁹ U.S. CONST. art. VI, cl. 2.

[T]he presumption against preemption only arises if Congress legislates in a field traditionally occupied by the states. In matters of air transportation, the federal presence is both longstanding and pervasive; that field is simply not one traditionally reserved to the states. The Supreme Court has not suggested that the presumption against preemption should be interposed in that field.¹⁰⁰

1. *Express Preemption*

Express preemption arises from an explicit statutory statement that states lack power of the subject matter. Federal law declares that “[t]he United States Government has exclusive sovereignty of airspace of the United States.”¹⁰¹ This provision has been interpreted, however, as addressing sovereignty vis-a-vis other countries rather than the federal-state relationship.¹⁰² In *Montalvo v. Spirit Airlines*,¹⁰³ the United States Court of Appeals for the Ninth Circuit found no general express preemption in the Federal Aviation Act,¹⁰⁴ and distinguished express preemption under the Airline Deregulation Act.¹⁰⁵

2. *Implied Preemption*

Montalvo explains two types of implied preemption in the aviation context: conflict preemption and field preemption.

Conflict preemption can exist when a state law conflicts with federal law, or when “a state law stands as an obstacle to the accomplishment and execution of the full purposes and objectives

¹⁰⁰ *Brown v. United Airlines, Inc.*, 720 F.3d 60, 68 (1st Cir. 2013) (holding that state common-law claims by skycaps for a share of an airline fee for curbside checking of baggage was preempted by the explicit preemption language in the Airline Deregulation Act).

¹⁰¹ 49 U.S.C. § 40103 (2012).

¹⁰² *Skysign Intern., Inc. v. City and Cty. of Honolulu*, 276 F.3d 1109, 1116 (9th Cir. 2002) (interpreting reservation of sovereignty to the United States to mean national sovereignty, not to mean preemption of state authority).

¹⁰³ 508 F.3d 464 (9th Cir. 2007).

¹⁰⁴ *Id.* at 470.

¹⁰⁵ *Id.* at 474–75 (quoting 49 U.S.C. § 41713(b)(1) (2012)) (“A State . . . may not enact or enforce a law, regulation, or other provision having the force and effect of law related to a price, route, or service of an air carrier that may provide air transportation under this subpart.”).

of Congress in enacting the federal law.”¹⁰⁶ In some hypothetical instances, conflict preemption would be obvious. If the FAA mandates practice auto-rotations as a part of helicopter training, and a state prohibits practice auto-rotations because of the high incidence of accidents associated with such flight training, the conflict is manifest, and the state provision must yield.

However, conflict preemption can be difficult to distinguish from field preemption. Suppose, for example, that an FAA regulation prescribes certain content for passenger briefings on commercial flights, and a state decides to impose an additional requirement that the briefing include advice that sitting for long periods of time can produce deep vein thrombosis. The state measure is preempted, *either* because the FAA has occupied the field of passenger briefing, *or* because adding to the FAA mandated briefing subjects conflicts with the scheme for passenger briefing the FAA envisions.¹⁰⁷ In other words, the FAA prescription of certain content implies that briefer should talk about nothing else in the briefing.

Field preemption exists when federal law so thoroughly occupies a legislative field “as to make reasonable the inference that Congress left no room for the States to supplement it.”¹⁰⁸ As Part III.A explains, preemption cannot extend beyond the Commerce power.

C. *Preemption in Aviation Law*

In the aviation context, Federal law generally preempts state law. Some three dozen reported state and federal cases address federal preemption in the field of aviation safety.¹⁰⁹ Some of them contain sweeping language concluding that the entire field of aviation safety is off-limits to state and local law. For example,

¹⁰⁶ *Id.* at 470.

¹⁰⁷ *See supra* Part III.B.2.

¹⁰⁸ *Montalvo v. Spirit Airlines*, 508 F.3d 464, 470 (9th Cir. 2007).

¹⁰⁹ A Westlaw search on 13 June 2015 with the search terms *sy,di*(“aviation safety” & *preemp!*) yielded 36 cases.

Abdullah v. American Airlines, Inc.,¹¹⁰ involved a state law claim for damages occasioned by operation of an airline transport in turbulence.¹¹¹ The United States Court of Appeals for the Third Circuit held that state regulation of aviation safety is federally preempted.¹¹² “[W]e find implied federal preemption of the entire field of aviation safety.”¹¹³ In early 2014, the FAA said: “[A] state law or regulation that prohibits or limits the operation of an aircraft, sets standards for airworthiness, or establishes pilot requirements generally would be preempted.”¹¹⁴

State regulation can originate in a statute or in common law. For example, a state might pass a statute that criminalizes certain drone-related conduct and imposes fines; or give authority to state or local administrative agencies to promulgate rules, and impose civil penalties for their violation. Alternatively, a state’s common-law can give individuals a private right of action for certain drone-related conduct, such as causing injury or damage, or invading personal privacy property rights. Preemption case law discussed in this part involves both types of approach.

In *In re Air Crash Near Clarence Center, New York*,¹¹⁵ the district court, assigned multiple cases involving a Colgan Airways crash, held that occupation of the field of aviation safety by the Federal Aviation Act leaves no room for state safety standards. The court held that “[a]pplying state law standards of care would interfere with these regulations and potentially subject airlines and related entities to 50 different standards.”¹¹⁶

Other cases, however, adopt a more nuanced approach, examining whether the FAA has regulated particular subject matter, the degree of conflict between federal and state rules on the subject, and whether the matter regulated by the state involves a

¹¹⁰ 181 F.3d 363 (3d Cir. 1999).

¹¹¹ *Id.*

¹¹² *Id.* at 365.

¹¹³ *Id.*

¹¹⁴ *Fact Sheet – Unmanned Aircraft Systems (UAS)*, FAA (Jan. 6, 2014), http://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=14153.

¹¹⁵ 798 F. Supp. 2d 481 (W.D.N.Y. 2011).

¹¹⁶ *Id.* at 486.

subject within traditional state police powers. This section continues with a description of the state of the law with respect to different aspects of aviation.

1. *Aircrew Qualification*

A state's prescription of qualifications for flight personnel is preempted, because of the FAA's extensive regulation in the area. In *French v. Pan Am Express, Inc.*,¹¹⁷ the First Circuit held that state regulation of drug tests for pilots was preempted, because it intruded on the field of pilot qualifications, a matter regulated in detail by the FAA.¹¹⁸

Similarly, in *Ventress v. Japan Airlines*,¹¹⁹ the court of appeals held that state employment claims by a flight engineer were preempted. The plaintiff's whistleblower claims would have drawn the state court into deciding "backdoor challenges to [Japan Airlines'] safety-related decisions regarding his and Captain Bicknell's physical and mental fitness to operate civil aircraft."¹²⁰ The court stated that "[p]ermitting indirect challenges to aviation safety decisions under the guise of state law whistleblower claims interferes with the agency's authority to serve as the principal arbiter of aviation safety."¹²¹ The court distinguished *Martin v. Midwest Express Holdings, Inc.*¹²² by finding that state standards of care for airplane stairs were not preempted because the Federal Aviation Requirements (FARs) established no requirements for airplane stairs.¹²³

The *Ventress* court was careful to point out, however, that not all state employment law in the airline employment context is preempted, only those state claims that "encroach upon,

¹¹⁷ 869 F.2d 1 (1st Cir. 1989).

¹¹⁸ *Id.* at 4.

¹¹⁹ 747 F.3d 716 (9th Cir. 2014).

¹²⁰ *Id.* at 722.

¹²¹ *Id.*

¹²² 555 F.3d 806, 809 (9th Cir. 2009). *See infra* Part III.C.4.

¹²³ *Ventress*, 747 F.3d at 721.

supplement, or alter the federally occupied field of aviation safety” and jeopardize national uniformity.¹²⁴

2. *Passenger Warnings and Liquor Service*

The *Montalvo*¹²⁵ court held that federal law preempted state negligence claims for an airline’s failure to warn about the danger of developing deep vein thrombosis. The court reasoned that a state-imposed duty to warn would conflict with federal safety standards for pre-flight passenger briefings, and noted that the FAA occupies the entire field of aviation safety.¹²⁶ The court reviewed the legislative history of the Federal Aviation Act and precedent and found Congressional intent to “make the Federal Aviation Administration the sole arbiter of air safety.”¹²⁷ It quoted Justice Jackson: “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.”¹²⁸

Although the court expressed reluctance to infer preemption from the mere comprehensiveness of statutory authority unless a federal agency has exercised the authority to occupy a subfield,¹²⁹ it found sufficient exercise of FAA authority to “infer a preemptive intent to displace all state law on the subject of air safety.”¹³⁰

Significantly for future drone regulation, the *Montalvo* court cited the “uniqueness of the aviation industry,” and went on to note that air transportation “requires more national coordination than any other public transportation” and “poses the largest risks.”¹³¹ The court reasoned that national regulation is required because air

¹²⁴ *Id.* at 722–23.

¹²⁵ *Montalvo*, 508 F.3d at 464.

¹²⁶ *Id.* at 468.

¹²⁷ *Id.* at 472.

¹²⁸ *Id.* at 471–72 (quoting *Northwest Airlines, Inc. v. Minnesota*, 322 U.S. 292, 303 (1944) (J. Jackson, concurring)).

¹²⁹ *Id.* at 470–71.

¹³⁰ *Id.* at 472.

¹³¹ *Id.* at 473.

transportation is a “national operation.”¹³² As Part IV.A explains, this is not true of microdrone operations.

In *U.S. Airways, Inc. v. O’Donnell*,¹³³ the Court of Appeals for the Tenth Circuit held that state liquor regulation was preempted as applied to airline flights. The Court cited *Martin*, but took a broader approach, using language that suggests that all aspects of aviation safety are preempted—appearing to agree with *Abdullah* that the statutory savings clause only preserves state remedies for violation of federal standard.¹³⁴ Nevertheless, the alcohol service on air carrier aircraft is the subject of specific federal aviation rules, and that with state law, New Mexico was “seeking to impose additional training requirements on flight attendants and crew members serving alcoholic beverages on airplanes.”¹³⁵ The court also noted the FAA’s detailed balancing of various considerations arising from alcohol service on flights.¹³⁶ So whether the Tenth Circuit would follow *Martin* or *Abdullah* is unclear. The court backed away from, but did not overrule *Cleveland*, noting that its

¹³² See *Montalvo v. Spirit Airlines*, 508 F.3d 464, 473 (9th Cir. 2007). The court held:

[i]f the FAA did not impliedly preempt state requirements for passenger warnings, each state would be free to require any announcement it wished on all planes arriving in, or departing from, its soil, or to impose liability for the violation of any jury’s determination that a standard the jury deems reasonable has been violated. Such a patchwork of state laws in this airspace . . . would create a crazy-quilt effect. Congress could not reasonably have intended an airline on a Providence-to-Baltimore-to-Miami run to be subject to certain requirements in, for example Maryland, but not in Rhode Island or in Florida. It is equally as doubtful that Congress would have intended the sufficiency of the Airlines’ warnings to hinge on where each passenger on each flight was likely to file suit. As the district court noted, such a result would be an anathema to the FAA.

Id. at 473 (internal quotations and citations omitted). The court distinguished *Skysign Int’l Inc. v. City and Cty. of Honolulu*, 276 F.3d 1109 (9th Cir. 2002), on the grounds that the FAA had not exercised its authority to regulate aerial advertising. *Id.* at 473.

¹³³ 627 F.3d 1318 (10th Cir. 2010).

¹³⁴ *Id.* at 1327–29.

¹³⁵ *Id.* at 1328.

¹³⁶ *Id.*

reasoning has been called into question by subsequent Supreme Court cases.¹³⁷ The court remanded, however, a claim for unsafe seating configurations, which required closer analysis of airline-fare preemption.¹³⁸

3. *Flight Rules: Aerial Advertising*

Federal law might not preempt state law on aerial advertising. Regulation of what aircraft may do in flight would seem to be at the heart of detailed FAA regulation. For example, parts 71, 91, 97, 119, 135, and 136 of the FARs contain hundreds of pages of specific operating rules. The regulations do not, however, cover everything relating to aircraft.

In *Skysign International, Inc. v. City and County of Honolulu*,¹³⁹ the Ninth Circuit held that local regulation of signage could be applied to banner-towing aircraft, notwithstanding broad federal preemption of aviation safety.¹⁴⁰ The plaintiff's helicopters operated under certificates of waiver ("COWAs") issued by the FAA.¹⁴¹

Because advertising is an activity traditionally regulated by the states rather than by the federal government, the court presumed "that federal law does not displace Honolulu's regulatory authority over advertising absent a clear statement of the federal intent to do so, either by Congress or by the FAA as Congress's delegate."¹⁴² The court found that Honolulu's general signage ordinance was entitled to this presumption, but not a companion ordinance that singled out aviation by prohibiting any advertising on an aircraft.¹⁴³ Further, the court found that Congress has expressly preempted state regulation of aircraft noise and airline pricing, but not state regulation of aerial advertising.¹⁴⁴ Although not mentioned by the

¹³⁷ *Id.* at 1326.

¹³⁸ *Montalvo v. Spirit Airlines*, 508 F.3d 464, 475 (9th Cir. 2007).

¹³⁹ 276 F.3d 1109 (9th Cir. 2002).

¹⁴⁰ *Id.* at 1117–18.

¹⁴¹ *Id.* at 1113.

¹⁴² *Id.* at 1115.

¹⁴³ *Id.* at 1116.

¹⁴⁴ *Id.*

court, based on the nature of the advertisement, the plaintiff's aircraft would not leave the state. If the aircraft traveled between states while carrying an advertisement, the outcome might have been different.

The court was unwilling to infer field preemption from the "mere volume and complexity" of federal aviation regulation¹⁴⁵ in the absence of any explicit federal regulation on the subject a state seeks to regulate. It rejected the plaintiff's argument that preemption should be inferred from FAA silence on a subject.¹⁴⁶ Significantly, it was equally unwilling to infer preemption from overlapping safety concerns.¹⁴⁷ The Court was unwilling to read a provision directing the FAA Administrator to "prescribe air traffic regulations in the flight of aircraft (including regulations on safe altitudes) for . . . protecting individuals and property on the ground."¹⁴⁸ The Court did not interpret this provision to "preclude local regulation with an identical purpose that does not actually reach into the forbidden, exclusively federal areas, such as flight paths, hours, or altitudes."¹⁴⁹ Therefore, by negative implication, a local ordinance that did address flight paths, hours, or altitudes would be preempted. Finally, the FAA COWAs¹⁵⁰ did not give rise to preemption, because they expressly required that the operator "understand" local laws relating to aerial signs.¹⁵¹

4. *Aircraft Design*

State regulation prescribing flight rules or aircraft design is preempted, despite personal injury cases arising from aircraft accidents involving questions of adequate design. The FAA

¹⁴⁵ *Id.*

¹⁴⁶ *Id.* at 1116–17 (9th Cir. 2002).

