

DRONES: UPDATING THE FOURTH AMENDMENT AND THE TECHNOLOGICAL TRESPASS DOCTRINE

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INTRODUCTION

*Never send a human to do a machine's job.*¹

Unmanned aerial systems (“UAS”),² commonly known as “drones,” are growing increasingly popular in both the public and private sectors.³ As UAS popularity grows, many are anxious that the government may utilize UAS to

¹ THE MATRIX (Warner Bros. 1999).

² UAS go by many other names, including the colloquial term, “drones,” as well as Unmanned Aircraft Systems (UAS), Unmanned Aircraft (UA), Unmanned Aerial Vehicle (UAV), Remotely Operated Aircraft (ROA), and Remotely Piloted Aircraft System (RPAS). *Unmanned Aircraft Systems (UAS) Frequently Asked Questions*, FED. AVIATION ADMIN., <https://web.archive.org/web/20141228005400/https://www.faa.gov/uas/faq> (last modified July 23, 2014, 10:50 AM) [hereinafter *UAS Frequently Asked Questions*] (“Currently the FAA and most of the international community uses the term ‘UA’ or ‘UAS’ for the UA System. . . . The International Civil Aviation Organization (ICAO) considers RPAS distinct from Autonomous RPAS, which do not require human action after takeoff. Both are subcategories of UAS.”). Also, the popular term “quadcopter” is often used to describe a small, four-rotor UAS. *What Is a Quadcopter?*, QUADCOPTERHQ.COM (Aug. 31, 2013), <http://quadcopterhq.com/what-is-a-quadcopter> (“A quadcopter is multi-rotor copter with four arms, each of which have a motor and a propeller at their ends.”).

³ Using technology provided by Google called “Google Trends,” we might infer that public interest in “Unmanned Aerial Vehicle” (and similar search terms) has never been higher, spiking at the end of 2014. *See Unmanned Aerial Vehicle: Aircraft Type*, GOOGLE TRENDS, <http://www.google.com/trends/explore#q=%2Fm%2F0g2bc> (last visited Nov. 13, 2015) (suggesting that public interest in UAVs has increased approximately 150 percent from December 2011 to December 2014, and 900 percent from December 2005). Likely, UAS are so popular because they are both affordable and fun. UAS open the skies up to the everyday person without having to obtain a pilot license and a manned aircraft, or having to learn to fly more difficult traditional model aircraft. *See Michael Stothard, Flying Cameras Herald Age of the ‘Dronie,’* FIN. TIMES: TECH. (Dec. 22, 2014, 10:16 AM), <http://www.ft.com/intl/cms/s/0/8b282b54-88f4-11e4-ad5b-00144feabdc0.html#axzz3ku24fgkr> (“Lego was an amazing toy 20 years ago. You could create a whole world. But today’s kids are different and they require something more special and technological,” said the chief executive of Parrot, a French drone manufacturing company).

violate privacy rights, especially in private homes.⁴ This note examines whether the Fourth Amendment prevents warrantless UAS surveillance of our homes, an issue that will likely vex courts in the near future.

This note explores a hypothetical case that may become a typical UAS surveillance scenario. Law enforcement, acting without a warrant (on bare suspicion or an anonymous tip) will operate a small UAS with an attached camera to investigate and film the interior of a suspect's home or backyard. Flying at a low altitude,⁵ the government will obtain aerial photographs or video capturing incriminating evidence against the suspect that the government could not have otherwise obtained from another lawful vantage point (at least not photographs or video of the same quality, or from such close proximity). To obtain this incriminating evidence otherwise would have required the police to physically trespass into a constitutionally protected area or violate criminal privacy laws. However, the government will argue that the evidence was clearly visible from a "lawful" aerial vantage point: the flight path of the UAS.

Whether such surveillance violates the Fourth Amendment will likely depend on the development of two separate issues. The first issue is whether the Supreme Court will update its Fourth Amendment doctrine to meaningfully limit warrantless technological surveillance. This will depend on whether the Court adopts a test that does not diminish its protections upon the proliferation of new technologies.⁶ The second issue is whether legislators preserve our expectations of privacy by limiting the ability of private citizens to use UAS to spy on their neighbors. In theory, effective enforcement of such regulations should preserve our "reasonable expectation[s] of privacy."⁷

⁴ See JOEL D. LIEBERMAN ET AL., UNLV CTR. FOR CRIME AND JUSTICE POLICY, AERIAL DRONES, DOMESTIC SURVEILLANCE, AND PUBLIC OPINION OF ADULTS IN THE UNITED STATES 1 (2014), http://www.unlv.edu/sites/default/files/page_files/27/CCJP-AerialDrones-2014.pdf; TERANCE D. MIETHE ET AL., UNLV CTR. FOR CRIME AND JUSTICE POLICY, PUBLIC ATTITUDES ABOUT AERIAL DRONE ACTIVITIES: RESULTS OF A NATIONAL SURVEY 1 (2014), http://www.unlv.edu/sites/default/files/page_files/27/CCJP-PublicAttitudesAboutAerialDrones-2014.pdf; see also Sandra Fulton, *Police Hunger for Drones May Be Growing, but So Are Privacy Concerns*, ACLU: WASH. MARKUP (Jan. 16, 2014, 3:06 PM), <https://www.aclu.org/blog/technology-and-liberty-national-security/police-hunger-drones-may-be-growing-so-are-privacy>; Halima Kazem, *San Jose Police's New Drone Prompts Privacy Concerns*, ALJAZEERA AM. (Nov. 28, 2014, 2:13 PM), <http://america.aljazeera.com/articles/2014/11/28/san-jose-police-snewdronepromptsprivacyconcerns.html>.

