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Unmanned but Accelerating: Navigating the Regulatory and Privacy Challenges of Introducing Unmanned Aircraft into the National Airspace System

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**UNMANNED BUT ACCELERATING: NAVIGATING THE
REGULATORY AND PRIVACY CHALLENGES OF
INTRODUCING UNMANNED AIRCRAFT INTO
THE NATIONAL AIRSPACE SYSTEM**

BENJAMIN KAPNIK*

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“I HOPE THESE are the robots that take over the earth.”¹ Comedian Aziz Ansari was talking about Tacocopter, a faux-Silicon Valley start-up that promises “flying robots” that deliver tacos.² Although Tacocopter’s creator insists that the website is not a joke,³ Federal Aviation Administration (FAA) regulations and logistical concerns mean that Americans are unlikely to see airborne taco-delivery machines anytime soon.⁴

A future of flying tacos, however, is not out of the question. Tacocopter is only one of the many contemplated uses for unmanned aircraft in America’s civil airspace, the national airspace system (NAS).⁵ Unmanned aircraft are already being used to monitor U.S. borders and collect atmospheric data, and the technology could prove essential for police and firefighters seeking alternative vantages during dangerous situations, for scientists studying pristine ecosystems, and even for companies delivering cargo.⁶

Unmanned aircraft have already become a big business, and the sector is growing quickly. Annual worldwide unmanned air-

¹ Salvador Rodriguez, *Tacocopter the Latest in a Rich Tradition of Internet Hoaxes*, L.A. TIMES (Mar. 28, 2012), <http://articles.latimes.com/2012/mar/28/business/la-fi-tn-tacocopter-internet-hoax-20120328>.

² *Tacocopter: One-Click Taco Delivery in the SF Bay Area*, TACOCOPTER, <http://tacocopter.com/> (last visited Sept. 19, 2012).

³ Rodriguez, *supra* note 1.

⁴ Jason Gilbert, *Tacocopter Aims to Deliver Tacos Using Unmanned Drone Helicopters*, HUFFINGTON POST (Mar. 23, 2012, 5:33 PM), http://www.huffingtonpost.com/2012/03/23/tacocopter-startup-delivers-tacos-by-unmanned-drone-helicopter_n_1375842.html.

⁵ See, e.g., Jefferson Morley, *States Fight for Drone Biz*, SALON (May 30, 2012, 9:19 AM), http://www.salon.com/2012/05/30/states_fight_for_drone_biz/singleton/ (noting that military expenditures make up the vast majority of the unmanned aircraft market); *Predator Drones and Unmanned Aerial Vehicles (UAVs)*, N.Y. TIMES–TIMES TOPICS, http://topics.nytimes.com/top/reference/timestopics/subjects/u/unmanned_aerial_vehicles/index.html?8qa (last updated Sept. 26, 2012) (describing unmanned aircraft and linking to recent articles on the topic).

⁶ NPR Staff, *What Will We Watch as Drones Evolve?*, GPB (July 30, 2011, 6:30 AM), <http://www.gpb.org/news/2011/07/30/what-will-we-watch-as-drones-evolve#> (noting the use of small unmanned aircraft for hostage situations and the potential use by Federal Express and United Parcel Service for shipping); Richard Conniff, *Drones Are Ready for Takeoff*, SMITHSONIAN MAG., June 2011, <http://www.smithsonianmag.com/science-nature/Drones-are-Ready-for-Takeoff.html> (noting the use of drones by border patrol and first responders and the possibility of monitoring low-altitude weather data to achieve “good storm-intensity forecasts” to allay the “huge economic costs”); Jeff Tollefson, *Unmanned Planes Take Wing for Science*, NATURE, Mar. 3, 2010, <http://www.nature.com/news/2010/100303/full/464014b.html> (discussing the role of unmanned aircraft in collecting atmospheric data).

craft expenditures are expected to grow from \$6.6 billion to \$11.4 billion within a decade.⁷ Although the market for civil use currently comprises less than 2% of the worldwide market for unmanned aircraft, that could change over the next several years as technology advances and as legislation and regulations allow broader use of unmanned aircraft in the NAS.⁸

Unmanned aircraft pose difficult safety and privacy questions for regulators and citizens. Cheap and easy-to-operate unmanned aircraft could allow local, state, and federal governments to increase aerial surveillance in the United States.⁹ Moreover, although there is intense political pressure to incorporate unmanned aircraft into the NAS, these aircraft do not yet have a safety record approaching that of commercial airliners, and they still cannot adequately “see and avoid” other air traffic.¹⁰

⁷ Press Release, Teal Grp. Corp., Teal Group Predicts Worldwide UAV Market Will Total \$89 Billion in Its 2012 UAV Market Profile and Forecast (Apr. 11, 2012), available at http://tealgroup.com/index.php?option=com_content&view=article&id=79:teal-group-predicts-worldwide-uav-market-will-total-89-billion-in-its-2012-uav-market-profile-and-forecast&catid=3&Itemid=16.

⁸ Morley, *supra* note 5.

⁹ See Joseph J. Vacek, *Big Brother Will Soon Be Watching—Or Will He? Constitutional, Regulatory, and Operational Issues Surrounding the Use of Unmanned Aerial Vehicles in Law Enforcement*, 85 N.D. L. REV. 673, 676–77 (2009) [hereinafter Vacek, *Big Brother Will Soon Be Watching*] (noting that a standard police helicopter can cost \$875,000 to purchase and \$500 per hour to operate for about 4.5 hours of flight time with two trained crew members, while an unmanned aircraft, purchased for a fraction of the price, can stay airborne for eight hours for \$5 per hour, without the need for trained crew members).

¹⁰ U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-12-981, UNMANNED AIRCRAFT SYSTEMS: MEASURING PROGRESS & ADDRESSING POTENTIAL PRIVACY CONCERNS WOULD FACILITATE INTEGRATION INTO THE NATIONAL AIRSPACE SYSTEM 14–15 (2012) (“To date, no suitable technology has been deployed that would provide [unmanned aircraft] with the capability to sense and avoid other aircraft and airborne objects and to comply completely with FAA regulatory requirements of the national airspace system.”); C. Todd Lopez, *Army Radar to Allow UAS to Fly in National Air Space*, U.S. ARMY (July 2, 2012), http://www.army.mil/article/82989/Army_radar_to_allow_UAS_to_fly_in_National_Air_Space/ (noting that new radar capabilities will allow an unmanned aircraft to enter the NAS by March 2014, but suggesting that until then the Army must have an observer within one mile and 3,000 feet of the unmanned aircraft, either on the ground or in a chase aircraft); Timothy M. Ravich, *The Integration of Unmanned Aerial Vehicles into the National Airspace*, 85 N.D. L. REV. 597, 607 (2009) (stating unmanned aircraft “are less reliable than manned aircraft over significantly fewer flight hours”); Mark Edward Peterson, *The UAV and the Current and Future Regulatory Construct for Integration into the National Airspace System*, 71 J. AIR L. & COM. 521, 571 (2006) (quoting 14 C.F.R. § 91.113(b) (2006)) (noting unmanned aircraft’s inability to “see and avoid” as required by FAA regulations).

This article describes the short-term regulatory and privacy hurdles facing the unmanned aircraft industry. Part I discusses the difficulty of defining “unmanned aircraft” and then examines the regulations and statutes governing unmanned aircraft. Part II examines the impact of privacy law on government and private unmanned aircraft operators.

I. THE REGULATION OF UNMANNED AIRCRAFT

The federal government is wrestling with how to regulate unmanned aircraft. The first step will be to define the category in such a way as to clarify which existing regulations apply to unmanned aircraft and which do not. This part addresses the current regulations governing unmanned aircraft and the forthcoming regulatory framework.

A. DEFINING UNMANNED AIRCRAFT

Unmanned aircraft have been identified by many names throughout their relatively brief existence.¹¹ Terms have included “drones,” “remotely piloted vehicles,” “unmanned aerial vehicles,” “unmanned aircraft systems,” and “unmanned aircraft.”¹² This article adopts the FAA’s preferred terminology, “unmanned aircraft.”¹³

The FAA must define unmanned aircraft to clarify which regulations apply to such aircraft and to ensure that the definition is broad enough to encompass all forms of unmanned aircraft without unintentionally regulating other industries.¹⁴ Unmanned aircraft are difficult to define because of their similarities to model aircraft, missiles, and rockets.¹⁵ The line between

¹¹ Although unmanned aircraft have only recently become prevalent, “dreams of early [unmanned aircraft] pioneers began to form alongside manned aviation,” and unmanned aircraft “were tested before and during World War I.” Peterson, *supra* note 10, at 528, 535.

¹² *Id.* at 528.

¹³ See *Unmanned Aircraft (UAS)—Questions and Answers*, FAA (Oct. 14, 2011, 11:08 AM), http://www.faa.gov/about/initiatives/uas/uas_faq/#Qn1.

¹⁴ See Peterson, *supra* note 10, at 528–32.