¹⁴⁷ *See id.* at 1117 ("Skysign notes that Honolulu justifies its ordinance based in part on the danger that distracting aerial advertising poses to motorists below, and it attempts to argue that Congress has confided to the FAA exclusive authority over such safety concerns.").

¹⁴⁸ 49 U.S.C. § 40103(b)(2)(B) (2012).

¹⁴⁹ *Skysign*, 276 F.3d at 1109.

¹⁵⁰ 14 C.F.R. § 91.311 (2015) (providing that banner-towing airplanes or helicopter require a certificate of waiver ("COWA") issued by the FAA).

¹⁵¹ 276 F.3d at 1117–18.

imposes detailed standards for aircraft design. The accommodation of federal and state standards in such cases is manifest, more than in cases involving aircrew qualifications and operating rules. Damages for personal injuries can co-exist with federal aviation safety regulations, however, as the cases discussed in this section show.

In *Lewis v. Lycoming*,¹⁵² the district court interpreted *Abdullah* and *Elssaad* to hold that state products liability claims are not preempted on field preemption grounds.¹⁵³ Instead, the court held that a successful preemption defense requires establishing conflict between federal and state standards, or at least federal regulation of a particular aspect of safety.¹⁵⁴

Many cases finding no preemption involve products liability actions premised on claims of negligent design, for example, *Public Health Trust of Dade County, Fla. v. Lake Aircraft, Inc.*¹⁵⁵ In *Lake Aircraft*, the plaintiff was injured in a seaplane accident and claimed that his seat was negligently designed. The Eleventh Circuit reversed summary judgment for the defendant, finding that, despite FAA standards for seat design, allowing a damages action to proceed did not interfere with federal regulation.¹⁵⁶

FAA regulation of aircraft design and manufacture is even more detailed than regulation of aircrew qualification. Preemption in this field of aviation safety is not complete, however. *Cleveland By and Through Cleveland v. Piper Aircraft Corp.*,¹⁵⁷ is an influential case illustrating this point.¹⁵⁸ In *Cleveland* the court of appeals found that aircraft manufacturers could comply with FAA “minimum” safety standards and also comply with standards of care embodied in state tort law.¹⁵⁹

¹⁵² 957 F. Supp. 2d 552 (E.D. Pa. 2013).

¹⁵³ *Id.* at 558–59.

¹⁵⁴ *Id.*

¹⁵⁵ 992 F.2d 291 (11th Cir. 1993).

¹⁵⁶ *Id.* at 294.

¹⁵⁷ 985 F.2d 1438 (10th Cir. 1993).

¹⁵⁸ *Id.* at 1444.

¹⁵⁹ *Id.* at 1445.

Cleveland involved a claim by the pilot¹⁶⁰ that his severe injuries in a crash were due to the negligent design of the aircraft. The jury found that Piper had negligently designed the aircraft by providing for inadequate visibility from the rear seat (from which the pilot was flying) and failing to provide a rear shoulder harness.¹⁶¹ Furthermore, the court held that FAA approval of an aircraft's design "is not intended to be the last word on safety."¹⁶² The court observed that the FAA has given manufacturers broad responsibilities for assuring their own compliance by appointing aircraft company employees to "act as surrogates of the FAA in examining, inspecting, and testing aircraft for purposes of certification."¹⁶³ There was, thus, no conflict preemption. As noted in the discussion of *O'Donnell* above, subsequent Tenth Circuit case law raises questions as to the viability of the *Cleveland* analysis.

When FAA regulations are silent on the design of a particular subsystem, there may be room for state law. The *Martin* court interpreted *Montalvo* to mean that when the agency issues "pervasive regulations" in an area, like passenger warnings, the FAA preempts all state law claims in that area.¹⁶⁴ In areas without pervasive regulations or other grounds for preemption, the state standard of care remains applicable.¹⁶⁵ The court rejected the proposition that the aircraft certification process preempts every state inquiry into aircraft design; the process only preempts those design or performance matters that are explicitly addressed by specific certification regulations.¹⁶⁶ The court observed that airstairs were not "pervasively regulated," and as such it was "hard to imagine that any and all state tort claims involving airplane

¹⁶⁰ The pilot was flying a Piper Super Cub PA-18-150. *Id.*

¹⁶¹ *Id.* at 1441.

¹⁶² *Id.* at 1445.

¹⁶³ *Id.* at 1445.

¹⁶⁴ *Martin v. Midwest Express Holdings, Inc.*, 555 F.3d 806, 809-10 (9th Cir. 2009).

¹⁶⁵ *Id.* at 811.

¹⁶⁶ *Id.* at 811-12.

steps are preempted by federal law.”¹⁶⁷ The *Martin* court found support for its approach in *Cleveland*,¹⁶⁸ and acknowledged that the Third Circuit takes a different approach. The Third Circuit decided that “federal law establishes the applicable standards of care in the field of air safety” and thus generally “preempts the entire field from state and territorial regulation.”¹⁶⁹

Later, in *Gilstrap v. United Airlines, Inc.*,¹⁷⁰ the Ninth Circuit embraced both *Martin* and *Abdullah*, adopting “*Abdullah*’s division of the FAA’s field preemptive effect into two components: state standards of care, which *may* be field-preempted by pervasive regulations, and state remedies, which may survive *even if* the standard of care is so preempted.”¹⁷¹ The court’s use of the words *may* and *even if*, however, still allows for *Martin*’s conclusion that preemption results only when the FAA has explicitly regulated the particular aspect of safety involved in the state lawsuit.

Unlike airstairs, however, pilot qualifications and medical standards are subject to detailed FAA regulation.¹⁷² Thus the different result in *Ventress, supra*.

¹⁶⁷ *Id.* at 812. (“Airstairs are not pervasively regulated; the only regulation on airstairs is that they can’t be designed in a way that might block the emergency exits. The regulations have nothing to say about handrails, or even stairs at all, except in emergency landings. No federal regulation prohibits airstairs that are prone to ice over, or that tend to collapse under passengers’ weight. The regulations say nothing about maintaining the stairs free of slippery substances, or fixing loose steps before passengers catch their heels and trip. It’s hard to imagine that any and all state tort claims involving airplane stairs are preempted by federal law. Because the agency has not comprehensively regulated airstairs, the FAA has not preempted state law claims that the stairs are defective.”) (internal citations omitted).

¹⁶⁸ *Id.* at 811 (citing *Abdullah*, 181 F.3d 363, 367) (to find FAA preemption of a failure to warn claim, but applying a state law analysis to a claim that a navigational instrument was defectively manufactured).

¹⁶⁹ *Id.* at 809 (quoting *Abdullah*, 181 F.3d at 367) (internal quotations omitted).

¹⁷⁰ 709 F.3d 995 (9th Cir. 2013).

¹⁷¹ *Id.* at 1006 (emphasis added).

¹⁷² *Ventress v. Japan Airlines*, 747 F.3d 716, 721–22 (9th Cir. 2014).

5. *Airport Location*

The boundary between state and federal authority gets murkier when states determine where airports can be located and what operations can occur to and from them. In this regulatory arena, aviation safety and traditional state control of real property and its uses overlap. *City of Burbank v. Lockheed Air Terminal Inc.*¹⁷³ is the leading Supreme Court case on preemption of airport regulation. In *City of Burbank*, the Court held that a municipal noise ordinance prohibiting jet aircraft from taking off overnight was preempted, despite the fact that the only scheduled flight affected by the ordinance flew intrastate.¹⁷⁴

In its 5-4 decision, the Court focused its attention almost entirely on federal regulation of aircraft noise rather than on general aviation safety regulation.¹⁷⁵ It emphasized, however, the interplay between operational restrictions to reduce noise and other aspects of aircraft operation. The Federal Aviation Act requires a “delicate balance between safety and efficiency and the protection of persons on the ground.”¹⁷⁶ The court held that “[a]ny regulations adopted by the Administrator to control noise pollution must be consistent with the ‘highest degree of safety.’”¹⁷⁷ It also noted that local restrictions on hours of operation would have a ripple effect through the national aviation system, and would limit the FAA’s flexibility in controlling traffic flow.¹⁷⁸

Several cases reached the opposite outcome, however. For example, in *Gustafson v. City of Lake Angelus*,¹⁷⁹ the Sixth Circuit held that a local ordinance¹⁸⁰ prohibiting operation of seaplanes on

¹⁷³ 411 U.S. 624 (1973).

¹⁷⁴ *Id.* at 625–26 (summarizing facts).

¹⁷⁵ *Id.* at 633–39.

¹⁷⁶ *Id.* at 639.

¹⁷⁷ *Id.* at 638–39.

¹⁷⁸ *Id.* at 639–40.

¹⁷⁹ 76 F.3d 778 (6th Cir. 1996).

¹⁸⁰ 76 F.3d at 781 (The challenged ordinance provided that “[l]and may not be used for any of the following purposes, all of which are declared to be public nuisances: E. The mooring, docking, launching, storage, or use of any . . . aircraft powered by internal combustion engines J. The landing upon the

a city-owned lake was not preempted. The court distinguished regulation of aircraft in flight from regulation of aircraft landing sites, “which involves local control of land (or, in the present case, water) use.”¹⁸¹ It also distinguished *City of Burbank*, which held that a local noise ordinance was preempted because it interfered with airport operations. Aircraft noise, the *Gustafson* court said, is the subject of several explicit pronouncements by the FAA, the Environmental Protection Agency (EPA), and in the legislation history of the Federal Aviation Act and the Noise Control that embraced federal preemption.¹⁸² The *Gustafson* court also distinguished *Command Helicopters, Inc. v. City of Chicago*,¹⁸³ finding local regulation of helicopter heavy lift operations preempted because it conflicted with FAA regulations on heavy lift operations.¹⁸⁴ It also found in 14 C.F.R. § 157.7(a), the federal airport siting regulation, an express savings clause for local zoning and other land use regulation,¹⁸⁵ and—citing a number of earlier

lands, waters, or ice surface within the Village of Lake Angelus of any aircraft, airplane, sailplane, seaplane, helicopter, ground effect vehicle, or lighter than air craft.”) (internal quotations omitted). The city council declared that the ordinances were intended to “protect the public health, safety, and general welfare” of the residents, by preventing “noise, danger, apprehension of danger, pollution, apprehension of pollution, contamination and infestation from other bodies of water, destruction of property values, and interference with other lawful uses of the lake enjoyed by the great majority of citizens, including boating, sailing, fishing, swimming, and other recreational uses.” *Id.*

¹⁸¹ 76 F.3d at 783.

¹⁸² “In contrast, in the present case, an examination of the Federal Aviation Act and regulations concerning seaplanes and aircraft landing sites indicates that the designation of plane landing sites is not pervasively regulated by federal law, but instead is a matter left primarily to local control. In contrast to the pervasive scheme of federal regulation of aircraft noise found in *Burbank*, we fail to identify any language in the Act, the regulations promulgated pursuant to the Act, or the legislative history of the Act, which by implication preempts enforcement of the City’s ordinances prohibiting the operation of seaplanes on Lake Angelus.” *Id.* at 784.

¹⁸³ 691 F.Supp. 1148 (N.D. Ill. 1988)

¹⁸⁴ 76 F.3d at 787–88.

¹⁸⁵ *Id.* at 784–85.

case—found that local airport siting regulation was not preempted.¹⁸⁶

Similarly, in *Condor Corp. v. City of St. Paul*,¹⁸⁷ the Eighth Circuit held that the denial of a permit for a heliport did not intrude upon exclusive federal power.¹⁸⁸ The court found “no conflict between a city’s regulatory power over land use, and the federal regulation of airspace, and have found no case recognizing a conflict.”¹⁸⁹ In *Golden State Farms, Inc. v. Bay*,¹⁹⁰ the New Jersey Supreme Court held that an ordinance prohibiting the creation of private heliports was not preempted. It distinguished heliport siting from matters that require national uniformity.¹⁹¹

In *Riggs v. Burson*,¹⁹² the Tennessee Supreme Court held that a state statute prohibiting heliports within nine miles of the boundary of national park was not preempted. The plaintiffs argued that the statute was aimed at flight of aircraft and aircraft noise; the defendants argued that it was aimed at the use of land and not the flight of aircraft.¹⁹³ In agreeing with the defendants, the court cited *Gustafson*, distinguished *Burbank*, and found *Condor Corp.* persuasive.¹⁹⁴ The legislature articulated legitimate state interests: regulation of “noise, disruption and safety risks caused by locating heliports near main roads and heavily populated areas.”¹⁹⁵ The

¹⁸⁶ *Id.* at 786.

¹⁸⁷ 912 F.2d 215 (8th Cir. 1990).

¹⁸⁸ *Id.* at 223.

¹⁸⁹ *Id.* 219.

¹⁹⁰ 390 A.2d 1177 (N.J. 1978).

¹⁹¹ *Id.* at 1181. “The case at hand does not present a situation where preemption may be predicated upon a felt need for a monolithic system of regulation. While in some important aspects uniform regulation may be required, that obvious need does not reach down to the level of the location of small, relatively isolated, privately owned helistops or heliports.” *Id.* The court cited cases supporting its conclusion that “state and local authority over the “operation and navigation of aircraft is supplanted by this federal regulation, . . . significant local power over ground operations of aircraft remains viable.” *Id.* (internal quotations omitted).

¹⁹² 941 S.W.2d 44 (Tenn. 1997).

¹⁹³ *Id.* at 48 (summarizing arguments).

¹⁹⁴ *Id.* at 48–51.