⁵ This note explores various altitudes, but will primarily discuss surveillance from 30–100 feet.

⁶ Specifically, it remains to be seen whether the Supreme Court will expand the technological trespass doctrine from *Kyllo v. United States* to incorporate technology that is in "general public use." See *Kyllo v. United States*, 533 U.S. 27, 34 (2001) (limiting its holding to circumstances in which "the technology in question is *not* in general public use" (emphasis added)).

⁷ See *Katz v. United States*, 389 U.S. 347, 360 (1967) (Harlan, J., concurring). Governments might protect our privacy from UAS by enacting new legislation or by finding ways to enforce already existing privacy laws against UAS operators. See, e.g., CAL. PENAL CODE § 647(j)(1) (West Supp. 2015) ("Any person who looks through a hole or opening, into, or otherwise views, by means of any instrumentality, . . . the interior of a bedroom, bathroom,

The Supreme Court's Fourth Amendment doctrine bifurcates into two primary lines of cases: (1) common-law trespass cases⁸ and (2) reasonable expectation of privacy cases.⁹ The common-law trespass cases further divide into two sub-doctrines: traditional physical trespass doctrine¹⁰ and the new technological trespass doctrine.¹¹

The Reasonable Expectation of Privacy Doctrine

Under the reasonable expectation of privacy test, warrantless UAS surveillance of our homes will probably comply with the Fourth Amendment, absent legislative regulation of private drone use. As drones become increasingly popular among private consumers, the reasonableness of our expectations of privacy from drones wanes.¹² To combat this, legislators might preserve our privacy by limiting the ability of private drone users to spy on their neighbors.

Additionally, three seminal aerial surveillance cases¹³ solidify the conclusion that we presently have no reasonable expectation of privacy from drones. These cases held that naked-eye surveillance of a constitutionally protected area, such as the home or curtilage, from a lawful aerial vantage point is not a "search" under the Fourth Amendment, at least where the government does not

changing room, fitting room, dressing room, or tanning booth, or the interior of any other area in which the occupant has a reasonable expectation of privacy, with the intent to invade the privacy of a person or persons inside [is guilty of disorderly conduct, a misdemeanor].").

⁸ See *United States v. Jones*, 132 S. Ct. 945, 949–54 (2012) (reaffirming by plurality opinion the viability of the common-law trespass doctrine); see also *Florida v. Jardines*, 133 S. Ct. 1409, 1414 (2013) (reaffirming *Jones* by majority opinion).

⁹ See *Katz*, 389 U.S. at 361 (Harlan, J., concurring).

¹⁰ See *Jones*, 132 S. Ct. at 945, 949–54.

¹¹ *Kyllo*, 533 U.S. at 34 (“[O]btaining 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 (as here) the technology in question is not in general public use.” (citation omitted)).

¹² The reasonableness of our privacy expectations from private UAS operators is already eroding, and UAS are already in “general public use.” See, e.g., Rebecca J. Rosen, *So This Is How It Begins: Guy Refuses to Stop Drone-Spying on Seattle Woman*, ATLANTIC (May 13, 2013), <http://www.theatlantic.com/technology/archive/2013/05/so-this-is-how-it-begins-guy-refuses-to-stop-drone-spying-on-seattle-woman/275769> (“New technologies may present new ways of violating people’s privacy It will take courts years to figure out how to apply our laws to our age of drones (and years for legislators to revise them—they’re not, after all, perfect), but we’re not starting from scratch. That said, police . . . will need to actually enforce existing laws, or they’re not all that helpful.”).

¹³ See *Florida v. Riley*, 488 U.S. 445 (1989) (involving an unwarranted naked-eye observation of the curtilage of a home from a manned helicopter operating at 400 feet, in compliance with FAA regulations for helicopters); *California v. Ciraolo*, 476 U.S. 207 (1986) (involving an unwarranted naked-eye observation of the curtilage of a home from a manned, fixed-wing aircraft operating at 1000 feet, lawfully within navigable airspace); *Dow Chem. Co. v. United States*, 476 U.S. 227 (1986) (involving high-resolution camera observation and photography of an “open field”—a constitutionally unprotected area—from a manned, fixed-wing aircraft operating lawfully within navigable airspace at 1,200; 3,000; and 12,000 feet).

observe “intimate details connected with the use of the home or curtilage.”¹⁴ Further, when viewing a constitutionally *unprotected* area, the government may utilize high-resolution cameras.¹⁵ Although the Supreme Court has never found aerial surveillance to violate the reasonable expectation of privacy test, it has yet to rule on the constitutionality of unmanned, low altitude UAS surveillance of the home. Nonetheless, with the already widespread use of drones by private citizens, it appears unlikely that the Court will find our expectations of privacy to be reasonable absent effective legislative intervention.

The Common Law Trespass Doctrine

A warrantless UAS surveillance of the home, in which the UAS flies above roof-level, will also comply with the Fourth Amendment under the common-law physical trespass test.¹⁶ Although a property owner owns the airspace above and around one’s property (to a limited altitude),¹⁷ the airspace higher than the roof of the house is simply not an area that is protected by the Fourth Amendment (it is not within the “curtilage” of the home).¹⁸ Under the common-law physical trespass test, the government does not violate the Fourth Amendment when it trespasses on private property, unless it enters a house or its curtilage (the area immediately surrounding the house).¹⁹ In contrast, the physical trespass test provides no protection to non-curtilage real property (i.e., “open fields”).²⁰ The private airspace above the roof of the house is more like an open field than the curtilage of the home.²¹ Therefore, the government probably does

¹⁴ *Riley*, 488 U.S. at 452 (“As far as this record reveals, no intimate details connected with the use of the home or curtilage were observed . . .”). *Accord Ciralo*, 476 U.S. at 215 (“In an age where private and commercial flight in the public airways is routine, it is unreasonable for respondent to expect that his marijuana plants were constitutionally protected from being observed with the naked eye from an altitude of 1,000 feet. The Fourth Amendment simply does not require the police traveling in the public airways at this altitude to obtain a warrant in order to observe what is visible to the naked eye.”).