¹⁵ See *id.* at 532 (discussing the differences between unmanned aircraft, rockets, and missiles); Joseph J. Vacek, *Civilizing the Aeronautical Wild West: Regulating Unmanned Aircraft*, 23 No. 3 AIR & SPACE LAW., 1, 20 (2011) [hereinafter Vacek, *Civilizing the Aeronautical Wild West*] (discussing the line between model aircraft and unmanned aircraft); see also SMALL UNMANNED AIRCRAFT SYS. (sUAS) AVIATION RULEMAKING COMM., COMPREHENSIVE SET OF RECOMMENDATIONS FOR sUAS REGULATORY DEVELOPMENT 1 (2009), available at <http://modelaircraft.org/faq/recommendations.pdf> (explaining that a model airplane is, historically, a radio-

the groups is blurring. For instance, the Pentagon has tested new unmanned aircraft the size of model aircraft (approximately two feet long) that can be instructed to dive into targets and detonate on impact, like a missile.¹⁶ Congress recently defined a model aircraft “as an unmanned aircraft that is—(1) capable of sustained flight in the atmosphere; (2) flown within visual line of sight of the person operating the aircraft; and (3) flown for hobby or recreational purposes.”¹⁷ Under this definition, all that separates a model aircraft from an unmanned aircraft is the manner in which it is used—flown within the operator’s sight and for recreational purposes.

The diversity of unmanned aircraft also complicates their definition and regulation. Unmanned aircraft come in a wide variety of shapes, sizes, and capabilities.¹⁸ For instance, Northrop Grumman’s RQ-4A Global Hawk has a 116-foot wingspan, longer than a Boeing 737-300, which suggests that it would be appropriate to regulate such drones in a manner similar to manned aircraft.¹⁹ By contrast, many unmanned aircraft, even those used by the military, are the size of model aircraft, which suggests that they should be regulated differently than larger, manned aircraft.²⁰ Despite the small size of some unmanned aircraft, the FAA so far has refused to authorize amateur use of unmanned aircraft because the flexible rules governing model aircraft are insufficient to regulate such powerful machines.²¹ Similarly, Professor Joseph J. Vacek points out that portions of existing aircraft regulations are inapplicable to unmanned air-

controlled plane that may be a scale model of other aircraft and is flown or collected as a hobby).

¹⁶ W.J. Hennigan, *Pentagon to Soon Deploy Pint-Sized but Lethal Drones: U.S. Officials Hope They Will Reduce Civilian Casualties and Collateral Damage*, L.A. TIMES, June 11, 2012, at A1.

¹⁷ FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 336(c), 126 Stat. 11.

¹⁸ *Flight of the Drones: Why the Future of Air Power Belongs to Unmanned Systems*, ECONOMIST, Oct. 8, 2011, <http://www.economist.com/node/21531433>.

¹⁹ *Compare id.* (listing the Global Hawk’s wingspan at 116.2 feet), *with 737 Family: 737-700 Technical Characteristics*, BOEING, http://www.boeing.com/commercial/737family/pf/pf_700tech.html (last visited Sept. 19, 2012) (listing Boeing 737-300’s wingspan at 112 feet and 7 inches).

²⁰ Hennigan, *supra* note 16.

²¹ Vacek, *Civilizing the Aeronautical Wild West*, *supra* note 15, at 19 (noting “the FAA is not willing” to authorize amateur use of unmanned aircraft); *see* FAA, AC 91-57, ADVISORY CIRCULAR: MODEL AIRCRAFT OPERATING STANDARDS (1981) (listing the only five standards that regulate the operation of model aircraft, including that they should be operated below an altitude of 400 feet and at a distance from airports and noise-sensitive areas).

craft, including regulations requiring seatbelts or supplemental oxygen above certain altitudes and those concerning windshield strength and the availability of emergency exits.²²

The government has yet to settle on a definition for “unmanned aircraft.” Congress’s recent FAA Modernization and Reform Act of 2012 states that the term “means an aircraft that is operated without the possibility of direct human intervention from within or on the aircraft.”²³ By contrast, the Department of Defense defines the category as “[a]n aircraft or balloon that does not carry a human operator and is capable of flight under remote control or autonomous programming.”²⁴ Meanwhile, the FAA defines an unmanned aircraft as “the flying portion” of an unmanned aircraft system, which is “flown by a pilot via a ground control system, or autonomously through use of an on-board computer, communication links and any additional equipment that is necessary for the [unmanned aircraft] to operate safely.”²⁵

B. THE EXISTING REGULATORY FRAMEWORK FOR UNMANNED AIRCRAFT

Given the difficulty of defining unmanned aircraft, it is not surprising that the government has also struggled with how to regulate the nascent technology. In February 2012, President Obama signed the FAA Modernization and Reform Act of 2012, which includes a series of mandates for the FAA to create new regulations to introduce unmanned aircraft into the NAS.²⁶ This section describes the existing regulatory scheme for unmanned aircraft and discusses the changes mandated by the new law.

Unmanned aircraft are currently regulated pursuant to the same regulations that apply to other aircraft, yet “the regulations do not intuitively apply to” unmanned aircraft.²⁷ Because un-

²² Vacek, *Civilizing the Aeronautical Wild West*, *supra* note 15, at 21.

²³ FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 331, 126 Stat. 11.

²⁴ JOINT CHIEFS OF STAFF, JOINT PUBLICATION 1-02: DEPARTMENT OF DEFENSE DICTIONARY OF MILITARY AND ASSOCIATED TERMS 327 (2010) (as amended through Aug. 15, 2012), *available at* http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf.

²⁵ *Unmanned Aircraft (UAS)—Questions and Answers*, *supra* note 13.

²⁶ Dan Namowitz, *Long-Term FAA Bill Signed into Law*, AIRCRAFT OWNERS & PILOTS ASS’N (Feb. 14, 2012), <http://www.aopa.org/advocacy/articles/2012/120214long-term-faa-bill-signed-into-law.html>.

²⁷ Tim Adelman & Leonard Ligon, *The Law and Operating Unmanned Aircraft in the U.S. National Airspace System*, SUAS NEWS (Mar. 14, 2012), <http://www.suas>

manned aircraft generally cannot meet the requirements of those regulations, particularly the requirement that aircraft have the ability to “see and avoid” obstacles, the FAA currently requires a Certificate of Waiver or Authorization (COA) for unmanned aircraft to operate in the national airspace.²⁸ Applications, which can be made on the Internet, are overseen by Air Traffic Operations, which examines civil (usually experimental) unmanned aircraft to ensure that they are airworthy.²⁹ Military unmanned aircraft do not use the same process to establish airworthiness, but they do need to comply with policies issued by the various military branches.³⁰

Applicants may apply for an airworthiness certificate for unmanned aircraft for research and development, crew training, or market surveys, which allow an entity to give demonstrations and train customers’ flight crews.³¹ To qualify for a certificate, the applicant must show the aircraft’s response to losing communication with its operator, protocol if communication cannot be recovered, and that the unmanned aircraft can be contained within a proposed flight area.³² The applicant must provide documentation of: (1) the proposed operating area; (2) the manuals and checklists associated with the aircraft, including those for normal and emergency procedures; (3) training for relevant personnel; (4) evidence of completion of pilot licenses or other necessary certification; and (5) proof that the Federal Communications Commission (FCC) has approved the fre-

news.com/012/03/13397/the-law-and-operating-unmanned-aircraft-in-the-u-s-national-airspace-system/.

²⁸ FAA, INTERIM OPERATIONAL APPROVAL GUIDANCE 08-01: UNMANNED AIRCRAFT SYSTEMS IN THE U.S. NATIONAL AIRSPACE SYSTEM 4–5 (2008) [hereinafter FAA INTERIM GUIDANCE]; see Adelman & Ligon, *supra* note 27. Tim Adelman and Leonard Ligon argue persuasively that the COA requirement cannot apply to unmanned aircraft, controlled by federal or state government agencies, which are only operated within the line of sight of the operator. Adelman & Ligon, *supra* note 27. Nonetheless, public safety entities continue to apply to the FAA for COAs, and according to the FAA, only two law enforcement entities are consistently using small unmanned aircraft for their operations. U.S. GOV’T ACCOUNTABILITY OFFICE, *supra* note 10, at 26–27.

²⁹ FAA INTERIM GUIDANCE, *supra* note 28, at 5.

³⁰ *Id.* at 7.

³¹ Airworthiness Certification of Unmanned Aircraft Systems and Optionally Piloted Aircraft, FAA Order No. 8130.34A, 3-4 (Oct. 27, 2010), available at [http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgOrders.nsf/0/57e4fb59279d1913862577cf005ebf26/\\$FILE/8130.34A.pdf](http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgOrders.nsf/0/57e4fb59279d1913862577cf005ebf26/$FILE/8130.34A.pdf) (explaining that applicants use FAA Form 8130-7).