¹⁹⁵ *Id.* at 50.

court stated, “[W]e agree with the persuasive federal and state authority that has upheld laws which restrict the use of land for the operation of helicopters or other aircraft.”¹⁹⁶

In *Vorhees v. Naper Aero Club, Inc.*,¹⁹⁷ the district court distinguished *Gustafson* and held that a private suit to enjoin operations on one runway of an existing airport was preempted. The litigation did not involve regulation of land use by a public body. Indeed, the airport was approved under state law.¹⁹⁸

In *Harrison v. Schwartz*, however,¹⁹⁹ Maryland’s highest court held that certain zoning restrictions imposed on airport operations were preempted and others were not. It held that conditions in the conditional use permit dictating aircraft takeoff separation times,²⁰⁰ and night-time takeoff times²⁰¹ were preempted. The court went on to distinguish the use of local zoning power to ban a certain use from permitting a use subject to conditions that “affect air navigation.”²⁰²

¹⁹⁶ *Id.* at 51.

¹⁹⁷ 96 F. Supp. 2d 820 (C.D. Ill. 2000).

¹⁹⁸ *Id.* at 823–24. “In *Gustafson*, the issue surrounded a city ordinance which prohibited the landing or taking-off of airplanes on a city lake—not an airport or runway. In the present case, plaintiff is seeking to enjoin an airport from using its already zoned runway—a runway which is protected by a state statute. *See* 620 ILL. COMP. STAT. 5/49.1 (prohibiting plaintiff from erecting any structure which would interfere with airport operations). Significantly, the plaintiff does not contend that the airport’s operation violates any ordinance or regulation. In sum, although plaintiff claims that he is seeking to regulate land use, what he is actually seeking to regulate is the use of the airspace above his property. Thus, plaintiff’s claim is preempted by the FAA.” *Id.*

¹⁹⁹ 572 A.2d 528 (Md. 1990).

²⁰⁰ “Aircraft take-offs shall be separated by intervals of at least 15 minutes in order to minimize the adverse effects of aircraft engine noise upon the residents of the surrounding area and to reduce the intensification of the use of the property in what is otherwise a primarily rural residential area.” *Id.* at 529.

²⁰¹ “Aircraft take-offs shall not be made before 9:00 a.m. or later than 7:00 p.m. on any day.” *Id.* (quoting conditions).

²⁰² *Id.* at 533.

6. *Environmental Regulation of Airport Activities*

Environmental regulation, especially when it is of a general nature rather than targeting specific airports or aviation operations, is likely to fall within state police power. A number of preemption cases involve environmental regulation by states and municipalities.

In *Tweed-New Haven Airport Authority v. East Haven*,²⁰³ the district court enjoined local environmental authorities from interfering with construction of federally approved and funded runway improvements. The court held that the local governmental regulation was preempted by the Federal Aviation Act under the doctrine of field preemption.²⁰⁴ It distinguished *Dallas/Fort Worth Int'l Airport Bd. v. City of Irving*,²⁰⁵ as involving land outside airport boundaries.²⁰⁶ It cited *Burbank-Glendale-Pasadena v. City of Los Angeles*, in which the City of Los Angeles enacted an ordinance requiring a local airport to submit for approval any plans that involved development—specifically runway and taxiway construction—on airport-owned land.²⁰⁷

In *United States v. City of Berkeley*,²⁰⁸ a case relied on by the Authority in *Tweed-New Haven*, the court addressed the City's attempt to regulate construction of an airport surveillance radar. According to the FAA, the construction was necessary to ensure air safety. The *Berkeley* court held that the City's attempted regulation was impliedly preempted by the Federal Aviation Act because federal regulation of the area is so pervasive. The court reasoned that non-proprietary versus proprietary is significant.²⁰⁹ When the local government is the proprietor of the airport, it has broader authority.²¹⁰ It found preemption despite evidence of local

²⁰³ 582 F. Supp. 2d 261 (D. Conn. 2008).

²⁰⁴ *Id.* at 272.

²⁰⁵ 854 S.W. 2d 161, 167 (Tex. App. 1993).

²⁰⁶ *Tweed-New Haven*, 582 F. Supp. 2d at 269.

²⁰⁷ 979 F.2d 1338, 1339 (9th Cir. 1992).

²⁰⁸ 735 F. Supp. 937 (E.D. Mo. 1990).

²⁰⁹ *Id.* at 941.

²¹⁰ The proprietary airport doctrine logically extends to any territory that a state or municipality like a park district owns and already regulates extensively.

concerns about traffic disruption and adverse affects on the quality of life of local residents because of noise.²¹¹

In *Goodspeed Airport LLC v. East Haddam Inland Wetlands & Watercourses Commission*,²¹² the Second Circuit held that local regulation of tree removal was not preempted. The plaintiff was privately owned and state-licensed. The airport argued that the trees were “obstructions to air navigation” under 14 C.F.R. § 77, and therefore that local limitations on removing them were preempted.²¹³ The court distinguished *Tweed*, in that the local regulatory action at issue in *Tweed* “constitutes a much more direct intrusion of local authority on the preempted field of air safety.”²¹⁴ The court noted that the airport in *Tweed* was not licensed by the FAA, was not federally funded, and there was no federal interest in the airport’s proposed actions.²¹⁵ The court also noted that the challenged local regulations did not single out aviation, but rather they were limitations of general applicability.²¹⁶ The court also observed that the FAA exercises only limited direct oversight of small airports.²¹⁷

Therefore, matters within the boundary of an airport are more likely to be preempted than those outside the boundaries, because activities outside the boundaries are less directly linked to aviation.²¹⁸

7. *Private Actions for Trespass to Land*

In addition to state and local regulation via statutes, ordinances, and administrative-agency rules, private actions for trespass to land also challenge federal authority. The common law of trespass to land recognizes the overflight close to the ground may be a

²¹¹ *Tweed-New Haven*, 582 F. Supp. 2d at 271 n.13.

²¹² 634 F.3d 206 (2d Cir. 2011).

²¹³ *Id.* at 208.

²¹⁴ *Id.* at 211.

²¹⁵ *Id.*

²¹⁶ *Id.*

²¹⁷ *Id.*

²¹⁸ *See Tweed-New Haven Airport Auth. v. East Haven*, 582 F. Supp. 2d 261, 271–72 (D. Conn. 2008)..

trespass: “Flight by aircraft in the air space above the land of another is a trespass if, but only if, (a) it enters into the immediate reaches of the air space next to the land, and (b) it interferes substantially with the other’s use and enjoyment of his land.”²¹⁹

Early in the history of aviation, the Supreme Court recognized that extensive liability for trespass would interfere with aviation: “The airspace, apart from the immediate reaches above the land, is part of the public domain. We need not determine at this time what those precise limits are. Flights over private land are not a taking, unless they are so low and so frequent as to be a direct and immediate interference with the enjoyment and use of the land.”²²⁰

These principles suggest that drone flight over private property at the heights approved for microdrones under the Section 333 exemptions and proposed in the NPRM could give rise to liability for trespass to land. While the advent of drones has extended the concept of air navigation and of the National Airspace System to levels lower than the traditional 500 feet, and thus extended the federal interest in regulating it to lower levels,²²¹ the fact remains that operations that close to the ground intrude upon traditional property rights. The resulting tension between private interests in exclusive domain over property and the public interest in air commerce places greater emphasis on delineating the height to which property extends—a question which the Restatement on Torts,²²² *Hinman*,²²³ and *Causby*²²⁴ do not address. A reasonable

²¹⁹ RESTATEMENT (SECOND) OF TORTS § 159 (2015) (discussing *United States v. Causby*, 328 U.S. 256, 267 (1946)). The Restatement suggests that “immediate reaches” of the land extend to 50 feet, not to 500 feet and that heights in-between, such as 150 feet would present questions of fact. *Id.* cmt. 1.

²²⁰ *Causby*, 328 U.S. at 267 (holding that low-level flights by military aircraft constituted a compensable taking); *see also* *Bryski v. City of Chicago*, 499 N.E.2d 162, 164–167 (Ill. App. Ct. 1986) (reviewing caselaw after *Causby* and concluding that sole remedy for aircraft noise from municipal airport is action for reverse condemnation).

²²¹ *But see infra* Part IV.A (evaluating argument that Commerce Clause and thus the permissible reach of FAA preemption does not extend below 500 feet).

²²² RESTATEMENT (SECOND) OF TORTS § 159 (2015).

²²³ *Hinman v. Pac. Air Lines Transp. Corp.*, 84 F.2d 755 (9th Cir. 1936).

²²⁴ *Causby*, 328 U.S. at 267.

rule of thumb is that a drone flying lower than treetop level or the level of utility lines commits a trespass, but not if it stays above that level.²²⁵

Some general principles can be established from the case law discussed above. First, courts have held that the FAA's extensive regulation in an area preempts state action in the same area. For example, regulation of pilots, employment claims by airline personnel, state liquor regulation, and aircraft design are all exclusively federal domain. However, some areas of regulation can coexist, for example, aerial advertising, airport location, and environmental regulation of a general nature. Second, states are also free to regulate drone operations when a statute explicitly saves room for state regulation, as in tort remedies.

D. Interaction of Commerce Clause and Preemption

The Commerce Clause and federal preemption doctrine interact in determining the legality of state regulation of drones. Under its commerce power, Congress retains the authority explicitly to preempt state and local regulation, as it has done with respect to

²²⁵ This is the authors' conclusion, based on the practical ability of a property owner to control airspace over her property.

economic regulation of airlines.²²⁶ It has explicitly forbore to do so with respect to state law remedies.²²⁷

As to the more general realm of aviation safety regulation, Congress has not spoken explicitly about state power, but it has granted broad authority to the FAA and specified some details as to how the FAA should exercise that authority.²²⁸ The FAA's details are in line with the many judicial findings of implied preemption.²²⁹ Therefore, the FAA could decide to adopt explicit statutory preemption of state regulation of drones, partially or completely, within the limits of interstate commerce.

Federal preemption thus turns on a parallel inquiry, with the FAA as the focus instead of Congress. Although some of the aviation preemption cases make sweeping pronouncements of field preemption, closer examination of the cases shows, not field preemption, but preemption turning on whether the FAA has exercised its statutory authority with respect to a particular aspect of safety. The analogy under the Commerce Clause is whether the Congress has exercised its authority on a particular subject.

As long as it acts within its statutory authority, the FAA could adopt a new rule that not only regulates some aspect of drone

²²⁶ 49 U.S.C. § 41713(b) (2012) (“A State, political subdivision of a State, or political authority of at least 2 States may not enact or enforce a law, regulation, or other provision having the force and effect of law related to a price, route, or service of an air carrier.”). Compare *Morales v. Trans World Airlines, Inc.*, 504 U.S. 374, 391 (1992) (state deceptive advertising guidelines preempted as applied to airline fares), with *American Airlines v. Wolens*, 513 U.S. 219, 233 (1995) (state breach of contract action for violating terms of frequent flying program not preempted). “[T]erms and conditions airlines offer and passengers accept are privately ordered obligations and thus do not amount to a State’s ‘enact[ment] or enforce[ment] of any law, rule, regulation, standard, or other provision having the force and effect of law within the meaning of § 1305(a)(1).’” 513 U.S. at 228. See also 49 U.S.C. § 40116(b) (prohibiting state taxation air commerce).

²²⁷ 49 U.S.C. § 40120(c) (“A remedy under this part is in addition to any other remedies provided by law.”). See also 49 U.S.C. § 40116(c) (allowing landing fees for commercial aircraft landing or taking off within a state).

²²⁸ 2012 Act § 332 (providing general guidance for FAA drone rules)

²²⁹ See *supra* Part III.B.2.

operations that theretofore had been unregulated, but it also could explicitly preempt state regulation. It could do so either as to the subject of the new FAA rule, or expressing its conclusion that an aspect of safety should go unregulated. As long as the FAA has done neither, states have a plausible argument that they are free to regulate the subject matter. *Martin* and *Montalvo*, discussed in Part IV.A, are examples of this kind of analysis. Having the power to define the boundary between federal and state regulation, the FAA or Congress could define a system for cooperative and concurrent state and federal regulation of drones, as Part VI suggests.

IV. STATE REGULATION OF DRONES

As Part III concludes, states are free to regulate drone operations when a statute explicitly saves room for state regulation, such as in tort remedies, or when the FAA has not exercised its authority on a particular subject.

Additionally, the FAA's approach to drone regulation makes room for some arguments not generally available with respect to traditional aviation safety regulation. While the FAA's statutory mandate is to *integrate* drones into the National Airspace System, its approach to microdrone regulation actually *segregates* microdrones and keeps them out of the vast expanse of the national airspace where most manned aircraft operations occur. The approach relegates microdrones to flights below 500 feet, where airplanes and helicopters cannot operate safely, and also keeps them out of airport traffic areas where manned aircraft operate below 500 feet in order to take off and land. The content of its proposed rule and its Section 333 exemptions prescribe few operating rules beyond the height limit and a line of sight requirement—which is tantamount to a horizontal distance restriction.

In effect, the FAA has said that microdrones can be operated commercially, as long as they are outside the national airspace system. The FAA has not admitted as much; rather, its position,

obvious from the content of FAR Part 91,²³⁰ is that airspace all the way to the ground is regulated by FAA rules.²³¹ There is no explicit floor of the national airspace system, however, expressed either in statute or rule.

A defender of state regulatory authority would argue that the combination of low altitudes and short distances puts microdrone flight, at least as the FAA would allow it for commercial purposes, outside the National Airspace System. Therefore, such operation is outside the realm of Air Commerce, outside Congressional power under the Commerce Clause, and beyond FAA jurisdiction.

Indeed, the FAA has defined microdrone airspace that is inherently local and well within traditional state police power. This argument may prove too expansive, however, because it would negate FAA authority, and leave it only to the states and their subdivisions to regulate low-level and close-in drone flights—not only drone flights, but *any* flight by any kind of vehicle.

A. *Subjects of State Regulation*

Under the Commerce Clause and Supremacy Clause preemption doctrine, states may not regulate matters authorized by Section 333 exemptions, or any final FAA microdrone rule.²³² States may prosecute local offenses, however, and apply their tort law to traditional sources of liability.²³³ States may not impose DROP qualification standards, but can apply general employment

²³⁰ 14 C.F.R. pt. 91 contains FAA operating rules for aircraft.

²³¹ “The FAA is responsible for the safety of U.S. airspace from the ground up.” *Busting Myths about the FAA and Unmanned Aircraft*, FAA (Feb. 26, 2015), <http://www.faa.gov/news/updates/?newsId=76240>.

²³² This conclusion results from the case law analyzed *supra* Part III.C, which holds that states may not regulate matters explicitly regulated by the FAA.