¹⁵ See *Dow Chem. Co.*, 476 U.S. at 239.

¹⁶ See, e.g., *United States v. Jones*, 132 S. Ct. 945, 949–54 (2012).

¹⁷ *United States v. Causby*, 328 U.S. 256, 263–65 (1946) (“We have said that the airspace is a public highway. Yet it is obvious that if the landowner is to have full enjoyment of the land, he must have exclusive control of the immediate reaches of the enveloping atmosphere. . . . The landowner owns at least as much of the space above the ground as he can occupy or use in connection with the land.”); see also *McCarran Int’l Airport v. Sisolak*, 137 P.3d 1110, 1120 (Nev. 2006) (“Thus, the landowners own the usable airspace above their property up to 500 feet, subject to intrusion by lawful air flight.”).

¹⁸ See *United States v. Dunn*, 480 U.S. 294, 301 (1987) (providing a four-factor test to determine whether an area is part of the “curtilage” of the home and therefore protected by the Fourth Amendment).

¹⁹ See *Oliver v. United States*, 466 U.S. 170, 176–77, 181 (1984) (reaffirming the validity of the open fields doctrine under *Katz*); *Hester v. United States*, 265 U.S. 57, 59 (1924).

²⁰ *Oliver*, 466 U.S. at 176–77, 181; *Hester*, 265 U.S. at 59.

²¹ *Oliver*, 466 U.S. at 176–77, 181; *Hester*, 265 U.S. at 59; see also *Dow Chem. Co. v. United States*, 476 U.S. 227, 239 (1986) (comparing the area around an industrial complex to an open field). The open fields doctrine is a limitation on both the *Katz* reasonable expecta-

not need a search warrant to fly through the airspace above the roof-level of private property. However, when a drone drops to a very low altitude (i.e., below and within the walls of the backyard), it is likely that it has entered a constitutionally protected area, wherein the government needs a warrant.

The Technological Trespass Doctrine

Most important of these Fourth Amendment doctrines, the technological trespass doctrine set forth in *Kyllo v. United States*,²² may invalidate warrantless drone surveillances of the home. This relatively new doctrine requires the government to obtain a warrant when it utilizes technology to gather information about the interior of a home, and when the only alternate means of obtaining this information would be to trespass on a constitutionally protected area.²³ However, the Court has not applied this doctrine to technologies that are “in general public use,”²⁴ a classification that likely applies to drones.²⁵

If the Court limits the *Kyllo* technological trespass doctrine to apply only to those technologies “not in general public use,” the technological trespass doctrine will suffer from the same limitations as the reasonable expectation of privacy test: both tests will provide little constitutional protection from widely popular technologies, such as drones. However, even if the Supreme Court adopts the “not in general public use” limitation, it may limit the reach of this limitation, and require the government to obtain a warrant when it wishes to use popular technology in an uncommon manner. This interpretation of the “not in general public use” exception would allow legislators to protect constitutional privacy rights by limiting the way in which private citizens use UAS.

Overview

Part I of this note will examine the capabilities, uses, and benefits of UAS. Part II will examine the three primary Fourth Amendment doctrines that will apply to government UAS surveillance of the home. Part III will apply these doctrines to several variations of a hypothetical UAS surveillance case.

I. BACKGROUND ON UNMANNED AERIAL SYSTEMS

A. The Capabilities, Uses, and Benefits of Unmanned Aerial Systems

UAS range dramatically in size, capability, and function. “They may have a wingspan as large as a Boeing 737 or smaller than a radio-controlled model

tion of privacy test and the common-law trespass test. *See, e.g., Oliver*, 466 U.S. at 176–77; *Hester*, 265 U.S. at 59.

²² *Kyllo v. United States*, 533 U.S. 27, 34 (2001).

²³ *Id.*

²⁴ *See id.* (containing dicta limiting this doctrine to technologies “not in general public use”).

²⁵ *See supra* note 3 (discussing the popularity of drones in the general public).

airplane.”²⁶ Some are going to be as small as a hummingbird,²⁷ a golf ball,²⁸ or even a bee.²⁹ UAS can be remotely piloted or can fly autonomously, guiding itself.³⁰

The American Civil Liberties Union divides UAS technology into the following five categories: (1) Large, fixed-wing aircraft for long-term high-altitude surveillance or military operations; (2) Small, fixed-wing aircraft; (3) “backpack” craft, such as “quadcopters,” designed to be carried and operated by a single person; (4) hummingbirds (i.e., the “Nano Hummingbird” by Aero-Vironment, intended for stealth operation that has a wingspan of only 6.5 inches and weighs less than a AA battery); and (5) blimps.³¹ Unlike drones, “manned aircraft are expensive to purchase, operate and maintain, and this expense has always imposed a natural limit on the government’s aerial surveillance capability. Now that surveillance can be carried out by unmanned aircraft, this natural limit is eroding.”³² Also, drones are less conspicuous than manned aircraft. For these reasons, drones provide distinct advantages to law enforcement and private drone operators alike. These advantages drive popular speculation that UAS surveillance will become frequent.