³² *Id.* at 3-1.

quency of spectrum used to communicate with the aircraft.³³ The typical COA is valid for two years.³⁴

Although the FAA initially refused to divulge information about the COA applications and awards, in response to a lawsuit by the Electronic Frontier Foundation, the agency released a list of sixty-one entities that had sought licenses to operate unmanned aircraft in April 2012.³⁵ Of those entities, only four applicants were disapproved, and forty-one of the licenses remained active.³⁶ Entities with active licenses include universities, federal agencies, local police departments, and branches of the military.³⁷ These entities vary in size, ranging from the U.S. Army to the City of Herington, Kansas, which in 2010 had a population of 2,526.³⁸ The list, however, does not divulge the quantities or models of unmanned aircraft that each entity was licensed to fly.³⁹ The FAA also disseminated a list of thirteen manufacturers that had applied for licenses to test unmanned aircraft, complete with model names and serial numbers for the aircraft they were testing.⁴⁰ The manufacturers include industry heavyweights like Raytheon Co., Bell Helicopter Textron Inc., and Honeywell International.⁴¹ In July 2012, the agency published additional files concerning 125 COA applications from eighteen entities (all but three of which were on the previously released list),⁴² including nine universities and nine other fed-

³³ *Id.* at 3-2 to 3-3.

³⁴ *FAA Makes Progress with UAS Integration*, FAA (May 14, 2012, 3:09 PM), <http://www.faa.gov/news/updates/?newsId=68004>.

³⁵ *Organizations That Have Sought to Use Drones*, WALL ST. J. (Apr. 20, 2012), <http://online.wsj.com/article/SB10001424052702303425504577354362860665508.html>.

³⁶ *Id.*

³⁷ *Id.* (e.g., the U.S. Navy, Eastern Gateway Community College, the Seattle Police Department).

³⁸ *Id.*; *American FactFinder*, U.S. CENSUS BUREAU, http://factfinder2.census.gov/bkmk/table/1.0/en/DEC/10_DP/DPDP1/1600000US2031400 (last visited Sept. 19, 2012).

³⁹ Jennifer Lynch, *FAA Releases Lists of Drone Certificates—Many Questions Left Unanswered*, ELECTRONIC FRONTIER FOUND. (Apr. 19, 2012), <https://www.eff.org/deeplinks/2012/04/faa-releases-its-list-drone-certificates-leaves-many-questions-unanswered> [hereinafter Lynch, *FAA Releases I*].

⁴⁰ *FAA List of Special Airworthiness Certificates—Experimental Category (SACs)*, ELECTRONIC FRONTIER FOUND. (Apr. 16, 2012), <https://www.eff.org/document/faa-list-special-airworthiness-certificates-experimental-categoriesacs>.

⁴¹ *Id.*

⁴² *Compare Organizations That Have Sought to Use Drones*, *supra* note 35, with Jennifer Lynch, *FAA Releases Thousands of Pages of Drone Records*, ELECTRONIC FRONTIER FOUND. (July 13, 2012), <https://www.eff.org/deeplinks/2012/07/faa>

eral, state, and local governmental bodies.⁴³ Of the 125 applications, however, only eight licenses remain active.⁴⁴ In August and September of 2012, the FAA again released information, related to 139 COA files, of which only twenty-four are active.⁴⁵ While available information outlines the current use of unmanned aircraft in the NAS, the FAA has released insufficient information to ascertain the full extent of current practices.⁴⁶

C. THE FORTHCOMING REGULATORY FRAMEWORK FOR UNMANNED AIRCRAFT

Congress, dissatisfied with the COA system, required the Secretary of Transportation to make several policy changes in the FAA Modernization and Reform Act of 2012.⁴⁷ Congress mandated a simpler process for issuing certificates to “appropriate government agencies” seeking to operate unmanned aircraft in the NAS.⁴⁸ In addition to requiring an expedited certification timeframe, the law requires that public safety agencies be allowed to operate unmanned aircraft under 4.4 pounds, as long as they are within sight of the operator, under 400 feet in altitude, and at least five miles from an airport or other similar location.⁴⁹ The FAA implemented the Act in May 2012 through an agreement with law enforcement organizations that allows the organizations to receive a COA for training and evaluation and, if they show proficiency, an operational COA to fly unmanned aircraft of up to twenty-five pounds.⁵⁰

The Act also requires the FAA to develop a “comprehensive plan to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system” by November 12,

releases-thousands-pages-drone-records [hereinafter Lynch, *FAA Releases II*] (showing the North Little Rock Police Department in Arkansas; the U.S. Department of Agriculture’s Agricultural Research Service; and Virginia Tech, which were not included on the April list).

⁴³ *Unmanned Aircraft Systems (UAS)*, FAA, <http://www.faa.gov/about/initiatives/uas/> (last visited Oct. 25, 2012).

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ See Lynch, *FAA Releases I*, *supra* note 39.

⁴⁷ See Press Release, Representative Edward J. Markey, Markey Releases Discussion Draft of Drone Privacy and Transparency Act (Aug. 1, 2012), available at <http://markey.house.gov/press-release/markey-releases-discussion-draft-drone-privacy-and-transparency-legislation>.

⁴⁸ FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 334(c), 126 Stat. 11.

⁴⁹ *Id.*

⁵⁰ *FAA Makes Progress with UAS Integration*, *supra* note 34.

2012.⁵¹ The law also requires a rulemaking to catalyze the integration of small unmanned aircraft into the NAS and the creation of six test ranges for unmanned aircraft throughout the country.⁵² Thus, the regulatory landscape for unmanned aircraft could be very different by 2013.

In its comprehensive plan, the FAA will have to address a variety of problems with incorporating unmanned aircraft into the NAS. The FAA will have to address safety concerns, coordinate with outside entities, and decide whether and how to address privacy concerns.⁵³

As noted above, unmanned aircraft have not developed a safety record akin to that of more established aircraft types.⁵⁴ There are several relevant concerns that the FAA will have to address, but three are the most prevalent. First, the FAA will need to identify technology (e.g., cameras, radar, even artificial intelligence) that can obviate the need for regulations requiring that pilots in the NAS be able to “see and avoid” obstacles in the air, such as other aircraft.⁵⁵ Second, the FAA will need to address the appropriate training for unmanned aircraft operators and the appropriate relationship between the operator and the device.⁵⁶ In particular, the FAA will need to decide whether a pilot can operate more than one device at a time and whether the pilot must be replaced at specific intervals.⁵⁷ Third, the regulations will need to stipulate appropriate procedures for when an unmanned aircraft loses contact with its operators and for when the connection to the aircraft is hacked by a third party.⁵⁸

⁵¹ H.R. 658 § 332(a)(1) (requiring the plan by 270 days after the statute’s enactment on February 15, 2012).

⁵² *Id.* § 332(b)–(c)

⁵³ See Douglas Marshall, *Unmanned Aerial Systems and International Civil Aviation Organization Regulations*, 85 N.D. L. REV. 693, 696–97 (2009); Peterson, *supra* note 10, at 571; JAY STANLEY & CATHERINE CRUMP, ACLU, PROTECTING PRIVACY FROM AERIAL SURVEILLANCE: RECOMMENDATIONS FOR GOVERNMENT USE OF DRONE AIRCRAFT 1–2 (2011).

⁵⁴ See *supra* note 10 and accompanying text.

⁵⁵ FAA INTERIM GUIDANCE, *supra* note 28, at 2 (suggesting that the inability to comply with the “see-and-avoid” provisions of 14 C.F.R. § 91.113 is the “[m]ost notabl[e]” reason that unmanned aircraft cannot comply with regulations for manned aircraft).

⁵⁶ Comments from Mark Reed, Staff Engineer, Air Line Pilots Ass’n Int’l, to FAA, U.S. Dep’t of Transp., Docket No. FAA-2012-0252, Unmanned Aircraft System Test Sites (May 8, 2012), available at <http://www.regulations.gov/#!documentDetail;D=FAA-2012-0252-0096>.

⁵⁷ See, e.g., *id.*

⁵⁸ See, e.g., *Researchers Use Spoofing to “Hack” into a Flying Drone*, BBC NEWS (June 29, 2012, 11:54 AM), <http://www.bbc.co.uk/news/technology-18643134>

Additionally, the FAA will need to coordinate with other countries and agencies in setting its regulations.⁵⁹ Internationally, the FAA must make certain that unmanned aircraft operations comply with U.S. treaty obligations and the rules of the International Civil Aviation Organization, which help ensure that U.S. aircraft have access to international airspace.⁶⁰ The FAA will also have to work with other domestic agencies.⁶¹ For instance, Congress mandates in the FAA Modernization and Reform Act of 2012 that the FAA must coordinate with the National Aeronautics and Space Administration and the Department of Defense when choosing test sites for unmanned aircraft.⁶² Additionally, the FAA will need to work with other agencies—likely the FCC and the Department of Defense—to ensure that sufficient wireless spectrum is available to adhere to FCC requirements while preparing for a growing number of unmanned aircraft using radio frequencies to communicate with their operators.⁶³

Finally, the FAA will need to decide whether and how to tackle privacy concerns raised by the introduction of unmanned aircraft into the NAS.⁶⁴ Even if the FAA decides not to address privacy, FAA regulations are likely to influence the manner in which courts confront unmanned aircraft, as the next part illustrates.⁶⁵

II. PRIVACY AND UNMANNED AIRCRAFT

The pending introduction of unmanned aircraft into the NAS has riled many who fear that the new machines will intrude on

(describing how researchers “hacked the GPS system of a drone”); Elisabeth Bumiller, *Navy Drone on a Test Flight Violates Restricted Airspace*, N.Y. TIMES, Aug. 26, 2010, at A16 (revealing that a United States Navy drone lost contact with its operators and entered restricted airspace near the District of Columbia).