²³³ This conclusion results from the cases analyzed *supra* Part III.C.7., which hold that the Federal Aviation Act does not preempt state law remedies.

law.²³⁴ States may not require the registration of drones registered with the FAA.²³⁵

If the argument prevails that the FAA has essentially defined the floor of the national airspace system as 500 feet,²³⁶ states and localities have plenary authority to regulate low-level drone flight. If that argument fails, or if plaintiffs with standing are unwilling to make the argument, the scope of federal and state regulation depends upon application of the case law, which yields the following conclusions.

States may not regulate subjects explicitly addressed by the FAA in its NPRM and Section 333 exemptions—at least not as to the holders of the exemptions and once the regulation becomes final. That means that states may not impose different weight limits, height limits, preflight inspection requirements, accident reporting requirements, or periodic reporting requirements on operations. Thus, states may not impose different DROP qualification, training, certification, or experience requirements. They may not impose vehicle design requirements.

Under *Martin*, silence on the part of the FAA is not enough to preempt.²³⁷ Therefore, the FAA had not preempted the field of drone regulation before it issued its notice of proposed rulemaking and began granting Section 333 exemptions, because it had not spoken. Now, however, the FAA has spoken. The *Martin* argument would be available only if the FAA unexpectedly does not act reasonably promptly to turn its NPRM and the comments it received into final rules. Otherwise, the defender of a state or local measure would be left only the relatively weak read of the Tenth Circuit *Cleveland* decision.²³⁸

²³⁴ This conclusion results from the cases analyzed *supra* Part III.C.1, which holds that states may not prescribe aircrew qualifications but may apply their general employment law.

²³⁵ This conclusion results from the case law analyzed in *supra* Part III.C, which holds that states may not regulate matters explicitly regulated by the FAA.

²³⁶ See *supra* Part III.D.

²³⁷ See *Martin*, *supra* note 122.

²³⁸ See *supra* Part III.C (analyzing cases).

Regardless, the holder of a Section 333 exemption would have a strong argument that the detailed involvement of the FAA in crafting the exemption preempts state and local regulation of matters covered by the exemption. On the other hand, states retain their authority to enforce generally applicable state and local law against disorderly conduct,²³⁹ public endangerment,²⁴⁰ refusal to obey the lawful command of a police officer,²⁴¹ and refusal to disperse.²⁴² The FAA has published guidance for local law enforcement personnel confronted with what they believe to be impermissible microdrone operations.²⁴³ Recognizing traditional state power to preserve public order, states should have the power to establish tort liability or to criminalize reckless conduct,²⁴⁴

²³⁹ See 720 ILL. COMP. STAT. 5/26-1 (2013) (disorderly conduct).

²⁴⁰ See MONT. CODE ANN. § 45-5-207 (1987) (criminal endangerment).

²⁴¹ See 720 ILL. COMP. STAT. 5/31-1 (2014) (interference with public officers).

²⁴² See *City of Chicago v. Morales*, 527 U.S. 41, 57–58 (1999) (affirming conclusion that gang-dispersal ordinance was unconstitutionally vague; explaining that laws criminalizing disobedience of police order are similarly questionable because of the possibility of arbitrary police orders); CA PENAL CODE §§ 409, 416 (discussing refusal to disperse).

²⁴³ See Federal Aviation Administration, U.S. Dept. of Transportation, *Law Enforcement Guidance for Suspected Unauthorized UAS Operations*, http://www.faa.gov/uas/regulations_policies/media/FAA_UAS-PO_LEA_Guidance.pdf.

²⁴⁴ Several states have criminalized reckless endangerment. In Alabama, “A person commits the crime of reckless endangerment if he recklessly engages in conduct which creates a substantial risk of serious physical injury to another person.” ALA. CODE § 13A-6-24 (West 2015).

New York has both a first degree and a second degree reckless endangerment statute. Reckless Endangerment in the Second Degree occurs, “when the person recklessly engages in conduct which creates a substantial risk of serious physical injury to another person.” N.Y. STAT. 120.20. Reckless Endangerment in the First Degree occurs, “when, under circumstances evincing a depraved indifference to human life, he recklessly engages in conduct which creates a grave risk of death to another person.” N.Y. STAT. 120.25.

In Illinois, the law provides:

Sec. 12-5. Reckless conduct.

(a) A person commits reckless conduct when he or she, by any means lawful or unlawful, recklessly performs an act or acts that:

(1) cause bodily harm to or endanger the safety of another person; or

although this also is the subject of an FAA rule prohibiting reckless flight operations.²⁴⁵

The Section 333 exemptions themselves do not address state and local regulation. The blanket COAs accompanying the exemptions however do. On the contrary, a note on the first page says, “This certificate constitutes a waiver of those Federal rules or regulations specifically referred to above. It does not constitute a waiver of any State law or local ordinance.”²⁴⁶ Further language on the last page says, “This Certificate of Waiver or Authorization does not, in itself, waive any Title 14 Code of Federal Regulations, nor any state law or local ordinance.”²⁴⁷

(2) cause great bodily harm or permanent disability or disfigurement to another person.

(b) Sentence.

Reckless conduct under subdivision (a)(1) is a Class A misdemeanor.

Reckless conduct under subdivision (a)(2) is a Class 4 felony.

720 ILL. COMP. STAT 5/12-5.

Additionally, such conduct has occurred frequently. *See, e.g.*, Brett Snider, Esq., *2 Drone Pilots Arrested for Allegedly ‘Endangering’ NYPD Helicopter*, FINDLAW (July 8, 2014, 10:52 AM), <http://blogs.findlaw.com/blotter/2014/07/2-drone-pilots-arrested-for-allegedly-endangering-nypd-helicopter.html>; Andrew Holleran, *Someone Got Struck By A Drone Outside Bryant-Denny Stadium Saturday Afternoon*, COLLEGE SPUN (Nov. 19, 2014, 3:48 PM), <http://collegespun.com/sec/alabama-sec/someone-got-struck-by-a-drone-outside-bryant-denny-stadium-saturday-afternoon>; Jim Hoffer, *Exclusive: Brooklyn Man Arrested For Flying Drone Over Manhattan*, ABC 7 (Oct. 18, 2013, 2:54 PM), <http://7online.com/archive/9292217/>; *New Yorker arrested for flying drone over US Open*, RT QUESTION MORE (Sept. 5, 2014, 8:24 PM), <http://rt.com/usa/185480-new-york-tennis-drone/> (news reports of drone flights resulting in charges of reckless endangerment).

²⁴⁵ 14 C.F.R. § 91.13 (2015) (prohibiting careless or reckless operation).

²⁴⁶ FAA FORM 7711-1 UAS COA Attachment accompanying section 333 Exemption No. 11310 (Colin Hinkle), docket no. FAA-2014-0608 at page 1 (Apr. 9, 2015)

²⁴⁷ FAA FORM 7711-1 UAS COA Attachment accompanying section 333 exemption No. Exemption No. 11310 (Colin Hinkle), docket no. FAA-2014-0608 at page 6 (Apr. 9, 2015) (“Should the proposed operation conflict with any state law or local ordinance, or require permission of local authorities or property owners, it is the responsibility of the operator to resolve the matter. This COA does not authorize flight within Special Use airspace without approval from the

But the fact that the exemption and COA do not “waive” state law or local ordinance does not mean that any particular state law or local ordinance is valid under the Commerce Clause or federal preemption analysis. If the FAA approves specific drone operations through the Section 333 process, preemption analysis says that a state cannot block the operations unless pursuant to a traditional police power not singling out aviation.

It is unlikely that states have the power to enforce Federal Aviation Requirements (“FARs”) directly. States have no inherent power to enforce federal law.²⁴⁸ As a general matter, judicial enforcement of FARs is reserved to the Secretary of Transportation and the Attorney General.²⁴⁹ State courts remain open to adjudicate claims of invasion of privacy, trespass to land, and negligence so long as the elements of each tort applied in a particular drone case do not conflict with FAA rules.

For example, a jury instruction in a privacy case that tells the jury it may find the defendant liable only if it finds intent to intrude into private activities in a manner that a reasonable person would find offensive,²⁵⁰ would protect the privacy litigation from

scheduling agency. The operator is hereby authorized to operate the small Unmanned Aircraft System in the National Airspace System.”).

²⁴⁸ Margaret H. Lemos, *State Enforcement of Federal Law*, 86 N.Y.U. L. REV. 698, 708 (2011) (asserting that states have no inherent power to enforce federal law); *Hawaii v. Standard Oil Co. of California*, 405 U.S. 251, 263–64 (1972) (affirming dismissal of state *parens patriae* suit for damages under Clayton antitrust act); *Connecticut v. Health Net, Inc.*, 383 F.3d 1258, 1262 (11th Cir. 2004) (affirming dismissal of action by state to enforce ERISA; no evidence of Congressional intent to give states enforcement standing).

²⁴⁹ See *Bonano v. East Caribbean Airline Corp.*, 365 F.3d 81, 84–85 (1st Cir. 2004) (holding that Congress meant to reserve enforcement of aviation regulations to the FAA); *Schmeling v. NORDAM*, 97 F.3d 1336 (10th Cir. 1996) (interpreting 49 U.S.C. § 46108 and holding that Federal Aviation Act does not grant private right of action to enforce FAA rules; affirming dismissal of action by former maintenance employer challenging dismissal for failing drug test).

²⁵⁰ The tort of invasion of privacy-intrusion upon seclusion is defined as “One who intentionally intrudes, physically or otherwise, upon the solitude or seclusion of another or his private affairs or concerns, is subject to liability to the other for invasion of his privacy, if the intrusion would be highly offensive

preemption. The FAA does not address the intent to intrude element, just like it did not address the design of airstairs in *Martin*.²⁵¹ Conversely, a jury instruction in a negligence case that defines the standard of care as flying no lower than 1000 feet above private property, or testimony allowing a jury to find the same thing, would result in preemption.

As aviation matured through the twentieth century, landowners periodically sued aircraft operators for trespass and nuisance.²⁵² Most of the trespass cases confronted questions about how high above the ground the property owner's rights extend.²⁵³ Above that height, trespass liability is preempted by FAA regulation. As for manned aircraft, machodrone flight is unlikely to engender difficulty with height questions. This question of the vertical extent of property is less prominent for microdrone operations. A landowner's exclusive rights surely extend to 500 or 1,000 feet above the ground, as a handful of older aviation cases hold.²⁵⁴ As Part III.C.7 suggests, treetop or utility-line level is a good rule of thumb for the upper limit of property rights.

States or municipal legislation or rules that target drones are more likely to be preempted than a statute or regulation of general effect, such as relating to noise, taxation, or environmental protection. Similarly, state legislation and regulation that specifies limits on flight profiles, crew qualifications, or aircraft design is

to a reasonable person.” RESTATEMENT (SECOND) OF TORTS § 652B (Am. Law Inst. 1977).

²⁵¹ See *supra* notes 164–69 and accompanying text.

²⁵² See, e.g., *Hinman v. Pac. Air Lines Transp. Corp.*, 84 F.2d 755 (9th Cir. 1936) (rejecting trespass liability for aircraft overflying private property).

²⁵³ Compare *United States v. Causby*, 328 U.S. 256, 264 (1946) (holding that military flights at eighty-three feet over plaintiff's property constituted a compensable “taking” because it encroached on plaintiff's property rights), with *Laird v. Nelms*, 406 U.S. 797 (1972) (holding that high-altitude flight creating sonic booms did not constitute a trespass); see also *Pueblo of Sandia ex rel. Chaves v. Smith*, 497 F.2d 1043, 1045 (10th Cir. 1974) (rejecting trespass action against aircraft operator because no proof of actual injury to concrete uses of land). “The landowner owns at least as much of the space above the ground as [he] can occupy or use in connection with the land.” *Causby*, 328 U.S. at 264.

²⁵⁴ See *supra* Part III.C.7.

more likely to be preempted than initiatives that address matters not directly related to flight, such as business financial reserves, employee vacation or sick leave, minimum wages, or employment discrimination. *French*, *Montalvo*, and *O'Donnell* illustrate state regulation that intrudes too far into definition of flight crew duties, a matter regulated by the FAA. Conversely, *Skysign* is an example of permitted general state regulation of advertising, and *Goodspeed Airport* is an example of permitted state environmental regulation.

If an existing or proposed FAA rule exists on a particular subject addressed by state legislation and regulation, it is more likely to be preempted. *Montalvo* and *O'Donnell* are examples.²⁵⁵ But if the FAA has left a gap in its regulations on the particular subject, state action to fill the gap is less likely to be preempted, even if the FAA regulates the general area. The regulation of airstairs in *Martin* is an example. Under the distinction it draws, requiring state or local registration of drones already registered with the FAA is not permissible, because it conflicts with the federal registration regime.

Moreover, preemption is less likely if a state narrowly targets a particular highly localized area of drone operations, and relates it to matters of traditional state concern, such as personal privacy, or security of property occupancy. Deference usually given to matters of traditional state concern, and the argument is stronger that the activity is outside the Commerce Clause.

If a state incorporates Federal regulatory standards into its tort law²⁵⁶ and provides its own remedies when a plaintiff can prove violation of the standards, proximate causation, and injury, preemption is unlikely. *Cleveland* illustrates this point,²⁵⁷ although the case goes further in allowing state regulation. *Abdullah* supports the proposition,²⁵⁸ and the other products liability cases discussed in Part III.C embrace the distinction.

²⁵⁵ See *supra* Part III.C (analyzing cases).

²⁵⁶ The common-law doctrine of negligence per se is an example of such incorporation.

²⁵⁷ See *supra* Part III.C (analyzing cases).