In terms of surveillance, UAS serve as a set of wings, so to speak, for nearly any imaging technology a government or private user desires to set aloft. And while manned aircraft may also serve this function, unmanned aircraft allow UAS operators to safely fly lower and closer to the target than would be practical for manned aircraft. Further, a small drone may fly inside a building or peer through windows undetected. Or a large blimp or fixed wing aircraft operating on improved solar power could remain in the air for *years* for citywide surveillance.³³ Furthermore, developers continue to attach increasingly

²⁶ *UAS Frequently Asked Questions*, *supra* note 2.

²⁷ *The Surveillance Hummingbird: Watch It Fly and Spy*, TIME, http://content.time.com/time/video/player/0,32068,1281633027001_2099853,00.html (last visited Sept. 13, 2015) [hereinafter *The Surveillance Hummingbird*] (showing first- and third-person videos of a hummingbird-sized drone with an attached camera flying inside and outside of a building).

²⁸ *U.S. Government to Use ‘Drones the Size of Golf Balls to Spy on American Citizens*, DAILYMAIL.COM (Jun. 9, 2012, 12:45 AM), <http://www.dailymail.co.uk/news/article-2156720/Eye-sky-U-S-government-use-drones-size-GOLF-BALLS-spy-citizens.html> (reporting on a thirty-page memorandum issued by Secretary of the Air Force Michael Donley, which stated that “drones, some as small as golf balls, may be used domestically to ‘collect information about U.S. persons.’”).

²⁹ See Sandeep Ravindran, *Insect-Inspired Vision Helps These Tiny Robots Fly*, MOTHERBOARD (June 17, 2014, 5:55 PM), <http://motherboard.vice.com/read/insect-inspired-vision-helps-these-tiny-robots-fly>.

³⁰ JAY STANLEY & CATHERINE CRUMP, ACLU, PROTECTING PRIVACY FROM AERIAL SURVEILLANCE: RECOMMENDATIONS FOR GOVERNMENT USE OF DRONE AIRCRAFT 2 (2011), <https://www.aclu.org/files/assets/protectingprivacyfromaerialsurveillance.pdf>.

³¹ *Id.* at 2–3.

³² *Id.* at 1.

³³ While current drone technology typically operates aloft for only a matter of hours, certain devices called High Altitude Long Endurance (HALE) UAS will have the potential to operate in the air for extremely prolonged periods of time, enabling them to gather long-term in-

powerful imaging technology that “increas[es] the chance that individuals will come under scrutiny from faraway aircraft without knowing it.”³⁴ UAS have the ability to carry very high-powered cameras (with high-power zoom lenses) that will produce quality, high-resolution images and video from far away.³⁵ Therefore, drones have a wide range of capabilities that will open new doors for government surveillance.

B. UAS Use by Federal, State, and Local Law Enforcement

While academics and attorneys slowly debate the uncertain constitutionality of utilizing UAS for law enforcement functions, many law enforcement agencies throughout the United States are already using them.³⁶ As discussed below, the Federal Bureau of Investigation, Customs and Border Protection, and state and local law enforcement agencies all utilize UAS.

1. The Federal Bureau of Investigation

The FBI has been utilizing UAS as far back as 2006 and has spent more than \$3 million on unmanned aircraft as of 2014.³⁷ FBI Director Robert S.

formation about the ground. John Villasenor, *Observations from Above: Unmanned Aircraft Systems and Privacy*, 36 HARV. J.L. & PUB. POL’Y 457, 495 (2013). Boeing is working on a HALE UAS called the SolarEagle, which will operate continually aloft in the stratosphere for up to five years. Press Release, Boeing Co., Boeing Wins DARPA Vulture II Program (Sept. 16, 2010), <http://boeing.mediaroom.com/2010-09-16-Boeing-Wins-DARPA-Vulture-II-Program>. The solar-powered QinetiQ Zephyr stayed aloft for over two continuous weeks. See Andrew Chuter, *Solar UAV Lands After Record 2 Weeks Aloft*, DEF. NEWS (July 23, 2010, 3:45 AM), <http://archive.defensenews.com/article/20100723/DEFSECT01/7230304/Solar-UAV-Lands-After-Record-2-Weeks-Aloft>.

³⁴ STANLEY & CRUMP, *supra* note 30, at 5.

³⁵ *Id.* These capabilities will only improve with time. In addition, developers could equip UAS with night-vision and “see-through imaging” (technology that has the potential to penetrate walls). *Id.* Or, instead of imaging technology, one might equip “laser microphones” on to drones, which allow users to pick up audio occurring within a home. See Charles Arthur, *Laser Spying: Is It Really Practical?*, GUARDIAN (Aug. 22, 2013, 3:34 PM) <http://www.theguardian.com/world/2013/aug/22/gchq-warned-laser-spying-guardian-offices>. Perhaps this is what the Supreme Court warned about in *Dow Chemical*: “An electronic device to penetrate walls or windows so as to hear and record confidential discussions of chemical formulae or other trade secrets would raise very different and far more serious questions” *Dow Chem. Co. v. United States*, 476 U.S. 227, 239 (1986).

³⁶ See Shawn Musgrave, *Finally, Here’s Every Organization Allowed to Fly Drones in the US*, MOTHERBOARD (Oct. 6, 2014, 3:00 PM), <http://motherboard.vice.com/read/every-organization-flying-drones-in-the-us>. For a list of at least some law enforcement agencies that have FAA permission (Certificates of Waiver or Authorization, or “COA”) to operate UAS for law enforcement purposes, see *FAA List of COA Applicants: Shawn Musgrave Made This Request to Federal Aviation Administration of the United States of America*, MUCKROCK, <https://www.muckrock.com/foi/united-states-of-america-10/faa-list-of-coa-applicants-9201/#files> (click on “Files” tab; then follow “view” hyperlink under “Responsive Documents”) (last visited Nov. 13, 2015).