⁵⁹ See Marshall, *supra* note 53.

⁶⁰ See *id.*

⁶¹ FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 332, 126 Stat. 11.

⁶² *Id.*

⁶³ See, e.g., Comments from David Boulos, Sikorsky Aircraft, to FAA, U.S. Dep’t of Transp., Docket No. FAA-2012-0252, Unmanned Aircraft System Test Sites (May 8, 2012), *available at* <http://www.regulations.gov/#!documentDetail;D=FAA-2012-0252-0222>; Comments from Robbie Elaine Hood, Nat’l Oceanic & Atmospheric Admin., to FAA, U.S. Dep’t of Transp., Docket No. FAA-2012-0252, Unmanned Aircraft System Test Sites (May 8, 2012), *available at* <http://www.regulations.gov/#!documentDetail;D=FAA-2012-0252-0186>.

⁶⁴ See STANLEY & CRUMP, *supra* note 53.

⁶⁵ See *infra* notes 83, 86 and accompanying text.

their privacy.⁶⁶ Groups from across the political spectrum have expressed concern, including the American Civil Liberties Union (ACLU),⁶⁷ the Electronic Frontier Foundation,⁶⁸ and Fox News.⁶⁹ Judge Andrew Napolitano, a commentator for Fox News, even suggested that “[t]he first American patriot that shoots down one of these drones that comes too close to his children in his backyard will be an American hero.”⁷⁰ This part analyzes the Fourth Amendment implications of the government’s use of unmanned aircraft for surveillance and reviews existing laws that could protect privacy from private operators of unmanned aircraft.⁷¹

A. GOVERNMENT SURVEILLANCE AND THE FOURTH AMENDMENT

Although several academics have concluded that existing law will not prevent widespread monitoring by unmanned aircraft, recent case law suggests some limitations on the government’s

⁶⁶ See STANLEY & CRUMP, *supra* note 53; Jennifer Lynch, *Are Drones Watching You?*, ELECTRONIC FRONTIER FOUND. (Jan. 10, 2012), <https://www.eff.org/deep-links/2012/01/drones-are-watching-you> [hereinafter Lynch, *Are Drones Watching You?*]; Catherine Herridge, *Privacy Concerns as U.S. Government Rolls Out Domestic Drone Rules*, FOX NEWS (May 14, 2012), <http://www.foxnews.com/politics/2012/05/14/privacy-concerns-as-us-government-rolls-out-domestic-drone-rules/>.

⁶⁷ See STANLEY & CRUMP, *supra* note 53, at 1 (suggesting that unmanned aircraft will “allow for pervasive surveillance, police fishing expeditions, and abusive use of these tools in a way that could eventually eliminate the privacy Americans have traditionally enjoyed in their movements and activities”).

⁶⁸ Lynch, *Are Drones Watching You?*, *supra* note 66.

⁶⁹ Herridge, *supra* note 66.

⁷⁰ Torie Bosch, *Would an American Who Shot Down a Surveillance Drone Be Considered a “Hero” By Some?*, SLATE (May 16, 2012, 11:54 AM), http://www.slate.com/blogs/future_tense/2012/05/16/anthony_napolitano_and_charles_krauthammer_on_domestic_surveillance_drones_video_.html (attributing the quote to Napolitano, who was speaking on the Fox News morning show, *Fox & Friends*).

⁷¹ A North Dakota state district judge, Joel D. Medd, was the first judge in the country to address a motion based on the constitutionality of domestic surveillance using unmanned aircraft when he denied a motion to dismiss charges against Rodney Brossart and his family, saying that the unmanned aircraft “appears to have had no bearing on these charges being contested.” Jason Koebler, *Court Upholds Domestic Drone Use in Arrest of American Citizen*, U.S. NEWS & WORLD REP., Aug. 2, 2012, <http://www.usnews.com/news/articles/2012/08/02/court-upholds-domestic-drone-use-in-arrest-of-american-citizen>. Brossart was arrested after allegedly chasing a sheriff off his land with a rifle. Brian Bennett, *Predator Drone Was Used in Brossart Arrests*, WDAY-TV (Dec. 12, 2011, 3:53PM), http://www.wday.com/event/article/id/11475/publisher_ID/30/. The sheriff returned and used a predator drone to find Brossart and ensure that he was unarmed before arresting him. *Id.*

use of unmanned aircraft for extended surveillance.⁷² This part will briefly review the Supreme Court cases that led one commentator to conclude that states have the power “to continually monitor [their] citizens from above.”⁷³ This part will then analyze the potential impact of *United States v. Jones*,⁷⁴ the Supreme Court’s recent Fourth Amendment decision. Finally, it will address the possibility of statutory protection from government use of unmanned aircraft.

1. *Unmanned Aircraft and Fourth Amendment Jurisprudence Before Jones*

Traditional Supreme Court Fourth Amendment jurisprudence suggests that there is likely no constitutional protection from aerial surveillance for individuals outside of protected spaces, such as homes.⁷⁵ The traditional definition of a search under the Fourth Amendment comes from Justice Harlan’s concurrence in *Katz v. United States*.⁷⁶ Justice Harlan wrote that governmental activity is a search if it violates “an actual (subjective) expectation of privacy . . . that society is prepared to recognize as ‘reasonable.’”⁷⁷ In the late 1980s, the Supreme Court decided several cases by applying the *Katz* test to aerial surveil-

⁷² See Courtney E. Walsh, *Surveillance Technology and the Loss of Something a Lot Like Privacy: An Examination of the “Mosaic Theory” and the Limits of the Fourth Amendment*, 24 ST. THOMAS L. REV. 169, 208–12 (2012); see, e.g., M. Ryan Calo, *The Drone as Privacy Catalyst*, 64 STAN. L. REV. ONLINE 29, 31 (Dec. 12, 2011), www.stanfordlawreview.org/online/drone-privacy-catalyst (suggesting “the widespread domestic use of drones for surveillance” would be constitutional); Travis Dunlap, Comment, *We’ve Got Our Eyes on You: When Surveillance by Unmanned Aircraft Systems Constitutes a Fourth Amendment Search*, 51 S. TEX. L. REV. 173, 175–76 (2009) (advocating that unmanned aircraft should only be used for aerial surveillance where “currently authorized by Fourth Amendment jurisprudence,” though admitting that the use of unmanned aircraft “would typically not constitute a Fourth Amendment search”); Paul McBride, Comment, *Beyond Orwell: The Application of Unmanned Aircraft Systems in Domestic Surveillance Operations*, 74 J. AIR L. & COM. 627, 661–62 (2009); Vacek, *Big Brother Will Soon Be Watching*, *supra* note 9, at 692 (“It seems the state will have the power, both constitutionally and technologically, to continually monitor its citizens from above.”).

⁷³ Vacek, *Big Brother Will Soon Be Watching*, *supra* note 9, at 692.

⁷⁴ 132 S. Ct. 945 (2012).

⁷⁵ See *Katz v. United States*, 389 U.S. 347, 350–52 (1967).

⁷⁶ See *id.* at 360–62 (Harlan, J., concurring).

⁷⁷ *Id.* at 361 (finding a search where the police attached a microphone to the outside of a phone booth).

lance.⁷⁸ These cases allow the government wide latitude to monitor people and land from above.⁷⁹

The Court issued two relevant decisions on the same day in 1986.⁸⁰ In *California v. Ciraolo*, the Court found that police could look into a suspect's backyard, even the protected curtilage⁸¹ around the suspect's home, from a plane 1,000 feet above the ground.⁸² The Court, in an opinion by Chief Justice Burger, wrote that society was not "prepared to honor" an expectation of privacy from observations that "took place within public navigable airspace" because "[a]ny member of the public flying in this airspace who glanced down could have seen everything that these officers observed."⁸³

The same day, the Court found that the government could use a powerful camera from a plane to capture details of an industrial plant without implicating the Fourth Amendment.⁸⁴ As in *Ciraolo*, the Court stressed that the impacted company had not taken steps to shield itself from aerial photography and that the government had used "navigable airspace."⁸⁵

Finally, in 1989, a plurality of the Court wrote in *Florida v. Riley* that when a helicopter flying at 400 feet did not violate a statute or regulation, there was no Fourth Amendment search because "no intimate details connected with the use of the home or curtilage were observed, and there was no undue noise, and no wind, dust, or threat of injury."⁸⁶ Justice O'Connor concurred, supplying the fifth vote and arguing that the defining

⁷⁸ See *Florida v. Riley*, 488 U.S. 445, 449–51 (1989); *California v. Ciraolo*, 476 U.S. 207, 211–13 (1986); *Dow Chem. Co. v. United States*, 476 U.S. 227, 234–40 (1986).