²⁵⁸ *Id.*

The case law validating state regulation of airport siting²⁵⁹ supports the proposition that states and municipalities have the power to specify where drones may take off and land, effectively limiting where microdrones may fly, given their short range. States and municipalities may not, however, regulate the height at which drones can be flown. Because the FAA prescribes a maximum height above ground level, justified by reducing interference between drones and higher flying manned aircraft, these requirements would be preempted. On the other hand, a state or local rule establishing a minimum height is less likely to be preempted because there is no FAA-established minimum height, and because of traditional police power to regulate land use. The cases involving claims of trespass to land by aircraft might suggest otherwise, however.²⁶⁰

Limiting the purposes for which drones may be flown, for example, prohibiting flights for surveillance or to capture imagery of a particular individual, might be permissible. The FARs, while imposing different airman and aircraft certification and different flight rules for different purposes such as banner towing, med-evac, and tourism in certain areas do this because of differing types of safety threats. A state or local law limiting purposes would be aimed instead at exercising traditional police power over privacy or land use. To the contrary is a recent student note,²⁶¹ which concludes that state and municipal laws focused on drone safety, such as measures limiting flight altitudes or flights over populated areas, are likely to be preempted.²⁶²

Conversely, state and local regulation of surveillance, justified by protection of personal privacy, may survive preemption challenges, at least if they apply the same limitations to manned aircraft as to drones.²⁶³ States should be able to regulate data collection, to limit liability for accidents, and to require liability

²⁵⁹ See *supra* Part III.C.5.

²⁶⁰ See *supra* Part III.C.7 and accompanying text.

²⁶¹ Ray Carver, *State Drone Laws: A Legitimate Answer to State Concerns or a Violation of Federal Sovereignty*, 31 GA. ST. U. L. REV. 377 (2015).

²⁶² *Id.* at 404.

²⁶³ *Id.* at 404–05.

insurance, because there is no federal aviation law on these subjects, and because of traditional—and statutory²⁶⁴—state prerogatives over insurance.

The airport regulation preemption decisions suggest that states and municipalities have more non-preempted power over facilities they own and manage than over facilities in private hands. States and municipalities likely have more authority to regulate drone conduct in public spaces than they do over private property, especially over public parks. States and municipalities already regulate access to public parks, charge fees, and determine what activities are permissible. Prohibiting drone flight without permit is a relatively simple matter to accomplish, as the Chicago Park District Commission initially proposed.

The distinction between sovereign and proprietary governmental functions was enshrined in Supreme Court case law for a while with respect to the reach of federal labor law into local government employment.²⁶⁵ The distinction has largely been abandoned as a touchstone of labor law preemption, but conceptually, it remains viable as a federalism principal, contrasting, for example, local regulation of a private airport from governmental operation of an airport.

B. *Model aircraft and Consumer Drones*

States have broader authority to regulate hobbyist flight of model aircraft and consumer drones compared with commercial drone operations, because the FAA has been active only with respect to commercial drone operations. Section 336 of the 2012 Act²⁶⁶ prohibits the FAA from promulgating any rule or regulation applicable to model aircraft weighing less than 55 pounds, as long as they are flown consistent with “community-based” guidelines,

²⁶⁴ 15 U.S.C. §§ 1011–1015 (2015) (saving state insurance regulation from federal preemption).

²⁶⁵ *See Garcia v. San Antonio Metropolitan Transit Authority*, 469 U.S. 528, 541–43 (1985) (discussing unworkability of proprietary/governmental function distinction).

²⁶⁶ *See supra* note 58 and accompanying text.

as a part of “community based programming,” and not near airports. The reference to community-based guidelines is generally understood to mean guidelines issued by the Academy of Model Aeronautics.²⁶⁷ The reference to “programming” probably means as a part of a local model aircraft club-sponsored outing.²⁶⁸

The Conference Report on the 2012 Act explains:

In this section the term “nationwide community-based organization” is intended to mean a membership based association that represents the aeromodeling community within the United States; provides its members a comprehensive set of safety guidelines that underscores safe aeromodeling operations within the National Airspace System and the protection and safety of the general public on the ground; develops and maintains mutually supportive programming with educational institutions, government entities and other aviation associations; and acts as a liaison with government agencies as an advocate for its members.²⁶⁹

Section 336 also says nothing about state or local regulations, and its withholding of authority for the FAA leaves a relatively clear field for states to regulate model aircraft operations.

The safe harbor for model aircraft is written around traditional practices of well-organized and long-established model aircraft hobbyist organizations such as the Academy of Model Aeronautics. In a traditional model aircraft club, Radio-Controlled (“RC”) hobbyists get together at designated fields as a group and cooperatively fly their aircraft, usually with one person serving as the pilot, and the second serving as an observer. Adherence to safe practices depends on the culture of a particular group and the dynamics of interaction on a particular day. All clubs have rules,²⁷⁰ however, both general and specific for operations for any particular field, and the club members generally follow them, exerting social pressure on anyone who deviates. On a visit to an RC hobbyist

²⁶⁷ ACADEMY OF MODEL AERONAUTICS, <http://www.modelaircraft.org/> (last visited Sept. 25, 2015).

²⁶⁸ This is the author’s opinion.

²⁶⁹ H.R. Rep. No. 112-381, at 199 (2012) (Conf. Rep.).

²⁷⁰ See *Academy of Model Aeronautics National Model Aircraft Safety Code*, ACADEMY OF MODEL AERONAUTICS (Jan. 1, 2014), <https://www.modelaircraft.org/files/105.pdf>.

field, one encounters hobbyists with their RC airplanes flying them in pairs, talking and joking about their planes and past exploits.²⁷¹ They all know each other. It is unlikely that one of them would stray too far from the norm and risk getting kicked out of the club.

If a club member becomes interested in drones, and buys a DJI Phantom or 3DR Solo, he is likely to fly it according to the rules, unless he decides to try to make money with it. Then, the pathway of the section 333 exemption process and the eventual final rule for sUAS are available. His habit of compliance with RC club rules and his general awareness of the FAA probably will cause him to comply rather than just to ignore the restrictions on commercial microdrone flight.

Hence, the operation of drones by organized RC hobbyists does not pose significant new threat to other aircraft or to the citizenry in general. Hobbyists have a good safety record, and commercial microdrone operators are unlikely to put their exemptions and certificates at risk by flouting the FAA's detail rules for commercial operations—whatever their eventual content.

The new threat comes from a different quarter: from the thousands of people who got microdrones as Christmas or birthday presents, but have no prior connection with an RC model club or any prior interest in tinkering with model aircraft.²⁷² Based on the more-than 1,600 section 333 exemptions that have been granted and the much larger number of pending petitions, some the users are entrepreneurs, especially photographers, freelance journalist, civil engineers, surveyors. The vast majority of these casual purchasers, however, do not plan on starting a business or making arrangements to fly their drones as a part of an RC club activity. Instead, they take their drones out into their backyards, local parks, and nearby school grounds and fly for fun. When they go to a sporting event, a music festival, a vacation location, or some other

²⁷¹ Based on personal observations by co-author Perritt during a July 2015 visit to the Blue Max RC Club Flying Field, Buffalo Grove, IL.

²⁷² Henry H. Perritt, Jr. and Eliot O. Sprague, *Law Abiding Drones*, 16 COLUM. SCI. & TECH. L. REV. 385, 407–18 (2015) (explaining lack of community-based adherence to rules by casual drone users).

recreational gathering, they will think about taking their drone for the same reason they take their cameras: to get some good imagery for their Facebook pages and to record videos for YouTube.

Indeed, recent events have confirmed this new threat. The drone that landed on the White House lawn²⁷³ was not being flown for commercial purposes; it was flown for fun in connection with an alcohol-fueled party. Likewise, the incident in King County Washington²⁷⁴ involved recreational, rather than commercial, drone flight.

Arguably, these consumer operations fall outside the statutory safe harbor for RC hobbyists anyway. Such operations are not “operated in accordance with a community based set of safety guidelines and within the programming of a nationwide community-based organization.”²⁷⁵

Enough ambiguity exists in the language to support broad claims that the Congress has placed all forms of consumer drone activity beyond the FAA’s reach. The statute may be amended, of course, as S.1608 proposes to do. But any proposed amendment is likely to face ferocious opposition from the RC hobbyist community²⁷⁶ and therefore passage of such an amendment is uncertain. Even if S.1608 becomes law, or if the FAA decides to impose automation performance requirements on microdrones as a prerequisite for sale,²⁷⁷ anarchy will be the norm for consumer drones unless states and municipalities supplement FAA enforcement resources. If states and municipalities decide to step

²⁷³ Michael D. Shear & Michael S. Schmidt, *White House Drone Crash Described as a U.S. Worker’s Drunken Lark*, N.Y. TIMES (Jan. 27, 2015), http://www.nytimes.com/2015/01/28/us/white-house-drone.html?_r=0.

²⁷⁴ Graham Johnson, *FAA investigating drone flying near news helicopters*, KIROTV (March 17, 2015), <http://www.kirotv.com/news/news/faa-investigating-drone-flying-near-news-helicopte/nkYk7/> (reporting on near miss between drone and news helicopters).

²⁷⁵ 2012 Act § 336(a)(2).

²⁷⁶ Nearly half of the comments filed on the NPRM were from hobbyists opposing FAA regulation of model aircraft.

²⁷⁷ Its current authority to do so is uncertain. *Compare* statutory language for motor vehicle regulation and electronic device regulation *with* FAA’s authority.

in, the preemption barriers are modest. States have a long history of regulating recreational activity that may pose safety problems: hunting, archery, recreational boating, and all-terrain vehicles.²⁷⁸ Requiring consumer drones to fly at low altitude, stay within line of sight of the operator, not to fly over people, and only to fly in public parks with a permit is not likely to interfere with commercial microdrone operations or to interfere with the operation of the National Airspace System.²⁷⁹

State and local regulation of consumer drones will have little adverse effect on the economics of commercial drone operation, because they are not being flown commercially—*if* the consumer drone regulations exclude commercial microdrone operations conducted under FAA rules and approvals.²⁸⁰ Limiting state and local regulation to risk-based and performance-oriented rules is a good idea anyway, but even if they are not so limited, the adverse effect on commercial designs may be limited because of a growing differentiation between consumer designs and even low-end commercial designs.²⁸¹

The matters outlined in Part IV.A that are off-limits to state and local regulations of commercial drone activity are permissible subjects for state and local regulation of recreational drone activity. If states exercise that authority, they can be significant contributors to public safety and other legitimate state interests.

²⁷⁸ This puts states in a strong position under the first criterion set forth in Part IV.C.1.

²⁷⁹ This puts states in a strong position under the second criterion set forth in Part IV.C.2.

²⁸⁰ This puts states in a strong position under the third criterion set forth in Part IV.C.3.

²⁸¹ This puts states in a strong position under the fourth criterion set forth in Part IV.C.4.

C. State and Local Initiatives

Only a handful of states have enacted statutes limiting the operation of drones (Unmanned Aerial Vehicles or “UAVs”).²⁸² Most of these laws prevent law enforcement use of drones for evidence gathering without appropriate search warrants. Some of these limitations prohibit law enforcement and citizens from weaponizing drones. Some heighten privacy protection by prohibiting aerial surveillance without consent. A few statutes limit drone involvement in hunting. The table on pages 59 through 62 lists the statutes and is followed by a discussion of specific statutory provisions and an evaluation of the likelihood of federal preemption.

| State | Citation | Approved / Effective | Summary |
|-------|--|---|---|
| Fla. | C.S.C.S.S.B 766 Freedom from Unwarranted Surveillance Act | Approved: May 14, 2015 | Prohibits law enforcement use to gather evidence; prohibits recording an image of a privately owned property or of the owner (tenant, occupant, invitee etc.) violating a reasonable expectation of privacy. Exceptions: police use with a warrant, “performance of reasonable tasks” within the scope of one’s license, property appraisals, utility inspection, mapping, delivering cargo (if FAA compliant). |
| Idaho | IC 21-213 | Approved: Apr. 11, 2013 Effective: July 13, 2013 | No law enforcement searches without a warrant; no aerial photography without prior consent. |

²⁸² Specifically, Florida, Idaho, Illinois, Indiana, Iowa, Maryland, Mississippi, Montana, Nevada, New Hampshire, North Dakota, Oregon, Tennessee, Texas, Utah, West Virginia, and Wisconsin have passed laws.

| State | Citation | Approved / Effective | Summary |
|-------|--|--|--|
| Ill. | 720 Ill. Comp. Stat. 5/48-3 Freedom from Drone Surveillance Act | | Prohibits law enforcement use of drones without a warrant; no drone interference with hunters |
| Ind. | IC 35-33-5-9 | Approved: July 1, 2014 | No law enforcement use without a warrant |
| Iowa | HF 2289 | Approved: May 23, 2014 | No drones for traffic law enforcement; evidence obtained without warrant is inadmissible. |
| Md. | SB 370 | Approved: May 12, 2015 Effective: July 1, 2015 | Only the state can make drone laws (preempts counties and local ordinances). |
| Miss. | SB 2022 | Approved: Apr. 23, 2015 | Defines felonious trespass to include peeping through a window, hole, or opening with a drone; prohibits photographs and video of people without consent |
| Mont. | HB 330 | Approved: Apr. 23, 2015 Effective: Oct. 1, 2015 | No weaponized or armored drones for law enforcement |
| Nev. | AB 236 | | No person shall weaponize a drone or operate a weaponized drone; no operation within 500ft or 250ft vertically from a critical facility and 5 miles from airport without consent; right of action (trespass) if drone is less than 250ft over property and property owner notifies DROP that the flight is unauthorized; no use for law enforcement to collect |

| State | Citation | Approved / Effective | Summary |
|-------|--|--|---|
| | | | evidence. Creates a public registry of all state operated drones. |
| N.H. | SB 222 Fish and Game—Animal—Harassment | Approved: May 7, 2015 Effective: Jan. 1, 2016 | No activity that disturbs animals with intent to prevent their lawful taking; no drone use with intent to conduct video surveillance of citizen lawfully hunting, finishing, or trapping, without prior consent. |
| N.D. | HB 1328 | Approved: Apr. 15, 2015 | Evidence obtained by a drone not admissible as evidence without a search warrant; law enforcement cannot use drone footage as a basis for probable cause; no lethal weapons on a drone. Does not prohibit drone usage for research and development by educational institution. |
| Or. | HB 2534 Fish and Game—Fish and Wildlife Comm’n—Drone Regulation HB 2354: only definition of drone changed to “unmanned aircraft system” | Approved: May 12, 2015 | Prohibits use of drones related to pursuit of wildlife (angling, hunting, trapping) or aiding through use of drones to harass, track, locate, or scout wildlife, and interfere with angling, hunting, and trapping. The definition of drone includes unmanned water-based vehicles. |
| Tenn. | HB 153 Crimes and Offenses—Drones—Photography and Pictures | Approved: Apr. 20, 2015 Effective: July 1, 2015 | No operation over events with 100+ attendees for a ticketed event; no flight around fireworks without event organizer’s consent. |

| State | Citation | Approved / Effective | Summary |
|-----------|--------------------------------------|----------------------------|---|
| Tex. | 423.008 | | Law enforcement must submit a report of drone use to the governor. |
| Utah | HB 296 | Approved: Mar. 27, 2015 | Evidence obtained by a drone not admissible as evidence without a search warrant. |
| W. Va. | HB 2515 Wildlife— Animals—Weapons | Approved: Apr. 2, 2015 | Prohibits hunting with drone. |
| Wis. | WSA 941.292 WSA 175.55 | Approved: Apr. 10, 2014 | No weaponized drones; no law enforcement use without a warrant. |

1. *Law Enforcement*

The drone statutes reinforce the constitutional limitation on unreasonable searches and seizures. This prevents law enforcement from taking advantage of a new technology to conduct warrantless searches.