³⁷ Brian Bennett, *FBI Has Been Using Drones Since 2006, Watchdog Agency Says*, L.A. TIMES (Sep. 26, 2013, 4:14 PM), <http://www.latimes.com/nation/nationnow/la-na-nn-fbi->

Mueller III admitted that the agency uses UAS for surveillance domestically.³⁸ Mueller claimed that the Bureau uses drones only “in a very, very minimal way and very seldom,” and that the Bureau has “very few” drones.³⁹ Nonetheless, the FBI apparently lacked meaningful self-regulation, relying on a case-by-case determination of the proper limitation of UAS use. Mueller claimed that the FBI was only in the “initial stages” of writing policies to limit privacy infringements, and claimed that the “principal privacy limitations” were “very narrowly focused on particularized cases and particularized needs.”⁴⁰ Therefore, the FBI appears to be currently operating drones without meaningful policy limitations.⁴¹

2. Customs and Border Protection

The United States Customs and Border Protection (“CBP”) operates “Predator” UAS (large, fixed-wing UAS similar to those used for military purposes abroad) along the United States border for surveillance.⁴² In addition, CBP has lent these drones to domestic law enforcement agencies for local law enforcement purposes.⁴³ CBP’s executive director, Lothar Eckardt, has stated that law-

using-drones-2006-20130926-story.html; *Justice Department Spent Nearly \$5M on Drones*, CBS NEWS (Sep. 26, 2013, 9:37 PM), <http://www.cbsnews.com/news/justice-department-spent-nearly-5m-on-drones>; Shawn Musgrave, *Every Drone Mission the FBI Admits to Flying*, MOTHERBOARD (Apr. 16, 2014, 3:30 PM), <http://motherboard.vice.com/read/every-drone-mission-the-fbi-admits-to-flying>.

³⁸ Richard A. Serrano & Brian Bennett, *FBI Uses Drones Inside U.S. for Spying, Director Says*, L.A. TIMES (Jun. 19, 2013), <http://articles.latimes.com/2013/jun/19/nation/la-na-fbi-mueller-20130620>. Accord Shawn Musgrave, *Where Is the Paper Trail for the FBI’s Drone Use?*, MOTHERBOARD (June 20, 2013, 9:55 AM), <http://motherboard.vice.com/blog/where-is-the-paper-trail-for-the-fbis-drone-use> (“Asked . . . whether the FBI uses drones and for what purposes, Mueller answered, ‘Yes, and for surveillance.’ [Asked] whether the FBI uses drones for surveillance on American soil, . . . Mueller confirmed with another terse ‘Yes.’”).

³⁹ Serrano & Bennett, *supra* note 38.

⁴⁰ *Id.*

⁴¹ See, e.g., Jason Koebler, *FBI Uses Drones for Surveillance, Without Clear Guidelines*, U.S. NEWS & WORLD REP. (June 19, 2013, 1:28 PM), <http://www.usnews.com/news/articles/2013/06/19/fbi-uses-drones-for-surveillance-without-clear-guidelines> (reporting that the director of the Electronic Privacy Information Center’s domestic surveillance project finds the FBI’s lack of clear guidelines troubling: “Government agencies should be prohibited from flying drones in the United States without meaningful rules to guide that use.”).

⁴² Elliot Spagat & Brian Skoloff, *AP Exclusive: Drones Patrol Half of the Mexico Border*, ASSOCIATED PRESS (Nov. 13, 2014, 2:00 PM), <http://bigstory.ap.org/article/8015402c7480430badfe47df502eaa19> (according to the report, since March 2013, the government has operated about 10,000 drone flights over a stretch of about 900 miles along the U.S.-Mexican border, and plans to expand the strategy to the Canadian border by the end of 2015); see also Robert Valdes, *How the Predator UAV Works*, HOWSTUFFWORKS.COM (Apr. 1, 2004), <http://science.howstuffworks.com/predator.htm> (stating the advantages of predator UAS for military purposes).

⁴³ Brian Bennett, *Police Employ Predator Drone Spy Planes on Home Front*, L.A. TIMES (Dec. 10, 2011), <http://articles.latimes.com/2011/dec/10/nation/la-na-drone-arrest-20111211>; Jennifer Lynch, *Customs & Border Protection Logged Eight-Fold Increase in Drone Surveillance for Other Agencies*, ELEC. FRONTIER FOUND. (July 3, 2013), <https://www.eff.org>

abiding people should not worry about the possibility that CBP will violate our privacy with these drones, because the cameras the drones carry “are unable to capture details like license plate numbers and faces on the ground.”⁴⁴ However, the CBP’s drones carry some advanced sensors and imaging technology, including visible-spectrum and infrared video, synthetic-aperture radar for change detection, and “Vehicle and Dismount Exploitation Radar” (VADER). These features allow for the “persistent reconnaissance, surveillance, tracking, and targeting of evasive vehicles and people moving on foot in cluttered environments.”⁴⁵

3. State and Local Law Enforcement Agencies

Police departments around the United States are buying drones, applying for FAA “Certificates of Waiver or Authorization” (“COA”),⁴⁶ and many are already flying them. For example, law enforcement officials in Grand Forks, North Dakota, used a drone to track down two suspects that fled from the police, leading to their arrests.⁴⁷ Further, CBP has conducted drone surveillance for the Texas Department of Public Safety, The North Dakota Bureau of Criminal Investigation, and the Minnesota Bureau of Criminal Investigation, for “missions rang[ing] from specific drug-related investigations, searches for missing persons, border crossings and fishing violations to general ‘surveillance imagery’ and ‘aerial reconnaissance’ of a given location.”⁴⁸

In 2006, the FAA investigated the Los Angeles Sheriff’s Department (LASD) for operating a drone without its permission, and then declined to issue the LASD a COA to fly drones.⁴⁹ An LASD official said that the department had no plans to spy on people, and that the drones would “most likely be used to track fleeing suspects, monitor hostage situations and search for missing

/deeplinks/2013/07/customs-border-protection-significantly-increases-drone-surveillance-other (“Recently released daily flight logs from [CBP] show the agency has sharply increased the number of missions its [ten] Predator drones have flown on behalf of state, local and non-CBP federal agencies.”).