⁷⁹ See *Riley*, 488 U.S. at 449–51; *Ciraolo*, 476 U.S. at 211–13; *Dow Chem. Co.*, 476 U.S. at 234–40.

⁸⁰ See *Ciraolo*, 476 U.S. at 207; *Dow Chem. Co.*, 476 U.S. at 227.

⁸¹ "Curtilage" is a common law concept which extends protection of the home to the area immediately surrounding the home. *United States v. Dunn*, 480 U.S. 294, 300 (1987). An area is within the curtilage of a home if it is "intimately tied to the home itself," as evidenced by "four factors: [(1)] the proximity of the area claimed to be curtilage to the home, [(2)] whether the area is included within an enclosure surrounding the home, [(3)] the nature of the uses to which the area is put, and [(4)] the steps taken by the resident to protect the area from observation by people passing by." *Id.* at 301.

⁸² *Ciraolo*, 476 U.S. at 209–13.

⁸³ *Id.* at 209–15.

⁸⁴ *Dow Chem. Co.*, 476 U.S. at 239 ("We hold that the taking of aerial photographs of an industrial plant complex from navigable airspace is not a search prohibited by the Fourth Amendment.")

⁸⁵ *Id.* at 230, 239; see *Ciraolo*, 476 U.S. at 209–13.

⁸⁶ *Florida v. Riley*, 488 U.S. 445, 451–52 (1989).

question was “whether the helicopter was in the public airways at an altitude at which members of the public travel with sufficient regularity that Riley’s expectation of privacy from aerial observation was not ‘one that society [was] prepared to recognize as “reasonable.”’”⁸⁷

Several conclusions can be drawn from the cases that Professor Vacek calls the “aerial surveillance trilogy”:⁸⁸

- First, all three decisions have allowed FAA regulation of public airways to define the parameters of the Fourth Amendment, and the lower courts have followed suit. Because the Supreme Court has based its decisions on where people are allowed to, and regularly do, fly aircraft,⁸⁹ the FAA’s forthcoming regulations concerning unmanned aircraft could have wide-ranging effects on the manner in which unmanned aircraft can be used constitutionally for surveillance, despite the agency’s protests.⁹⁰ The decisions also lend credence to Representative Edward J. Markey and Representative Joe Barton’s concerns represented in a letter to the FAA seeking “information about how the FAA is addressing” the chance that unmanned aircraft will “enable invasive and pervasive surveillance without adequate privacy protections.”⁹¹
- Second, the Supreme Court has yet to find that any form of aerial surveillance is a search, suggesting that the lower courts may hold that the Fourth Amendment does not restrict the use of unmanned aircraft.⁹² Professor Vacek writes that “it seems . . . there is no reasonable expectation of privacy in any area in open view from above.”⁹³

⁸⁷ *Id.* at 454 (O’Connor, J., concurring) (quoting *Katz v. United States*, 389 U.S. 347, 361 (1967)).

⁸⁸ Vacek, *Big Brother Will Soon Be Watching*, *supra* note 9, at 681.

⁸⁹ See *supra* notes 83, 85–87 and accompanying text.

⁹⁰ See U.S. GOV’T ACCOUNTABILITY OFFICE, *supra* note 10, at 36 (noting that FAA officials have argued “that regulating privacy issues” is “outside FAA’s mission”).

⁹¹ Letter from Representative Edward J. Markey & Representative Joe Barton, Congressional Bi-Partisan Privacy Caucus, U.S. House of Representatives, to Michael P. Huerta, Acting Adm’r of the FAA (Apr. 19, 2012), *available at* <http://markey.house.gov/sites/markey.house.gov/files/documents/4-19-12.Letter%20FAA%20Drones%20.pdf>.

⁹² See, e.g., *Riley*, 488 U.S. at 451–52; *California v. Ciraolo*, 476 U.S. 207, 209–13 (1986); *Dow Chem. Co. v. United States*, 476 U.S. 227, 239 (1986).

⁹³ Vacek, *Big Brother Will Soon Be Watching*, *supra* note 9, at 682.

- Third, despite the relative clarity of *Ciraolo*, the Court was split 4-1-4 in *Riley*, which seemed to reintroduce the possibility of protecting homes and their curtilage from aerial surveillance.⁹⁴ Although the area viewed in *Riley* was within the curtilage of the defendant's home, all four opinions in the case suggested that the curtilage may yet allow some form of protection from aerial surveillance.⁹⁵ Thus, despite the arguably limited Fourth Amendment rights related to aerial surveillance, lower courts have bemoaned the "unhappy state of Supreme Court precedent" in the area.⁹⁶ Courts have continued to struggle with the altitude from which the government can look down onto people and their land.⁹⁷ For example, the Fourth Circuit has found that even when a helicopter allegedly flew only thirty-five feet above a criminal defendant's land, because the prosecution could establish that "such flights were a regular occurrence in the area" and the helicopter fully complied with FAA regulations, the

⁹⁴ Compare *Ciraolo*, 476 U.S. at 209–10 (suggesting that curtilage is unprotected), with *Riley*, 488 U.S. at 451–52 (White, J.) (premising the constitutionality of the action on the fact that "intimate details connected with the use of the home or curtilage" were not observed).

⁹⁵ Compare *Riley*, 488 U.S. at 450–52 (White, J.) (noting that "the property surveyed was within the curtilage of respondent's home" but premising the constitutionality of the action on the fact that "intimate details connected with the use of the home or curtilage" were not observed), and *id.* at 454 (O'Connor, J., concurring) ("The fact that a helicopter could conceivably observe the curtilage at virtually any altitude or angle, without violating FAA regulations, does not in itself mean that an individual has no reasonable expectation of privacy from such observation."), with *id.* at 456 (Brennan, J., dissenting) (arguing that the Fourth Amendment would not "tolerate [] such an intrusion on privacy and personal security" as allowing a helicopter "to investigate what is taking place behind the walls of the curtilage"), and *id.* at 468 (Blackmun, J., dissenting) (arguing that the prosecution should have had the burden to prove that there was sufficient aerial traffic and that *Riley* lacked a reasonable expectation in the privacy of his curtilage).

⁹⁶ *Pew v. Scopino*, 904 F. Supp. 18, 25 (D. Me. 1995).

⁹⁷ See, e.g., *United States v. Boyster*, 436 F.3d 986, 992 (8th Cir. 2006) (finding that evidence could not be suppressed where the defendant failed to show that flights at an altitude of 100 feet "are so rare as to make aerial surveillance at that level unreasonable"); *Pew*, 904 F. Supp. at 25–27 (finding only one of several instances of helicopter surveillance to be a search under the Fourth Amendment because that helicopter "was not within navigable airspace" as it flew "directly over [a home] at an extraordinarily low level"). But see, e.g., *United States v. Saltzman*, No. 92-5389, 1993 WL 100082, at *3 (6th Cir. Apr. 5, 1993) (per curiam) (affirming the district court's suppression order and noting that "[i]f, in fact, the officers were flying at an altitude of 125 to 150 feet, their disturbance of the home would interfere with the defendant's normal use of his premises").

defendant's Fourth Amendment rights were not violated.⁹⁸ The Sixth Circuit, by contrast, has affirmed the suppression of evidence based on flights at an altitude four times higher.⁹⁹

The aerial surveillance cases suggest that the government has broad discretion, but the Court added another twist to the surveillance of private spaces in 2001. In *Kyllo v. United States*,¹⁰⁰ it found "that obtaining by sense-enhancing technology any information regarding the interior of the home that could not otherwise have been obtained without physical 'intrusion into a constitutionally protected area' . . . constitutes a search—at least where . . . the technology in question is not in general public use."¹⁰¹ In *Kyllo*, the use of a thermal imager to ascertain whether marijuana was being grown in a home was a "'search' within the meaning of the Fourth Amendment" and "presumptively unreasonable without a warrant."¹⁰² *Kyllo* likely prohibits the police from using unmanned aircraft equipped with thermal or other sense-enhancing surveillance to monitor a home without a warrant.¹⁰³ The *Kyllo* prohibition applies only so long as the technology is not in common use; however, as Professor Vacek suggests, "the test seems to turn on whether Wal-Mart sells it or not."¹⁰⁴

Traditional Supreme Court Fourth Amendment jurisprudence seems to suggest that there is likely no reasonable expectation of privacy, and thus no constitutional protection of individuals outside of protected spaces, such as a home, from aerial surveillance.¹⁰⁵ There may be, however, some minimal coverage within those areas where an individual could reasonably expect privacy.¹⁰⁶ There is also protection from unmanned

⁹⁸ *United States v. Breza*, 308 F.3d 430, 434 (4th Cir. 2002).