Some states prohibit law enforcement from gathering evidence without a search warrant. In Illinois, law enforcement “may not use a drone to gather information”²⁸³ unless it obtains a search warrant prior to the search.²⁸⁴ Law enforcement agents may use drones in certain circumstances like crime scene and traffic investigation.²⁸⁵ Wisconsin and Indiana, like Illinois, prohibit the use of drones to gather evidence without a search warrant.²⁸⁶ Violation results in

²⁸³ 725 Ill. Comp. Stat. Ann. § 167/10 (West 2014).

²⁸⁴ *Id.* § 167/15 (2).

²⁸⁵ *Id.* § 167/15 (5) (confines law enforcement drone operation to the geographic location and imposes a time limit on investigation).

²⁸⁶ WIS. STAT. ANN. § 175.55 (West 2014); IND. CODE ANN. § 35-33-5-9 (West 2014). *See* FLA. STAT. ANN. § 934.50 (West 2015); IDAHO CODE ANN. § 21-213 (West 2013), IOWA CODE ANN. § 808.15 (West 2014); 2015 Nev. Stat. ch. 327, 2015 N.D. Laws ch. 239 (H.B. 1328) (prohibiting drone use to gather evidence without a search warrant).

inadmissibility of the evidence. In addition, North Dakota prohibits use of drone imagery to establish probable cause to obtain a search warrant that would lead to drone captured evidence.²⁸⁷

Some states prohibit—or propose to prohibit—law enforcement from weaponizing a drone.²⁸⁸ In addition to weaponizing a drone, Wisconsin prohibits law enforcement from equipping a drone with armor.²⁸⁹ Other states extend this prohibition to civilian drone operations.²⁹⁰

Texas addresses concerns about law enforcement abuse but not limiting drone use. The Texas statute does not explicitly require a search warrant when law enforcement conducts an aerial search to gather evidence using a drone.²⁹¹ It merely requires that the law enforcement agency must, every two years, submit a written report to the governor, the governor lieutenant, and each member of the state legislature with a list of drone missions, costs of operating and maintaining a drone, and a list of non-criminal drone investigations.²⁹²

2. *Privacy*

States with drone privacy statutes address the fear of citizens using drones as “prying eyes” to collect information about their neighbors from an aerial vantage point. The statutes prohibit aerial imagery capture without consent.²⁹³ Florida, for example, prohibits any surveillance of a privately owned property, its owner, and anyone legally occupying the premise (landlord, tenant, or licensee).²⁹⁴ The Idaho statute prohibits capturing imagery of land and occupants without prior consent of the owner or the

²⁸⁷ 2015 N.D. Laws ch. 239 (establishing limitations on the use of unmanned aerial vehicles for surveillance).

²⁸⁸ 2015 Montana Laws ch. 261.

²⁸⁹ WIS. STAT. ANN. § 175.55 (West 2014).

²⁹⁰ 2015 N.D. Laws ch. 239 (H.B. 1328) (establishing limitations on the use of unmanned aerial vehicles for surveillance).

²⁹¹ TEX. GOV'T CODE ANN. § 423.008 (West 2013).

²⁹² *Id.*

²⁹³ *See, e.g.*, FLA. STAT. ANN. § 934.50 (West 2015); IDAHO CODE ANN. § 21-213 (West 2013).

²⁹⁴ FLA. STAT. ANN. § 934.50 (West 2015).

occupant.²⁹⁵ Additionally, some states legitimately use drones over property for property appraisals, utility inspections, and mapping, if the DROP performs the “reasonable task” under a state occupational license.²⁹⁶

Flying a drone over private property without consent can lead to a trespass claim against the DROP or a penalty. Some states allow a trespass claim after the landowner notifies the DROP about an unauthorized flight over the landowner’s land lower than 250 feet.²⁹⁷ Texas, for example, creates a civil right of action against a violating DROP and allows a landowner to recover a penalty for every captured image or for distributing images.²⁹⁸ In Mississippi, a drone trespass is a “felonious trespass” when a DROP uses a drone to peep through a “window, hole, or opening.”²⁹⁹ For drone operation during live events, Tennessee prohibits unauthorized use with more than 100 guests attending a ticketed event.³⁰⁰

3. *Hunting*

Aside from privacy concerns, some states worry about the role of drones in the outdoors. States have enacted bills concerning hunting, fishing, and trapping. New Hampshire prohibits drone use with the intent to prevent lawful taking by hunters.³⁰¹ Oregon, for example, prohibits drone use to interfere with hunting, trapping, and fishing.³⁰² State statutes also prohibit drone use to aid in hunting. It is illegal to track, locate, and scout for wild animals³⁰³

²⁹⁵ IDAHO CODE ANN. § 21-213 (West 2013).

²⁹⁶ FLA. STAT. ANN. § 934.50 (West 2015).

²⁹⁷ 2015 Nev. Stat. ch. 327 (regulating operators of unmanned aerial vehicles in Nevada).

²⁹⁸ TEX. GOV’T CODE ANN. § 423.006 (West 2013).

²⁹⁹ 2015 Miss. Laws ch. 489 (prohibiting “peeping tom” activities that do not amount to felonious trespass).

³⁰⁰ 2015 Tenn. Pub. Acts ch. 240 (prohibiting unmanned aerial vehicles from capturing images at an event with more than 100 people).

³⁰¹ 2015 N.H. Laws ch. 38 (amending current animal harassment laws to include drone usage).

³⁰² 2015 Or. Laws ch. 61 (prohibiting the use of drones in pursuit of wildlife).

³⁰³ *Id.*

and to herd animals with a drone to hunt.³⁰⁴ Drone wildlife statutes prevent DROPs from interfering with others' enjoyment of wildlife sports and from taking advantage of a drone to gain an upper hand in outdoor sport. The measures restricting what state or local law enforcement may do with drones are not preempted because of the traditionally strong state interest³⁰⁵ in regulating its own law enforcement bodies and the limited effect on air commerce. Likewise, the measures related to hunting are not preempted because of the traditional state interest³⁰⁶ in that subject.

The Tennessee, Florida, Idaho, and Mississippi statutes present more interesting preemption questions, because they restrict the operations of civilian drones outside the hunting context. Tennessee's prohibition of flying over major events can be justified by the state's interest in public safety. Limitations on what people can do in connection with large public events are a traditional mainstay of state and local regulation.³⁰⁷ The Tennessee crowd overflight prohibition is congruent with the section 333 exemption and (probable) eventual final-rule prohibition on flying over crowds. Tennessee could further justify its involvement as simply providing additional enforcement mechanisms for a federally established standard, similar to what happens when state law provides remedies for conduct that violates federal standard. On the other hand, a state crowd overflight restriction that goes well beyond the federal standard is more vulnerable to a preemption challenge.

The prohibition against aerial imagery over property without the owner's consent and of human subjects without their consent can be justified as an extension of traditional state measures to protect private property and personal privacy interests.³⁰⁸ These

³⁰⁴ VA. CODE ANN. § 19.2-60.1 (West) 2015).

³⁰⁵ See *supra* note 92 and accompanying text.

³⁰⁶ *Id.*

³⁰⁷ See *Ward v. Rock Against Racism*, 491 U.S. 781, 796 (1989) (upholding, against First Amendment challenge, city regulation of noise emanating from concerts).

³⁰⁸ See *supra* note 100, and accompanying text (explaining deference to traditional state interests).

matters are generally left to the states and covered by extensive state regulation already. Many states already prohibit capturing or publishing images of persons without their consent.³⁰⁹ State overflight rules on this subject, however, are more vulnerable to preemption challenges when they extend the height below which permission is required. A limit of 250 feet places half of the FAA's allowable height under off-limits, especially if it is accompanied by restrictions or overflight of public spaces. Such inconsistent height limits interfere with the federal regulatory regime and burden air commerce.

These state privacy measures would fare better under preemption analysis if they simply extended existing state limitations on photographing individuals. Such measures do not single out drones or other aircraft for special restrictions. The case law is more hospitable to state regulation of general application.

D. *Space for Municipalities?*

Whether municipalities may regulate drones depends on whether the states of which they are a part may, and on how state law defines the relationship between the state and its subdivisions.

The sovereignties in the United States' constitutional structure are the federal government and the states, not municipalities.³¹⁰ The states met at the Constitutional Convention and ceded some of their sovereign power to the United States; counties, towns, and cities were not at the table.³¹¹

³⁰⁹ See CAL. CIV. CODE § 3344 (West 2015) (prohibiting commercial use of another's name, voice, signature, photograph, or likeness without permission); 765 ILL. COMP. STAT. ANN. 1075/30 (West 1999) (prohibiting commercial use of a person's identity). The statute defines "identity" as "any attribute of an individual that serves to identify that individual to an ordinary, reasonable viewer or listener, including but not limited to (i) name, (ii) signature, (iii) photograph, (iv) image, (v) likeness, or (vi) voice." *Id.* at 1075/5.

³¹⁰ Indian tribes also are sovereign, but their role in drone regulation is beyond the scope of this article.

³¹¹ See *Wyeth v. Levine*, 555 U.S. 555, 584–86 (2009) (Thomas, J., concurring) (characterizing federalism under U.S. Constitution).

States started out with more sovereignty than they have now. They gave away some sovereignty—part of it upward to the national sovereign, and part of it downward to counties, cities, and towns. Counties and other municipalities enjoy only such powers as are granted by the sovereign state.³¹² The Civil War established that states, having ratified the United States Constitution, are not entitled to take back any of the sovereignty they ceded to the federal government.³¹³ The states, in contrast, may take back the sovereignty they ceded downward to local units of government at any time. For example, a 2015 Maryland statute preempts municipal drone regulation.³¹⁴

Of course, if that state's local government prerogatives are codified in that state's constitution, the process for taking it back may be more arduous than simply passing a bill in one session of the Legislature.³¹⁵ In some states, local government enjoys only those governmental authorities explicitly granted to them by state statute or constitutional provision, as was the case in Alabama for many years.³¹⁶ The trend, however, is for states to adopt home rule legislation that grants general governmental power to

³¹² See *Monell v. Dep't of Soc. Servs.*, 436 U.S. 658, 674 (1978) (explaining that municipalities derive all their powers from the state).

³¹³ *Texas v. White*, 74 U.S. 700, 740 (1868) (noting that the Civil War rejected Texas's sovereign right to secede). Secession is the complete recapture of sovereignty. Thus by rejecting secession, the Union's victory in the Civil War impliedly rejected the power of a state to withdraw the cession of sovereignty to the federal government in the constitution.

³¹⁴ MD. CODE ANN., ECON. DEV. § 14-301 (West 2015) (“Only the State may enact a law or take any other action to prohibit, restrict, or regulate the testing or operation of unmanned aircraft systems in the State. (C) Subsection (b) of this section: (1) preempts the authority of a county or municipality to prohibit, restrict, or regulate the testing or operation of unmanned aircraft systems; and (2) supersedes any existing law or ordinance of a county or municipality that prohibits, restricts, or regulates the testing or operation of unmanned aircraft systems.”).

³¹⁵ *City of Philadelphia v. Schweiker*, 858 A.2d 75, 83 (Pa. 2004) (contrasting municipal home rule powers derived from state constitution with those derived from state statute).

³¹⁶ Paul Diller, *Intrastate Preemption*, 87 B.U. L. REV. 1113, 1127 n.64 (2007) (characterizing Alabama's lack of meaningful home rule).

municipalities, roughly equivalent to that exercised by the state, unless a specific power is withheld in the home rule statute or by subsequent legislation.³¹⁷

V. ECONOMIC AND POLITICAL REALITIES

Deciding what powers states and municipalities have to regulate drones does not exhaust the subject. Regulation arises, not only from economics, law, and good ideas, but also from politics and passion.

A. Economics

Two distinct markets exist for commercial microdrone activities. The first is the market for the vehicles themselves, and the second is the market for services provided by operators of those vehicles. The market for the vehicles is undeniably national and international in character. The dominant vendor for small drones in the United States is DJI, a Chinese company.³¹⁸ United States vendors such as 3Drobotics,³¹⁹ like their foreign counterparts, seek footholds in international markets. Allowing states to set different standards for vehicles would significantly interfere with the efficient functioning of these markets, and it would be even worse if regulations are made at the local level. It would be bad enough to need 50 different business plans and

³¹⁷ See David J. Barron, *Reclaiming Home Rule*, 116 HARV. L. REV. 2255, 2277–2322 (2003) (analyzing history and competing philosophies of home rule); *City of Commerce City v. State*, 40 P.3d 1273, 1279 (Colo. 2002) (describing home rule authority).

³¹⁸ See Ryan Mac, Heng Shao & Frank Bi, *Bow To Your Billionaire Drone Overlord: Frank Wang's Quest To Put DJI Robots Into The Sky*, FORBES (May 6, 2015, 6:00 AM), <http://www.forbes.com/sites/ryanmac/2015/05/06/dji-drones-frank-wang-china-billionaire/> (providing profile of DJI and its competitive position).

³¹⁹ See Chris Anderson, *How I Accidentally Kickstarted the Domestic Drone Boom*, WIRED MAGAZINE (Jun. 22, 2012), http://www.wired.com/2012/06/ff_drones/ (providing profile of 3D Robotics by founder).

vehicle requirements, let alone 36,000 for municipalities.³²⁰ Of course, drone manufacturers and operators could use a “common denominator” model and adapt to the most stringent regulatory requirements in all their models, but that would increase costs.