⁴⁴ Spagat & Skoloff, *supra* note 42.

⁴⁵ Jay Stanley, *Up to 20% of Border Patrol Drone Flights Are Inside the United States*, ACLU: FREE FUTURE (Oct. 2, 2014, 7:46 AM), <https://www.aclu.org/blog/20-border-patrol-drone-flights-are-inside-united-states?redirect=blog/technology-and-liberty-immigrants-rights/20-border-patrol-drone-flights-are-inside-united>.

⁴⁶ *Certificates of Waiver or Authorization (COA)*, FED. AVIATION ADMIN., https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/uas/coa/ (last modified Nov. 14, 2014 1:20 PM).

⁴⁷ See Bennett, *supra* note 43; Jason Koebler, *Police Used a Drone to Chase Down and Arrest Four DUI Suspects in a Cornfield*, MOTHERBOARD (Oct. 2, 2014, 1:00 PM), <http://motherboard.vice.com/read/police-used-a-drone-to-chase-down-and-arrest-four-dui-suspects-in-a-cornfield> (reporting that those arrestees “had the unlucky distinction of becoming the first Americans ever tracked down and arrested with the help of a police quadcopter.”).

⁴⁸ Lynch, *supra* note 43.

⁴⁹ See Lynn Doan & Ashraf Khalil, *FAA Grounds Baca’s Plan for Eyes in the Sky*, L.A. TIMES (June 22, 2006), <http://articles.latimes.com/2006/jun/22/local/me-drone22>.

children and hikers.”⁵⁰ Many more examples of law enforcement plans to use UAS exist.⁵¹

C. Public Awareness and Sentiment About Use of UAS

The University of Nevada, Las Vegas, Center for Crime and Justice Policy conducted multiple nationwide and statewide surveys on the general public’s attitude about domestic UAS use in the United States.⁵² According to these surveys, 73 percent of respondents reported that they have heard or read about drone use for delivery services (i.e., mail or books) to private residences, 61 percent were aware of the potential to use drones in remote areas for search and rescue operations, and 41 percent were aware of the potential to use drones in open public places to detect criminal activities.⁵³ These results demonstrate that the public is generally aware of the growing use of drones.

It is not surprising that 93 percent of the public favors using drones in remote areas to aid in search and rescue operations (i.e., finding missing or injured persons).⁵⁴ However, the public is evenly torn on whether law enforcement should employ drones to detect criminal activities in *open public places*.⁵⁵ When asked about their level of concern about drone use for monitoring people’s daily activities around the *home*, 72 percent responded that they are very concerned and only 9 percent responded that they are not concerned at all.⁵⁶ Most respondents oppose the use of drones for surveillance by federal, state, or local governments.⁵⁷ Interestingly, many more respondents oppose drone surveillance by private citizens.⁵⁸ No doubt, such a high level of public concern should promote legislative solutions to prevent invasions of privacy by UAS.⁵⁹

⁵⁰ *Id.*

⁵¹ See, e.g., *Seattle Cancels Police Drone Program After Outcry over Privacy Issues*, NBC NEWS (Feb. 8, 2013, 3:39 PM), http://usnews.nbcnews.com/_news/2013/02/08/16903237-seattle-cancels-police-drone-program-after-outcry-over-privacy-issues?lite; see also Melissa Pamer & Mark Mester, *LAPD’s 2 Drones Will Remain Grounded During Policy Review, Police Commission Says amid Protest*, KTLA (Sept. 15, 2014, 1:28 PM), <http://ktla.com/2014/09/15/anti-spying-group-drone-free-lapd-to-protest-state-bill-that-would-allow-police-drones>.

⁵² See LIEBERMAN ET AL., *supra* note 4; MIETHE ET AL., *supra* note 4; see also MARI SAKIYAMA ET AL., UNLV CTR. FOR CRIME AND JUSTICE POLICY, NEVADA VS. U.S. RESIDENTS’ ATTITUDES TOWARD SURVEILLANCE USING AERIAL DRONES 1 (2014), http://www.unlv.edu/sites/default/files/page_files/27/NevadaU.S.Residents'Attitudes.pdf (“Eighty-three percent of Nevada residents in this survey were opposed to using drones to monitor people’s daily activities around their home.”).

⁵³ MIETHE ET AL., *supra* note 4, at 2.

⁵⁴ *Id.* at 3.

⁵⁵ *Id.*

⁵⁶ *Id.* at 4.

⁵⁷ LIEBERMAN ET AL., *supra* note 4, at 5.

⁵⁸ *Id.*

⁵⁹ See *id.* at 6 (discussing the public policy impact and legislative challenges that likely arise from the public sentiment regarding drones, and stating that “legislative efforts to regulate

It remains to be seen how public sentiment will change as drones more fully integrate into society, especially if regulatory efforts fail.