⁹⁹ *Saltzman*, 1993 WL 100082, at *3 (affirming the district court's suppression order and noting that "[i]f, in fact, the officers were flying at an altitude of 125 to 150 feet, their disturbance of the home would interfere with the defendant's normal use of his premises").

¹⁰⁰ 533 U.S. 27 (2001).

¹⁰¹ *Id.* at 34 (quoting *Silverman v. United States*, 365 U.S. 505, 512 (1961)).

¹⁰² *Id.* at 29, 40.

¹⁰³ *Dunlap*, *supra* note 72, at 197; Vacek, *Big Brother Will Soon Be Watching*, *supra* note 9, at 683.

¹⁰⁴ Vacek, *Big Brother Will Soon Be Watching*, *supra* note 9, at 683; accord *Dunlap*, *supra* note 72, at 197.

¹⁰⁵ *See Katz v. United States*, 389 U.S. 347, 350–52 (1967).

¹⁰⁶ *See, e.g., Florida v. Riley*, 488 U.S. 455, 454 (1989) (O'Connor, J., concurring).

aircraft equipped with sense-enhancing technology that could allow the government to see inside protected spaces, as long as the technology is not commonly used.¹⁰⁷

2. *Unmanned Aircraft and Fourth Amendment Jurisprudence After Jones*

Although *United States v. Jones* did not specifically address aerial surveillance, the case suggests the possibility of major changes in Fourth Amendment jurisprudence as a result of changing technology.¹⁰⁸ In *Jones*, in January 2012, the Supreme Court unanimously found that the use of a Global Positioning System (GPS) tracking device on a suspect's car for twenty-eight days was a search "within the meaning of the Fourth Amendment."¹⁰⁹ Justice Scalia wrote the majority opinion for five justices, holding that the government commits a Fourth Amendment search both when it violates the *Katz* test and when it physically occupies protected "private property for the purpose of obtaining information."¹¹⁰ Justice Scalia wrote that the Fourth Amendment "must provide *at a minimum* the degree of protection it afforded when it was adopted."¹¹¹ Thus, according to the Court, "the [g]overnment's installation of a GPS device on a target's vehicle, and its use of that device to monitor the vehicle's movements, constitutes a 'search.'"¹¹²

Justice Alito, concurring in the judgment, emphasized that the majority opinion would be difficult for lower courts to follow because of the changes in trespass law since the time of the country's founding.¹¹³ He would have held, instead, that the suspect's "reasonable expectations of privacy were violated by the long-term monitoring of the movements of the vehicle he drove."¹¹⁴ Justice Alito did not define "the point at which the tracking . . . became a search," but he said that "the line was

¹⁰⁷ Dunlap, *supra* note 72, at 197; Vacek, *Big Brother Will Soon Be Watching*, *supra* note 9, at 683.

¹⁰⁸ 132 S. Ct. 945 (2012).

¹⁰⁹ *Id.* at 948–49.

¹¹⁰ *Id.* at 949.

¹¹¹ *Id.* at 953.

¹¹² *Id.* at 949.

¹¹³ *See, e.g., id.* at 957 n.2 (Alito, J., concurring) (joined by Justices Ginsburg, Breyer, and Kagan) (noting that a common law suit for trespass to chattels, unlike today, did not require actual damage to the object allegedly trespassed against and that the car in that case did not sustain any damage).

¹¹⁴ *Id.* at 958.

surely crossed before the [four]-week mark.”¹¹⁵ Highlighting that the majority’s “trespass-based theory” created “incongruous results” because it did not impose any constraints on tracking a car for extended periods of time with “aerial assistance,” Justice Alito concluded that “[i]n circumstances involving dramatic technological change, the best solution to privacy concerns may be legislative.”¹¹⁶

Finally, although Justice Sotomayor joined the majority opinion, she wrote separately to agree with Justice Alito that surveillance over extended periods of time amounts to a search under the reasonable expectation of privacy test.¹¹⁷ Justice Sotomayor went further, however, arguing that “it may be necessary to reconsider the premise that an individual has no reasonable expectation of privacy in information voluntarily disclosed to third parties.”¹¹⁸ Thus, although the five-justice majority decided the case on the physical intrusion grounds outlined by Justice Scalia, five justices (including Justice Sotomayor) also agreed that extended monitoring of a person in public spaces is a search under the Fourth Amendment.¹¹⁹

Lower courts have struggled to apply *Jones*.¹²⁰ Judges have wrestled with the limitations of the holding because “*Jones* was simply concerned with whether the trespass was a search in the first place, but expressly declined to consider whether that search was unreasonable without a warrant because the government waived that argument.”¹²¹ Despite Justice Alito’s concerns,

¹¹⁵ *Id.* at 964.

¹¹⁶ *Id.* at 961, 963–64.

¹¹⁷ *Id.* at 954–55 (Sotomayor, J., concurring).

¹¹⁸ *Id.* at 957.

¹¹⁹ *Id.* at 949 (majority opinion).

¹²⁰ *See, e.g.*, *United States v. Peter*, No. 3:11-CR-132 JD, 2012 WL 1900133, at *26–27 (N.D. Ind. May 24, 2012) (“[I]t may take courts years to work out the full ramifications of *Jones*.”).

¹²¹ *Id.* Courts have also struggled with the relevancy of the good-faith exception to the exclusionary rule from *Davis v. United States* to the *Jones* decision. *See Davis v. United States*, 131 S. Ct. 2419, 2428 (2011) (refusing to use the exclusionary rule where police conduct “was not culpable in any way,” such as where there was reliance on existing appellate precedent). *Compare, e.g.*, *United States v. Rosas-Illescas*, No. 2:11-CR-492-RDP-HGD, 2012 WL 1946580, at *17 (N.D. Ala. May 30, 2012) (refusing to suppress evidence collected in good faith via a GPS device), *United States v. Heath*, No. CR 12-4-H-DWM, 2012 WL 1574123, at *3 (D. Mont. May 3, 2012) (refusing to suppress evidence captured through use of a GPS device before the decision in *Jones* was rendered), *and United States v. Fata*, No. 2:11-cr-00188-RLH-CWH, 2012 WL 893743, at *13–18 (D. Nev. Mar. 15, 2012) (finding a violation of the Fourth Amendment pursuant to *Jones* but refusing to exclude the evidence per *Davis*), *with United States v. Katzin*, No. 11-226,

courts applying *Jones* have tended not to grapple with eighteenth-century legal issues.¹²² Nevertheless, as one judge has suggested, the “competing rationales between the majority” and concurring opinions in *Jones* offer insight into “the direction the Court might lead us in the light of technological advancements and privacy concerns.”¹²³

In particular, the decision could have repercussions for the use of unmanned aircraft by governmental agencies. First, the combination of Justice Alito’s concurrence in the judgment and Justice Sotomayor’s concurrence strongly suggests that a majority of the Supreme Court would find extended surveillance by unmanned aircraft to be a search within the meaning of the Fourth Amendment.¹²⁴ Second, eighteenth-century tort law could provide an alternative justification for requiring unmanned aircraft to maintain a certain altitude above homes they monitor. Third, Justice Sotomayor’s concurrence could lay the groundwork for a shift in Supreme Court jurisprudence that would considerably narrow the constitutional use of unmanned aircraft for surveillance.

As noted above, Justice Sotomayor agreed with Justice Alito’s conclusion that extended surveillance, even without physical contact, can be a search under the Fourth Amendment.¹²⁵ Thus, that portion of Justice Alito’s opinion carries the support of five justices. Although the portion would not be considered binding precedent, it suggests that the Court is likely to find

2012 WL 1646894, at *31 (E.D. Pa. May 9, 2012) (“The risk of institutionalizing a policy of permitting reliance on non-binding authority, particularly in the face of other, contrary non-binding authority, at least borders on being categorized as systemic negligence. Indeed, opening to the [g]overnment the shelter of the good faith exception in this case would encourage law enforcement to beg forgiveness rather than ask permission in ambiguous situations involving the basic civil rights. In the face of *Jones*, this the [c]ourt will not do.”). The application of the good-faith standard, however, is beyond the scope of this article. For an interesting analysis of the role of *Davis* in the evolution of Fourth Amendment jurisprudence, see Orin S. Kerr, *Fourth Amendment Remedies and Development of the Law: A Comment on Camreta v. Greene and Davis v. United States*, in *CATO SUPREME COURT REVIEW*, 2010–2011 237 (Ilya Shapiro ed., 2011).

¹²² See, e.g., *Peter*, 2012 WL 1900133, at *26–27 (not mentioning eighteenth-century jurisprudence); *United States v. Wilkerson*, No. 11-027, 2012 U.S. Dist. LEXIS 8527, at *2 (E.D. La. Jan. 23, 2012) (also not mentioning eighteenth-century jurisprudence).

¹²³ *Wilkerson*, 2012 U.S. Dist. LEXIS 8527, at *2 n.1.