In contrast, the market for drone services is inherently local. The limited range of the available vehicles means that any particular mission is going to take place in a relatively small area. For example, an Amazon delivery drone could only deliver packages within the range of the battery flight time limitations. Thus, Amazon could only serve the market immediately adjacent to its warehouse and distribution offices. Even so, there are broader impacts. Depending on the altitudes at which they are flown, these local missions could pose collision risks to interstate and international airline and commercial operations.

Also, economies of scale for marketing, finance, and operations management may lead commercial drone operators over time to expand, so they offer the same or similar services in more than one geographic area. One crew dispatcher for DROPs can handle more than one customer’s callouts. Promotional materials prepared for one local market can be made suitable for others. Investment promotion, cash management, accounting, purchasing, and liability insurance all represent fixed costs that can be shared among different local markets.

The enterprise structure of the commercial helicopter industry is an analogy to how commercial drone operations will be structured; the markets and missions are, in many respects, similar. National or regional operations instead of purely local ones predominate for oil and gas exploration crew transportation, for medevac, for electronic newsgathering, and for much utility infrastructure inspection. To be sure, there are many purely local operators in each of these industry sectors, but they provide services mostly at the margins of their customers’ operations and of their own, flying an occasional utility patrol or event shot

³²⁰ *Lists & Structures of Government*, CENSUS.ORG, https://www.census.gov/govs/go/municipal_township_govs.html (last visited Sept. 26, 2015) (noting number of sub-county municipalities in the United States).

opportunistically in to fill out a portfolio of that offers flights for almost any purpose, frequently coupled with flight training as the mainstay business.

Drone operator organizational structure also will depend, to some extent, on the organizational structure of the customers for drone services. An enterprise with a national or international footprint is likely to want to standardize drone services contracts across its geographically dispersed operations. It can do this, of course, while still allowing local decision-makers to contract with local operators, but the economies of scale from both buyers and sellers of drone services will push things toward arrangements of wider scope.

Different operating rules in different parts of the country would be impediments to realizing these efficiencies. Even if compliance is not a problem—for example not flying over 200 feet in New York State, but up to 500 feet in Colorado; or being allowed to fly the drone from a moving vehicle in Nebraska but not in Michigan—finding out what the rules are if they vary from place to place would impose significant additional transaction costs for legal research and advice.

B. *Politics*

Politics will share the stage with law and economics in determining how regulatory power over drones will be allocated among the federal government, states, and municipalities. Microdrones will produce a clash over federalism when constituent or interest group pressures to draft drone legislation prove irresistible. Two different political issues exist: the politics of the content of state or local drone regulation, and the politics of federalism and federal preemption. Section IV.B discusses the politics of content. This section addresses the politics of federalism.

The politics of federalism intersects with judicial appreciation of the need to give greater room for state regulation of federal

interests in areas where states traditionally have exercised power.³²¹ Most state and local lawmakers do not think much about preemption. Even if they are lawyers and recall the concept from law school and the bar exam, they are unlikely to have an appreciation of the analysis conducted in part III and its conclusion. Lawmakers, however, likely have a general understanding that some matters are mostly federal and some are mostly local.

When lawmakers think of the subject as aviation regulation, they are likely to assume that it is a matter for the federal government. When the subject is zoning, other land-use regulations, nuisance, protection of personal privacy, and localized disorderly conduct, they assume it's a matter for state or local regulation. Consider the following hypothetical: a state legislature or a city council has proposed legislation on its agenda, sponsored by one of its members in response to constituent pressure. The content of the measure may restrict drones, or it may encourage their expanded use, depending on local politics.

The Maryland statute³²² clearly is an example of the latter, but most of the others on the list in Part IV.C are examples of the former. The legislative body schedules hearings, and at some point, a hearing witness, another legislator, or staff counsel suggests that the measure might be preempted by federal law. That will surely come as a surprise. “You mean the federal government excludes us from aviation regulations all the way down to one centimeter over my backyard?” someone may ask. Then the battle is on—the FAA is extremely unlikely to accede to the proposition that it has anything less than exclusive authority all the way to the ground.

1. *Not in My Backyard*

Ultimately, as Part V explains, the boundary between federal and state regulation will be defined not by abstract legal principles, but by policy decisions made by federal, state, and local legislators. Their policy decisions will, of course, be informed by

³²¹ See *supra* Part III.

³²² See *supra* note 314 and accompanying text.

politics operating at their particular level of government. An axiom of political science is that concentrated interests trump diffuse interests. Socially desirable projects such as cell phone towers, wind turbine farms, waste disposal sites, and electricity infrastructure “often succumb to a political process that yields to concentrated costs over diffuse benefits.”³²³ Organization matters and it is not easy to organize.³²⁴

Regulation at the federal level favors well-organized national interests, most of whom are likely to be pro-drone: farmers,³²⁵ the press and media,³²⁶ realtors,³²⁷ electricity and gas utilities,³²⁸ insurers,³²⁹ airlines,³³⁰ pilots,³³¹ and railroads.³³² It will be easier for

³²³ Barak D. Richman & Christopher Boerner, *A Transaction Cost Economizing Approach to Regulation: Understanding the NIMBY Problem and Improving Regulatory Responses*, 23 YALE J. ON REG. 29, 37 (2006) (explaining political economy of NIMBY); Michael A. Fitts, *Can Ignorance Be Bliss? Imperfect information as a Positive Influence in Political Institutions*, 88 MICH. L. REV. 917, 930–31 (1990) (summarizing literature on the greater political power of concentrated interests opposing diffuse interests); Michael A. Fitts, *The Vices of Virtue: A Political Party Perspective on Civic Virtue Reforms of the Legislative Process*, 136 U. PA. L. REV. 1567, 1580–81 (1988) (summarizing theory of how concentrated interests bias legislative decision-making);

³²⁴ See Lucas R. White, *Untangling the Circuit Splits Regarding Cell Tower Siting Policy and 47 U.S.C. § 332(c)(7): When is a Denial of One Effectively a Prohibition on All?*, 70 WASH. & LEE L. REV. 1981, 1987–88 (2013) (analyzing collective action problems in cell phone tower siting decisions).

³²⁵ See *Political Power of the Agribusiness & Crop Insurance Lobbies*, TAXPAYERS FOR COMMON SENSE (October 2012), http://www.taxpayer.net/images/uploads/downloads/Political_Power_of_Farm_And_Crop_Insurance_Lobbies_Fact_Sheet.pdf.

³²⁶ Commercial TV and radio stations spent \$31.7 million on lobbying in 2014 alone. *Commercial TV & Radio Stations*, CENTER FOR RESPONSIVE POLITICS, <https://www.opensecrets.org/lobby/induscode.php?id=C2100&year=2014> (last visited Sept. 26, 2015).

³²⁷ The real estate industry spent \$1.2 billion on lobbying from 1998 to 2015. *Top Industries*, CENTER FOR RESPONSIVE POLITICS, <https://www.opensecrets.org/lobby/top.php?indexType=i&showYear=a> (last visited Sept. 26, 2015).

³²⁸ Electric utilities spent \$2 billion on lobbying from 1998-2015. *Id.*

³²⁹ See *Health Care: A huge win for the insurance lobby*, THE ECONOMIST, (Apr. 3, 2013, 5:01 PM), <http://www.economist.com/blogs/democracyinamerica/2013/04/health-care> (referring to “the immense power wielded by health insurers”). The insurance industry was the second ranked industry, after

drone manufacturers to exert political power at the national level rather than having to develop a presence at the state and municipal level.

Does a role for states and municipalities mean more restrictions on desirable drone use because of the not-in-my-backyard phenomenon?³³³ Answering that question requires analysis of the political dynamics of local political decision-making, and that involves assessment of whether pro-drone or anti-drone interests are likely to be concentrated or diffuse.

Yale political science professor Robert Dahl, in his classic 1961 book, *Who Governs?: Democracy and Power in an American City*, highlighted the role of local governmental institutions as mediators among conflicting interests groups, some of which had more power to influence the process than others. Dahl said that a political issue “can hardly be said to exist unless and until it commands the attention of a significant segment of the political stratum [the small segment of the population that is involved

pharmaceuticals and health products in lobbying expenditures from 1998 to 2015. *Top Industries*, CENTER FOR RESPONSIVE POLITICS, *supra* note 327.

³³⁰ The air transport industry spent \$1.1 billion on lobbying from 1998 to 2015. *Id.*

³³¹ Airline pilot unions spent more than \$2 million on lobbying in 2014. *Air transport unions*, CENTER FOR RESPONSIVE POLITICS, <https://www.opensecrets.org/lobby/induscode.php?id=LT100&year=2014>.

³³² Railroads spent \$ 34.3 million on lobbying in 2014. *Railroads*, CENTER FOR RESPONSIVE POLITICS, <https://www.opensecrets.org/lobby/indusclient.php?id=M04&year=2014>.

³³³ “NIMBY, describes the situation where local citizens, organized community groups, and officials who want to benefit from an ‘essential infrastructure,’ such as wireless telecommunication facilities, but do not want the infrastructure located in their particular neighborhoods and communities.” Camille Rorer, Recent Development, *Can You See Me Now? The Struggle between Cellular Towers and NIMBY*, 19 J. NAT. RESOURCES & ENVTL. L. 213, 216–17 (2004–05); See Hannah Wiseman, *Expanding Regional Renewal Governance*, 35 HARV. ENVTL. L. REV. 477, 483–84 (2011) (arguing that fragmentation of governmental authority prevents efficient land use for renewable energy; proposing regional structures).

regularly in politics].”³³⁴ An issue may take root because members of the political stratum get interested in it and influence other members to pay attention. It also may take root when the apolitical stratum experiences a vaguely felt need, and members of the political stratum formulate ways for the need to be addressed by political institutions.³³⁵ The vicissitudes of press and media attention drive awareness in both strata. A highly publicized drone accident, or a rescue of a lost child enabled by drone imagery would have this impact.

One cannot predict political behavior in a particular unit of government without sophisticated public opinion polling of the population of that particular unit. Even then, predictions based on poll results are notoriously unreliable when political opinion is rapidly changing or when a particular issue is not very firmly in the public consciousness.³³⁶ Still, national polling suggests that the public attitude toward drones is unfavorable,³³⁷ likely fueled by a perception that civilian drones resemble military drones used in combat by the armed services and intelligence agencies—Predators and Reapers with thousands of pounds flying out of sight, at thousands of feet above the ground, and loitering for many hours to spy on or launch missiles at those below.

Over time, the wider use of civilian microdrones will alter the public perception, but for now, the likelihood is great that negative public attitude, reinforced by the not-in-my-backyard phenomenon, will make state and local legislative bodies instinctively hostile to widespread use of microdrones.

³³⁴ Robert Alan Dahl, *WHO GOVERNS?: DEMOCRACY AND POWER IN AN AMERICAN CITY* 92 (2d ed. 2005) (explaining crystallization of political issues).

³³⁵ *Id.*

³³⁶ See Everett Carll Ladd, *A word on the limitations of polling*, *CHRISTIAN SCIENCE MONITOR*, (May 20, 1988), <http://www.csmonitor.com/1988/0520/epoll-.html> (summarizing limitations of political polls).

³³⁷ Alwyn Scott, *Americans OK with police drones - private ownership, not so much: Poll*, *REUTERS*, (Feb. 5, 2015), <http://www.reuters.com/article/2015/02/05/us-usa-drones-poll-idUSKBN0L91EE20150205> (reporting that 42% of 2,000 respondents opposed private ownership and operation of drones, but 62% support police use for crime fighting).

Public concern about drones has been intensified by the FAA's misleading public characterization of a database of drone sightings by manned aircraft pilots. In several press releases, the agency has characterized these reports as representing near-collisions between drones and helicopters or airplanes. The data show no such thing. A careful analysis by the Academy of Model Aeronautics shows that the database mostly reports mere drone sightings. In only one percent of the reports, did the pilot take evasive action, the routine maneuver to avoid a mid-air collision. Many of the reports were vague about what the pilot saw. In one case the pilot reported what "looked like a flying dog."³³⁸

For example, in May 2015, the Commissioners of the Chicago Park District considered a measure to prohibit drones from flying in Chicago's extensive public parks without a permit.³³⁹ No mechanism for obtaining a permit existed. The initial measure was withdrawn from the agenda pending reconsideration at another meeting after model aircraft enthusiasts protested. Subsequently, counsel for the Park District carefully reviewed the law of federal preemption and crafted a more nuanced proposal, which is expected to be considered later in 2015.

The City of Chicago has adopted an ordinance that represents a model for other municipalities.³⁴⁰ The ordinance exempts section 333 exemption holders but subjects other operations to limitations similar to imposed by the FAA on commercial operations and by the AMA on hobbyists. It appropriately focuses local regulatory energies on the two problem areas: casual users ignorant of

³³⁸ See Henry H. Perritt, Jr., *Report: FAA exaggerates drone 'close calls'*, RTDNA NEWSLETTER (Sep. 23, 2015 1:30 PM), http://www.rtdna.org/article/report_faa_exaggerates_drone_close_calls; *A Closer Look at the FAA's Drone Data*, ACADEMY OF MODEL AERONAUTICS, http://www.modelaircraft.org/gov/docs/AMAAnalysis-Closer-Look-at-FAA-Drone-Data_091415.pdf.

³³⁹ Board of Commissioners 5/13/2015 Meeting, CHICAGO PARK DISTRICT, <https://chicagoparkdistrict.legistar.com/LegislationDetail.aspx?ID=2283879&GUID=C26DC8E7-CAA4-44B1-A9ED-E275409C6D92>.

³⁴⁰ Amendment of Municipal Code Title 9 by adding new Chapter 9-121 to regulate use of small unmanned aircraft in City airspace, SO2015-5419 (approved by Aviation Committee, Nov. 12, 2015; enacted by City Council, Nov. 18, 2015).

aviation safety regulation, and commercial operators who flout federal regulation. It allows local law enforcement to enforce federal rules by incorporating them into local law. The initial version would have banned all drone operations within the city limits unless the vehicles were registered with the city and the owner could prove insurance coverage. The version actually adopted eliminates the registration and insurance requirements.³⁴¹

In some communities, drone proponents will be well organized and influential, as they were in Chicago. Realtors,³⁴² construction firms, and utilities, are alert and have drones high enough on their agendas that they are willing to make the effort. In some rural communities, agricultural interests that want to use drones will be influential. In most cases, however, it is more likely that concentrated opposition will trump diffuse supporters who do not know about the initiative or who do not want to go to the trouble of opposing it.