D. Drone Legislation and Regulation: Federal, State, and Local Law

Federal law surrounding UAS is unclear and in flux. Federal statutes and regulations governing aviation are far from relevant to the use of UAS, and instead are tailored around manned flights from at least 400 to 500 feet above the ground (save helicopters, which sometimes may fly lower, when safe to do so).⁶⁰ Hence, Congress directed the FAA to develop a plan for the integration of “civil” UAS⁶¹ into the national airspace by September 2015, via the FAA Modernization and Reform Act of 2012 (“FMRA”).⁶² However, the FAA has dragged its feet in complying with the FRMA and promulgating drone regulations, and might not comply until 2017.⁶³ At the time of this writing, the FAA has proposed detailed drone regulations.⁶⁴ Thankfully, the FAA has also provided an executive summary of these regulations.⁶⁵

Federal aviation regulations are found in Title 14 of the Code of Federal Regulations, notwithstanding the existence of several other regulation-like doc-

aerial drone usage in the areas of domestic surveillance face a major challenge. This challenge involves establishing public policy that achieves the delicate balance between (1) maximizing the benefits of this technology (i.e., increasing public safety through domestic surveillance activities) and (2) minimizing its costs on individuals’ rights to privacy.”)

⁶⁰ See 14 C.F.R. § 91.119 (2015) (minimum safe altitudes); *Busting Myths About the FAA and Unmanned Aircraft*, FED. AVIATION ADMIN., <http://www.faa.gov/news/updates/?newsId=76240> (last modified Mar. 7, 2014, 4:44 PM) [hereinafter *Busting Myths*] (“[M]anned aircraft generally must stay at least 500 feet above the ground.”). See generally 49 U.S.C. § 44101 (2012); 14 C.F.R. § 1.1 (2015).

⁶¹ *Civil Operations (Non-Governmental)*, FED. AVIATION ADMIN., https://www.faa.gov/uas/civil_operations (last modified Mar. 17, 2015, 10:42 AM) (defining “civil” as non-governmental).

⁶² FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 332, 126 Stat. 11, 73 (2012) (serving, in relevant part, as a directive by Congress to the FAA to update federal aviation regulations, but not as an enforceable statute or regulation in itself, beyond defining some of the boundaries of the FAA’s regulatory authority to regulate drones).

⁶³ See L. Gordon Crovitz, *The Grinch Who Stole . . . Drones*, WALL ST. J. (Dec. 28, 2014, 7:04 PM), <http://www.wsj.com/articles/l-gordon-crovitz-the-grinch-who-stole-drones-1419811476> (“The Government Accountability Office recently reported a ‘consensus of opinion’ that the FAA won’t have new rules before 2017.”).

⁶⁴ Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. 9543 (proposed Feb. 23, 2015) (to be codified at 14 C.F.R. pts. 21, 43, 45, 47, 61, 91, 101, 107, 183).

⁶⁵ *Id.* at 9545–48. Of note, the FAA aims to require a minimum certification process for private UAS operators, to limit UAS operation to “line of sight” flying (that is, the drone must stay within your direct, naked-eye vision), and to restrict UAS to below 500 feet. See *id.* at 9546–47. However, these restrictions do not apply to hobbyist drones, when these drones meet the requirements of section 336 of Public Law 112-95 (“Special Rule for Model Aircraft”). *Id.* at 9555, 9585. Hobbyist drones are those “flown strictly for hobby or recreational use,” and “operated in accordance with a community-based set of safety guidelines and within the programming of a nationwide community-based organization.” *Id.* at 9585.

uments published by the FAA. These include an “Advisory Circular” that details optional guidelines for model aircraft users titled “Model Aircraft Operating Standards.”⁶⁶ This document may reflect the basic framework of the FAA’s forthcoming drone regulations.

Currently, several legal issues are unclear. For example, which currently enacted laws already proscribe drone use;⁶⁷ what is the scope of federal authority, both Congressional and administrative, to regulate local use of drones; and what is the scope of state and local governments’ powers to regulate private and public drone use in light of the FAA’s authority?

Whether federal regulation of aircraft (or unmanned aircraft) preempts state and local drone legislation is unclear. The FAA’s website claims that the FAA has preemptive authority over regulation of private drone use.⁶⁸ However, the FAA probably does not have such broad and exclusive authority over drone laws. The Federal Aviation Act, granting the FAA its regulatory authority, has

⁶⁶ FED. AVIATION ADMIN., U.S. DEP’T OF TRANSP., AC 91-57, ADVISORY CIRCULAR: MODEL AIRCRAFT OPERATING STANDARDS 1 (1981), http://www.faa.gov/documentLibrary/media/Advisory_Circular/91-57.pdf (“This advisory circular outlines, and encourages voluntary compliance with, safety standards for model aircraft operators.”). The FAA released an unmanned aircraft safety video, largely echoing the contents of the Advisory Circular. *See* Fed. Aviation Admin., *Know Before You Fly*, YOUTUBE (Dec. 22, 2014), <https://www.youtube.com/watch?v=XF5Q9JvBxM&feature=youtu.be>.

⁶⁷ For example, a highly publicized National Transportation Safety Board (“NTSB”) case decided whether current FAA regulations for manned aircraft proscribe commercial drones, or if commercial drones fall under the FAA’s exemption for model aircraft. Raphael Pirker, N.T.S.B. Order No. EA-5730, No. CP-217, at 5 (Nov. 17, 2014) (holding that all aerial drones fall into the FAA’s definition of “aircraft” because of the “the clear, unambiguous plain language of 49 U.S.C. § 40102(a)(6) and 14 C.F.R. § 1.1: an ‘aircraft’ is any ‘device’ ‘used for flight in the air.’ This definition includes any aircraft, manned or unmanned, large or small.”). The board in *Pirker* concluded that the FAA has the authority to impose fines for reckless commercial operation of unmanned aircraft. *Id.* at 1–2. Presumably, this decision also means that the FAA has regulatory authority over private hobby unmanned aircraft as well, despite its historical choice to exempt those “aircraft” from federal regulations. *See id.* For a good overview of the lawfulness of private drone flights, see Tim Adelman, *Can I Fly or Can’t I Fly? Drones in the Wake of the NTSB’s Pirker Opinion*, THOMSON REUTERS: THE KNOWLEDGE EFFECT (Jul. 2, 2014), <http://blog.thomsonreuters.com/index.php/can-i-fly-or-cant-i-fly-drones-in-the-wake-of-the-ntsbs-pirker-opinion>, but note that Adelman published this article in reference to the initial *Pirker* holding, which the NTSB reversed later that year. Nonetheless, the article provides useful insights into the legal landscape of private drone flights.