¹²⁴ See RICHARD M. THOMPSON II, CONG. RESEARCH SERV., RL 42701, *DRONES IN DOMESTIC SURVEILLANCE OPERATIONS: FOURTH AMENDMENT IMPLICATIONS AND LEGISLATIVE RESPONSES* 9–10 (2012).

¹²⁵ See *supra* notes 114–17 and accompanying text.

extended monitoring by an unmanned aircraft of “persons, houses, papers and effects” to be a search under the Fourth Amendment.¹²⁶ According to Justice Alito, however, use of GPS in *Jones* became a search because it was “long-term monitoring.”¹²⁷ Thus, it is unlikely that courts would find that short-term surveillance of individuals in public by unmanned aircraft implicates the Fourth Amendment. Although the police may soon have the technological capacity to monitor individuals for extended periods using unmanned aircraft,¹²⁸ it could be years before such a case reaches the courts because the current FAA regulations require unmanned aircraft used by the police to stay within sight of their operators.¹²⁹ Thus, although *Jones* suggests a very real constraint on the use of unmanned aircraft by the government,¹³⁰ the constraint may not be applicable until FAA regulations catch up with the technological capability of unmanned aircraft.

Second, although criminal defendants may attempt to exclude evidence located by unmanned aircraft by relying on Justice Scalia’s emphasis on the eighteenth-century law of trespass,¹³¹ they would probably only be successful, at most, in finding alternative justification for a prohibition on warrantless flights above homes at low altitudes. These defendants could cite the common law doctrine of *cujus est solum ejus est usque ad coelum*—which at the time of the ratification of the Fourth Amendment meant that “ownership of the land extended to the periphery of the universe”—to argue that the use of unmanned aircraft above their land and, in particular, above their homes, is akin to the government committing a trespass into the car in *Jones*, under eighteenth-century law.¹³² In 1946, however, the Supreme Court firmly rejected the continued application of the doctrine, suggesting that it “has no place in the modern world,” where “[t]he air is a public highway.”¹³³ Furthermore, even if the doctrine did apply, it would likely be limited by the “open fields doctrine,” which holds that the Fourth Amendment does

¹²⁶ See U.S. CONST. amend. IV; *supra* note 114–17 and accompanying text.

¹²⁷ *United States v. Jones*, 132 S. Ct. 945, 958 (2012) (Alito, J., concurring).

¹²⁸ See Lynch, *Are Drones Watching You?*, *supra* note 66 (noting that “[s]ome newer drones” can track sixty-five people simultaneously, even as far as twenty-five miles away).

¹²⁹ See *supra* note 49 and accompanying text.

¹³⁰ See *Jones*, 132 S. Ct. at 949–53.

¹³¹ See *id.* at 957 (Alito, J., concurring).

¹³² See *United States v. Causby*, 328 U.S. 256, 260 (1946).

¹³³ *Id.* at 261.

not protect individuals from searches on their land as long as it is not within the protected curtilage of their “houses.”¹³⁴ The courts could, however, consider combining *cujus est solum ejus est usque ad coelum* and the open fields doctrine into the idea of an “aerial curtilage,” a zone of Fourth Amendment protection extending some short distance above a house, from within which conducting any surveillance from unmanned aircraft would be considered a search under the Fourth Amendment.

Finally, Justice Sotomayor’s concurrence, albeit in dicta and the work of only a single justice, suggests that the recent surge in technological development may lead the Court to “reconsider” some of its long-standing Fourth Amendment jurisprudence.¹³⁵ That suggestion finds support in Supreme Court precedent, as the Court has historically responded to technological changes by “adjust[ing] the level of Fourth Amendment protection to try to restore the prior equilibrium.”¹³⁶ Considering the widespread expressions of concern regarding unmanned aircraft’s potential to reduce Americans’ privacy, the Court may react with major changes to Fourth Amendment jurisprudence.¹³⁷

Jones provides several hints about how the Supreme Court may address privacy concerns from unmanned aircraft, but Justice Alito also suggests that Congress should enact privacy legislation to handle the concerns.¹³⁸ Historically, legislatures have not been particularly responsive to the needs of criminal suspects and defendants.¹³⁹ Indeed, Professor Donald Dripps argued that “the legislature will not impose limits on the police or the prosecutor unless” either (1) “the courts have declared that certain law enforcement techniques may be constitutional if and only if these techniques are subjected to legislative regulations” or (2) “law enforcement methods offend some powerful interest

¹³⁴ See *Jones*, 132 S. Ct. at 953.

¹³⁵ See *id.* at 957 (Sotomayor, J., concurring).

¹³⁶ Orin S. Kerr, *An Equilibrium-Adjustment Theory of the Fourth Amendment*, 125 HARV. L. REV. 476, 480 (2011). Kerr suggests that even *Jones* interpreted “the Fourth Amendment to counter technology’s ability to narrow privacy.” Orin S. Kerr, *Defending Equilibrium-Adjustment*, 125 HARV. L. REV. F. 84, 89 (2011).

¹³⁷ See *supra* notes 66–70 and accompanying text.

¹³⁸ See *Jones*, 132 S. Ct. at 962 (Alito, J., concurring).

¹³⁹ See, e.g., Donald A. Dripps, *Criminal Procedure, Footnote Four, and the Theory of Public Choice; Or, Why Don’t Legislatures Give a Damn About the Rights of the Accused?*, 44 SYRACUSE L. REV. 1079, 1079–81 (1993); William J. Stuntz, *The Political Constitution of Criminal Justice*, 119 HARV. L. REV. 780, 785 (2006) (“Scholars generally agree that American politics is too punitive, discriminatory, and unconcerned with the interests of the criminal justice system’s targets.”).

group.”¹⁴⁰ Professor Dripps emphasized that “[e]xamples of legislative indifference to glaring defects in the criminal process are legion.”¹⁴¹ Professor William Stuntz recognized many of the same concerns but suggested that the Supreme Court create “unattractive” default rules in criminal procedure to incentivize legislatures, which “know more about relevant policy alternatives than courts do,” to legislate criminal procedure.¹⁴²

Justice Alito, looking to the technological revolution, appears to follow Professor Stuntz’s recommendation, noting that Congress may respond to the “diminution of privacy that new technology entails” by enacting legislation.¹⁴³ Given the diverse outcry against the possibility of privacy-infringing unmanned aircraft¹⁴⁴ and the fact that unmanned aircraft could monitor broad swaths of the population without being limited to particular suspects,¹⁴⁵ unmanned aircraft may prove to be an area of criminal law that could prompt legislative action. Several bills were introduced in 2012 in attempts to confront privacy concerns raised by the introduction of unmanned aircraft into the NAS.¹⁴⁶ Notably, Representative Austin Scott of Georgia and Senator Rand Paul of Kentucky have already introduced legislation to require warrants for surveillance by unmanned aircraft.¹⁴⁷ The bills are not expected to move quickly through

¹⁴⁰ Dripps, *supra* note 139, at 1082–83.

¹⁴¹ *Id.* at 1086.

¹⁴² Stuntz, *supra* note 139, at 827.

¹⁴³ *Jones*, 132 S. Ct. at 962 (Alito, J., concurring); see Stuntz, *supra* note 139, at 827.

¹⁴⁴ See *supra* notes 66–70 and accompanying text.

¹⁴⁵ See Lynch, *Are Drones Watching You?*, *supra* note 66.

¹⁴⁶ See THOMPSON, *supra* note 124, at 18–19 (discussing a bill introduced by Representative Ted Poe to require a warrant and a felony investigation for the use of unmanned aircraft by law enforcement, and discussing attempts by representatives and senators to control the U.S. Environmental Protection Agency’s use of unmanned aircraft to monitor farms).

¹⁴⁷ Jen DiMascio, *Legislators Draft Bill to Govern Commercial Use of UAVs*, AVIATION DAILY, June 21, 2012, at 4. In the House, the bill simply states that, apart from exceptions for border patrol, exigent circumstances, and “to counter a high risk of a terrorist attack,” anyone “acting under the authority of the United States shall not use a drone to gather evidence or other information pertaining to criminal conduct or conduct in violation of a regulation except to the extent authorized in a warrant issued under the procedures described in the Federal Rules of Criminal Procedure.” Preserving Freedom from Unwarranted Surveillance Act of 2012, H.R. 5925, 112th Cong. § 2-3 (2d Sess. 2012). The Senate version of the bill extends the prohibition to any person or entity “funded in whole or in part by” the federal government, and—unlike the House version, which allows for only a “civil action” in response—renders any evidence garnered “in violation of this Act” inadmissible “in any court of law in the United States.” *Compare* Preserv-

Congress,¹⁴⁸ but the Association for Unmanned Vehicle Systems International (AUVSI), an association with over 2,100 members that has proven an effective lobbying force for proponents of unmanned aircraft,¹⁴⁹ has already created a relationship with the ACLU to help policymakers craft privacy rules for unmanned aircraft.¹⁵⁰ The result of that partnership and any legislation could shape the role of unmanned aircraft in the United States for the foreseeable future.¹⁵¹

B. PRIVATE OPERATORS OF UNMANNED AIRCRAFT AND PRIVACY

Although Representative Scott and Senator Paul's proposed legislation addresses only privacy concerns stemming from the government's use of unmanned aircraft,¹⁵² AUVSI and the ACLU may attempt to address privacy concerns from non-governmental entities' operation of unmanned aircraft in the NAS. Even without legislation, however, existing statutes and common law causes of action may provide some protection for privacy. These laws vary widely across states, however, and there is no single national standard that would apply to unmanned aircraft today. This part will briefly address the criminal and civil liabil-

ing Freedom from Unwarranted Surveillance Act of 2012, S. 3287, 112th Cong. §§ 3, 6 (2d Sess. 2012), with H.R. 5925 § 4.