2. *Intellectual Capital*

Eighty years ago, Justice Brandeis famously observed that the genius of the federal structure of the United States is that states can serve as laboratories within which different regulatory approaches can be tried out.³⁴³ Moreover, having different local regulations has

³⁴¹ The authors of this article worked with the City Council and drone interest groups to revise the proposal before it came to a vote. Both testified in favor of the revised ordinance. Most of the testimony by other witnesses was favorable to drones, as well.

³⁴² Realtors are well represented on zoning bodies. Accordingly their interest in using drones to market listed properties is concentrated relative to that of neighbors who may oppose drone operations for this purpose. *But see* Jerry L. Anderson & Erin Sass, *Is the Wheel Unbalanced? A Study of Bias on Zoning Boards*, 36 URB. LAW. 447 (2004) (reporting on survey of members of Iowa zoning boards, data from which mostly refuted hypothesis of pro-development bias).

³⁴³ “Denial of the right to experiment may be fraught with serious consequences to the nation. It is one of the happy incidents of the federal system that a single courageous state may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country. This Court has the power to prevent an experiment.” *New State Ice Co. v. Liebmann*, 285 U.S. 262, 311 (1932) (Brandeis, J., dissenting) (invalidating,

its merits. For example, each region has its own environmental characteristics (weather and terrain) that rational drone rules should take into account. The conditions for drone operations and the risks they pose are different in rural and urban environments.

The agenda of the state laboratories, however, is not determined by an intellectual exploration of facts and the public interest. It is determined by politics, and politics translates into policy only when intellectual capital links amorphous public desire to concrete legislative or regulatory language.³⁴⁴

Drone regulation is unlike occupational safety and health³⁴⁵ and employment discrimination.³⁴⁶ In those areas, many states had mature effective programs before the national program was crafted. Drone regulation is completely different. Virtually all of the intellectual capital with respect to drone regulation has been developed under the premise that drones would be regulated nationally.

As a result, few states or municipalities have given any serious thought to how drones should be regulated. Few interest groups have focused on drafting desirable state and local regulations. Most of the bills proposed have been impulsive, superficial, and motivated by ill-conceived public perceptions of the realities of drone flight. On a relatively new issue like drones, local decision-makers are buffeted by public outcries animated by urban myth and overblown anecdotes about what might happen. Local decision makers go with the flow, as they lack firm intellectual or political anchors to resist or to shape public opinion. Overblown public response to new technologies is not unprecedented, however. The early days of the automobile set off a regulatory overreaction. For

as violating substantive due process, state law restricting entry into ice business).

³⁴⁴ Tomiko Brown-Nagin, *Elites, Social Movements, and the Law: The Case of Affirmative Action*, 105 COLUM. L. REV. 1436, 1506–07 (2005) (explaining that groups at the margins of society may lack the necessary social and intellectual capital to influence events; qualities that elites possess in abundance).

³⁴⁵ See *supra* Part VI.A.

³⁴⁶ See *supra* Part VI.A.

example, a New York City cab driver was arrested and jailed for driving his electric taxi at the “breakneck speed” of 12 miles-per-hour, and a Connecticut legislator introduced a bill to require drivers to come to a complete stop to avoid frightening horses.³⁴⁷

State and local legislators are not irresponsible; they just lack resources to determine the facts. Interest groups provide essential technical support and intellectual capital to higher-level legislative bodies and forge long-standing relationships involving trust with the ample committee and personal staffs that support Congress. Interest groups frequently are impotent at lower levels of government, because they lack the resources to interact effectively with legislators, who often are part time, and have little, if any, staff support.

VI. FUTURE REGULATORY FRAMEWORK

Uninhibited drone regulation at the state and, especially, at the local level will result in dramatically different regulatory regimes across the country, often the product of ill-informed local hysteria. The result would stifle innovation and realization of the benefits of new technologies. It also would bear little relationship to actual risks and their mitigation.

Federal preemption of aviation safety regulation is motivated in large part by the need to prevent such evils. In addition to encouraging safety of air commerce, the FAA Administrator has a statutory duty to “encourage the development of civil aeronautics.”³⁴⁸ It is thus appropriate for the FAA not only to assure that state and local regulation does not interfere with its safety mandate, but also to assure that state and local regulations

³⁴⁷ Randy Alfred, *May 21, 1901: Connecticut Sets First Speed Limit at 12 MPH*, WIRED (May 21, 2008), http://archive.wired.com/science/discoveries/news/2008/05/dayintech_0521.

³⁴⁸ 49 U.S.C. § 40104 (2012); *see also* 49 U.S.C. § 40101(d)(3) (2012) (“[FAA Administrator shall consider] encouraging and developing civil aeronautics, including new aviation technology”); 49 U.S.C. § 40101 (c)(2) (2012) (“[FAA Administrator shall consider] the public right of freedom of transit through the navigable airspace”).

does not stifle innovation and the development of commercial drone markets.

In considerable measure, the motivation for this article's proposal is to give the FAA and Congress a way to respond to state and local political pressure to allow states and municipalities to regulate drones. Adoption of the proposal is far better for air commerce, the national airspace system, and local democracy than a shoving match among different levels of government, inevitably resulting in an outbreak of uncoordinated litigation in state and federal court.

A. *Mechanisms for Federal-State Cooperation*

Cooperative federal-state regulation is not uncommon. Mechanisms for sharing federal and state authority over the same subject matter are pillars of air pollution regulation, occupational safety and health regulation, and remedying employment discrimination.

For example, the Clean Air Act distributes responsibility for setting and enforcing air-pollution standards among the federal EPA and state and local governments.³⁴⁹ Title VII of the Civil Rights Act of 1964 requires the complaints of employment discrimination be filed first with state anti-discrimination agencies, if they exist, before the federal Equal Employment Opportunity Commission (EEOC) has jurisdiction.³⁵⁰ Congress, in crafting the federal Occupational and Safety Act, was reluctant to federalize workplace safety. Accordingly, it provided for a system of state implementation plans under federal Occupational Safety and Health Administration (OSHA) oversight.³⁵¹

³⁴⁹ Arnold W. Reitze, Jr., *Air Quality Protection Using State Implementation Plans—Thirty-Seven Years of Increasing Complexity*, 15 VILL. ENVTL. L.J. 209, 211–12 (2004) (explaining allocation of federal, state, and local authority in state implementation plans under the Clean Air Act).

³⁵⁰ See Employment Discrimination and Title VII of the Civil Rights Act of 1964, 84 HARV. L. REV. 1109, 1213–16 (1971) (criticizing deferral-state procedure).

³⁵¹ See *AFL-CIO v. Marshall*, 570 F.2d 1030, 1035 (D.C. Cir. 1978) (remanding OSHA regulations on staffing and funding of state implementation

B. *Default: Federal Regulation and Preemption*

Default regulation for drones would comprise FAA regulations for DROP qualification, vehicle capabilities, and operating rules. A petition process would accommodate state and local governments who desire to play a role. A state or municipality (authorized by state law) could petition the FAA to regulate drones in certain airspace. The FAA would be required to grant the petition, so long as it meets the following interrelated criteria, to be considered collectively:

1. It must show that the proposed state regulation involves matters traditionally of concern to the states;
2. It must show that the proposed state regulation does not interfere with effective operation of the national airspace system, including drone integration into it;
3. It must not interfere with the economies of scale necessary to allow drone commerce to develop in an unfettered market;
4. It must impose performance rather than technical engineering standards.

In effect, the regulatory regime would be an inversion of the state of affairs in mid-2015, when the default is a prohibition, and commercial operators must petition to fly. Under the proposal, the default would be permission to fly with units of state and local government empowered to petition to limit it. This arrangement could be authorized by statute, or it could be implemented under existing statutory authority. The FAA already has authority to decide when to regulate and when to stay its hand, and it also has authority to delegate its regulatory responsibility to others.³⁵² For

plans); Courtney M. Malveaux, *OSHA Enforcement of the “As Effective As” Standard for State Plans: Serving Process or People?*, 46 U. RICH. L. REV. 323, 324–25 (2011) (explaining that Occupational Safety and Health Act allows states to adopt their own implementation plans so long as they are at least as effective as federal standards).

³⁵² See 49 U.S.C. § 44702(d) (2012) ([authorizing FAA Administrator to delegate] “examination, testing, and inspection necessary to issue a certificate under this chapter”); 14 C.F.R. § 183.1 (summarizing delegation of authority for issuing airman, operating, and aircraft certificates).

the most part, delegation now involves shifting authority to private persons, but there is no reason that the authority to delegate explodes delegation to state and local governmental authorities.³⁵³

Moreover, the FAA frequently exercises the authority to leave certain areas within the scope of its statutory authority unregulated.³⁵⁴ Model aircraft operations were an obvious example before the 2012 statute withdrew FAA authority over the subject.³⁵⁵ Commercial airline aircraft airstairs are another example, to borrow from case law.³⁵⁶ In effect, under the proposal, the FAA would delegate its authority to particular states in the space and to the extent that that the state proposes. It would withhold its authority to impose its own rules in that space and to that extent.

The concept could be implemented in the final rule for microdrones. It was not disclosed in the proposed rule, however, and therefore it has not received the public comment the Administrative Procedure Act envisions.³⁵⁷ If the rule is deferred, the federal government will have a considerable head start in regulating microdrones—exactly the opposite of the experience with occupational safety and health and employment discrimination regulation. That is not necessarily negative, as the initial increment of federal regulation could produce data about and what does and does not work, where state supplementation of the regulatory framework is most desirable.

The default position of federal regulation, while leaving the initiative to states and municipalities to pose exactly what they want to regulate, is that Congress, or the FAA, need not make guesses as to what is well suited for state and local regulation and what will satisfy state and local desires. If a state want to exclude drones from certain areas of geography, it can propose to do so.

³⁵³ See generally Henry H. Perritt, Jr. & Eliot O. Sprague, *Developing DROP Discipline: Training and Testing Operators of Small Unmanned Aircraft Systems*, 7 HASTINGS SCI. & TECH. L. J. 143, 158–61 (2015) (analyzing FAA authority to delegate).

³⁵⁴ See *supra* Part III.C.

³⁵⁵ See *supra* Part IV.B.

³⁵⁶ See *supra* Part III.C.

³⁵⁷ 5 U.S.C. § 553 (2012).

C. *FAA Authority to Approve a State Plan*

This section discusses some legal justification that would allow state or local rules to coexist with federal law on drones.

1. *Unusual Local Interest*

The first possibility would build on the Commerce Clause doctrine and federal-preemption analysis that allows states a wider ambit of regulatory authority alongside, or instead of, the federal government in areas traditionally within the state police power: land-use regulations, personal privacy, and other areas of common law torts. A state petition that imposes insurance requirements, or tort rules for imposing liability arising from drone accidents, would be viewed favorably under this criterion. A petition that addresses traffic separation, DROP qualification, or vehicle standard would not.

2. *Non-Interference with the National Airspace System (NAS)*

The second consideration involves assessing the state proposal in terms of its effect on the efficient and safe operation of the national airspace system. A state proposal to exclude drones from the airspace below treetop and powerline level over private property without permission would be viewed favorably under this criterion because it would have little effect on national airspace system operations and on most legitimate drone flight; indeed it is not clear that anyone is permitted to fly a manned aircraft or a drone below treetop and powerline level about private property under existing if FARs, under the NPRM, or under the Section 333 exemptions.

On the other hand, a blanket ban on drones over the entire territory of a municipality would interfere with the efficient and safe operation of the national airspace system, given that Congress has declared that commercial drone operations are a part of the national airspace system, subject only to compliance with FAA rules to ensure safe integration.

3. *No Adverse Effect on Economies of Scale*

The third criterion would require a showing by the state that its rules can be accommodated without commercial drone operators having to have separate business plans and operating programs for

each local area in the United States. It also could be heightened by showing that a state or local government proposes to adopt uniform or model rules proposed by an entity like the Uniform Commissioners on National State Laws, the National Association of Attorneys General, or some other private group. Satisfaction of this criterion also would exist if a petitioner shows that compliance with the rules impinges only slightly on likely commercial drone operations. Restricting low-level flight over backyards is an example of where impingement is low. Exposing certain purposes such as harassment to after-the-fact liability would be another example.

On the other hand, a state or municipal regulatory regime that limits the kinds of vehicles that can be flown would be suspect under this criterion. It would have the effect of requiring drone operators with more than a local footprint to select their fleets to accommodate a patchwork quilt of potentially inconsistent vehicle requirements. Local imposition of DROP and other crew member qualification requirements would be suspect for the same reason. Any system that requires advance approval of drone flight would be inconsistent with this criterion because it would increase the transaction costs to know what the advance approval requirements are and to alter operations to comply with them. Advance approval for specific flights would be considerably worse in this regard than blanket approval for flights during a defined period of time, such as a year.

4. *Plausible Risk Basis and Performance Orientation*

The fourth criterion is related to the first. The risks that a petitioner identifies should be explicitly and logically linked to the interests cited under the first criterion. The analysis would resemble that used in the Fourteenth Amendment due process analysis to demonstrate a nexus between limitations on human activity and legitimate state interests.³⁵⁸

³⁵⁸ See *City of Cleburne, Tex. v. Cleburne Living Center*, 473 U.S. 432, 440 (1985) (summarizing rational basis test).

VII. CONCLUSION

The availability of small inexpensive drones has resulted in thousands of people flying them for fun and for business. Farmers, electric utilities, pipeline companies, photographers, moviemakers, television producers, public-safety organizations, and television stations are regularly using them to collect aerial imagery when helicopters and airplanes are too expensive or cannot be flown safely. Despite the obvious utility of drones, casual users have alarmed the public and the traditional aviation community, who fear injury to people on the ground, invasion of personal privacy, and midair collisions with other aircraft.

Aviation safety has been understood for more than 50 years to be a matter exclusively reserved for regulation by the federal government. The FAA has been slow to develop a regulatory framework, but now it has begun that process in earnest, approving more than 1,500 specific commercial operations, and publishing a 46-page proposed rule in the Federal Register.

Meanwhile, state statutes and local ordinances are breaking out all over the country. While many of these are preempted by federal law, not all of them are. A careful and well-informed effort by state and local legislative bodies to understand the risk and appreciate the particular role that states can play to supplement federal regulation can improve public safety without strangling this revolutionary new aviation technology in its cradle.