¹⁴⁸ See DiMascio, *supra* note 147, at 4.

¹⁴⁹ *About Us*, ASS'N FOR UNMANNED VEHICLE SYS. INT'L, <http://www.auvsi.org/home/aboutus/> (last visited Sept. 19, 2012).

¹⁵⁰ Jen DiMascio, *Groups Seek Input on Privacy Rules for Civilian-Use UAVs*, AVIATION DAILY, Apr. 6, 2012, at 3.

¹⁵¹ AUVSI has already attempted to address the "unique challenges and opportunities" of unmanned aircraft through a "Code of Conduct" for the unmanned aircraft industry, with commitments for operators and manufacturers, including "not operat[ing] [unmanned aircraft] in a manner that presents undue risk to persons or property on the surface or in the air," "cooperat[ing] fully with federal, state, and local authorities in response to emergency deployments, mishap investigations, and media relations," and "respect[ing] the privacy of individuals." ASS'N FOR UNMANNED VEHICLE SYS. INT'L, UNMANNED AIRCRAFT SYSTEMS OPERATIONS INDUSTRY "CODE OF CONDUCT" (2012), available at <http://higherlogicdownload.s3.amazonaws.com/AUVSI/958c920a-7f9b-4ad2-9807-f9a4e95d1ef1/UploadedFiles/AUVSI%20UAS%20Operations%20Code%20of%20Conduct%20-%20Final.pdf>. This code, however, is not binding, and other groups, such as the ACLU, have suggested it is insufficient "to quell privacy concerns." Kevin Begos, *Conduct Code for Unmanned Aircraft is Unveiled*, ASSOCIATED PRESS, July 3, 2012, (quoting Chris Calabrese, an ACLU lobbyist), available at <http://www.boston.com/business/news/2012/07/03/conduct-code-for-unmanned-aircraft-unveiled/d1JdYtOI3evkf0uafnzBXL/singlepage.html>.

¹⁵² See H.R. 5925.

ity that private unmanned aircraft operators may encounter when they are accused of violations of privacy.

1. *Criminal Liability Under Privacy Laws for Unmanned Aircraft Operators*

Operators of unmanned aircraft may have to wrestle with a variety of criminal statutes depending on the states in which they operate the aircraft. Every state criminalizes certain forms of surveillance or recording, often through “Peeping Tom” laws.¹⁵³ As the name suggests, however, many of the pertinent laws extend only to surreptitious photography, recording of potentially sexualized content, or recording in or near “a place where one may reasonably expect to be safe from surveillance,” such as a bathroom or changing room.¹⁵⁴ Unmanned aircraft may also implicate state laws related to stalking, especially if the aircraft trespasses while conducting surveillance or if it acts as an eavesdropping device.¹⁵⁵ Thus, while private operators of unmanned aircraft will have to avoid inadvertently violating existing state laws, state legislatures will have to grapple with the possibility of writing new statutes that more directly address the technology and the potential for non-licentious invasions of privacy.

¹⁵³ See NAT’L DIST. ATTORNEYS ASS’N & NAT’L CTR. FOR PROSECUTION OF CHILD ABUSE, VOYEURISM STATUTES 2009 (2009), available at http://www.ndaa.org/pdf/voyeurism_statutes_mar_09.pdf; see, e.g., OKLA. STAT. tit. 21, § 1171 (Supp. 2012) (imposing fines, imprisonment, or both for the use of “photographic, electronic or video equipment in a clandestine manner for any illegal, illegitimate, prurient, lewd or lascivious purpose with the unlawful and willful intent to view, watch, gaze or look upon any person without the knowledge and consent of such person when the person viewed is in a place where there is a right to a reasonable expectation of privacy”).

¹⁵⁴ ME. REV. STAT. tit. 17-A, § 511 (Supp. 2011) (criminalizing the use, “in a private place without the consent of the person or persons entitled to privacy in that place, [of] any device for observing, photographing, recording, amplifying or broadcasting sounds or events in that place”); see, e.g., COLO. REV. STAT. § 18-7-801 (Supp. 2011) (extending only to surreptitious photography of “another person’s intimate parts”); D.C. CODE § 22-3531 (2010) (making it a crime to “record” someone who is in the bathroom, changing clothes, or “[e]ngaging in sexual activity,” or “to intentionally capture an image of a private area of an individual”); N.Y. PENAL LAW § 250.45 (McKinney 2012) (effective Aug. 11, 2003) (criminalizing the use of “an imaging device to surreptitiously view, broadcast or record” someone dressing or to use such a device “in a bedroom, changing room, fitting room, restroom, toilet, bathroom, washroom, shower or any room assigned to guests or patrons in a motel, hotel or inn”).

¹⁵⁵ See, e.g., ALA. CODE § 13A-11-32 (2005); ALA. CODE § 13A-11-33 (2005).

2. *Civil Liability for Privacy Torts of Unmanned Aircraft Operators*

In addition to the potential criminal liability for operators of unmanned aircraft for infringing on privacy, common law privacy torts could reach operators of unmanned aircraft.¹⁵⁶ Like criminal liability, tort liability will be determined by “the local law of the state where the invasion occurred.”¹⁵⁷ Although state tort law can vary, one student commentator has provided an extended discussion, concluding that tort law should protect individuals from “visual aerial surveillance of private residences.”¹⁵⁸ Generally, operators of unmanned aircraft will have to be most concerned with “unreasonable intrusion upon the seclusion of another.”¹⁵⁹

“One who invades the right of privacy of another” is “subject to liability for the resulting harm to the interests of the other.”¹⁶⁰ The tort of unreasonable intrusion on seclusion, however, is generally actionable only if the intrusion is “highly offensive to a reasonable person.”¹⁶¹ The victim must be in a private place (thus, for instance, excluding liability for pictures of a plaintiff in a public place) unless the intrusion involves access to matters “that are not exhibited to the public gaze,” such as someone’s undergarments.¹⁶² If a plaintiff could show that the operator of an unmanned aircraft violated the plaintiff’s privacy within those limited parameters, the plaintiff could recover “for (a) the harm to his interest in privacy resulting from the invasion; (b) his mental distress proved to have been suffered if it is of a kind that normally results from such an invasion; and (c)

¹⁵⁶ As with any technology that can travel across state lines, unmanned aircraft could create interesting jurisdictional issues for state courts. However, the issue is beyond the scope of this article.

¹⁵⁷ RESTATEMENT (SECOND) OF CONFLICT OF LAWS § 152 (1971). The place of invasion in an intrusion upon solitude “is the place where the plaintiff was at the time.” *Id.* § 152 cmt. c.

¹⁵⁸ Jeremy Friedman, Note, *Prying Eyes in the Sky: Visual Aerial Surveillance of Private Residences as a Tort*, 4 COLUM. SCI. & TECH. L. REV. 1, ¶ 3, 6 (2002–2003).

¹⁵⁹ RESTATEMENT (SECOND) OF TORTS § 652A (1977). Other privacy torts recognized by the Restatement but unlikely to be implicated by unmanned aircraft include “appropriation of name or likeness” and “publicity given to private life.” *Id.* §§ 652C, 652D. In addition to the possibility of liability for privacy torts against individuals, the Fifth Circuit has held that the use of overhead surveillance to steal trade secrets is tortious. *E.I. duPont deNemours & Co. v. Christopher*, 431 F.2d 1012, 1015 (5th Cir. 1970).

¹⁶⁰ RESTATEMENT (SECOND) OF TORTS § 652A (1977).

¹⁶¹ *Id.* § 652B.

¹⁶² *Id.* § 652B cmt. c.

special damage of which the invasion is a legal cause.”¹⁶³ State courts and, where appropriate, state legislatures will need to wrestle with whether or not to adapt existing causes of action to respond to the increasing use of unmanned aircraft.

III. CONCLUSION

The actions that the FAA and state and federal legislatures take today will define the way unmanned aircraft are introduced to—and remain in—U.S. civilian airspace. Despite Aziz Ansari’s wishes, it may be many years before they become a pervasive presence and even longer before unmanned flying machines deliver food. What is clear, however, is that unmanned aircraft are on their way, and the legal system must adjust accordingly.

¹⁶³ *Id.* § 652H.