⁶⁸ *Fact Sheet—Unmanned Aircraft Systems (UAS)*, FED. AVIATION ADMIN., http://www.gov/news/fact_sheets/news_story.cfm?newsId=14153 (Jan. 6, 2014) (“[The FAA’s authority] generally preempts any state or local government from enacting a statute or regulation concerning matters—such as airspace regulation—that are reserved exclusively to the U.S. Government. For example, a state law or regulation that prohibits or limits the operation of an aircraft . . . generally would be preempted. . . . Under most circumstances, it would be within state or local government power to restrict the use of certain aircraft, including a UAS, by the state or local police” (emphasis added)).

no express preemption clause.⁶⁹ Therefore, whether state and local drone regulations will survive a constitutional challenge will depend on whether Congress (or the FAA) has impliedly preempted UAS regulations. To do so, the federal government must evoke a “clear and manifest purpose” to preempt the state regulation in question.⁷⁰

States and municipalities may limit private drone flights near specific sensitive areas, like backyards, crowds, or government buildings. And it is doubtful that Congress or the FAA will express a “clear and manifest purpose” to preempt such laws. This is especially true because enforcement of such laws would be difficult if left exclusively to the federal government, and these laws protect interests particularly important to state and local governments (i.e., property, safety, and privacy). This issue is complex and is outside the scope of this note.

Multiple sources keep a decently up-to-date record of the progress of state UAS-related legislation. From these, we see that at least forty-five states have considered 168 bills related to drones, and twenty-six have enacted laws addressing UAS issues.⁷¹

II. MODERN FOURTH AMENDMENT JURISPRUDENCE RELEVANT TO WARRANTLESS UAS SURVEILLANCE

The function of the Fourth Amendment appears on its face to secure a constitutionally-protected domain of private activity, life, and property, that is enjoyed exclusively by the People, to which the People have granted the government only a limited right of access—when the government presents probable cause of criminal activity. By its terms, the Amendment ensures the “right of the People to be secure” in our “persons, houses, papers, and effects,” free from “unreasonable searches.”⁷² Warrantless “searches” are presumptively unreasonable, so we are left with determining whether a warrantless government action constitutes a “search” for the purposes of the Fourth Amendment. Three independent doctrines may brand a government action as a “search” for the purposes of the Fourth Amendment: (A) the common-law physical trespass doctrine, (B) the reasonable expectation of privacy doctrine, and (C) the technological trespass doctrine.

⁶⁹ See Federal Aviation Act of 1958, Pub. L. No. 85-726, 72 Stat. 731 (1958) (codified as amended in scattered sections of 49 U.S.C.); *Martin ex rel. Heckman v. Midwest Express Holdings, Inc.*, 555 F.3d 806, 808 (9th Cir. 2009).

⁷⁰ *Cipollone v. Liggett Group, Inc.*, 505 U.S. 504, 516 (1992).

⁷¹ *Current Unmanned Aircraft State Law Landscape*, NAT'L CONF. ST. LEGISLATURES (Nov. 25, 2015), <http://www.ncsl.org/research/transportation/current-unmanned-aircraft-state-law-landscape.aspx> (“So far, 26 states have enacted laws addressing UAS issues and an additional six states have adopted resolutions.”); see also Allie Bohm, *Status of 2014 Domestic Drone Legislation in the States*, ACLU: FREE FUTURE (June 30, 2014), <https://www.aclu.org/blog/technology-and-liberty/status-2014-domestic-drone-legislation-states>.

⁷² U.S. CONST. amend. IV.

A. *The Common-Law Physical Trespass Doctrine*

In 2012, a plurality of the Supreme Court deemed an investigation unconstitutional because the government physically intruded upon a person's car.⁷³ In *United States v. Jones*, Justice Scalia, writing for the plurality, explained that a person's "Fourth Amendment rights do not rise or fall with the *Katz* [reasonable expectation of privacy] formulation."⁷⁴ Justice Scalia explained that the common-law trespass test is now and always has been the foundational and primary doctrine of the Fourth Amendment.⁷⁵ Applying the common-law trespass test in *Jones*, the plurality found that "the Government'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,'" and thereby violated the Fourth Amendment.⁷⁶ The next year, a majority of the Supreme Court expressly reaffirmed *Jones* and the viability of the common-law physical trespass doctrine.⁷⁷

The *Jones* plurality distinguished *United States v. Knotts*, a 1983 case in which the Court held that "[a] person traveling in an automobile on public thoroughfares has no reasonable expectation of privacy in his movements from one place to another."⁷⁸ Instead of abrogating *Knotts* and finding that *Jones* *did* have a reasonable expectation of privacy on the road, the *Jones* plurality held that the government's physical intrusion on *Jones*'s car constituted a "search" within the "original meaning" of the Fourth Amendment.⁷⁹ *Jones* revived a strict level of protection from physical trespasses onto "persons, houses, papers, and effects."⁸⁰

B. *The Reasonable Expectation of Privacy Doctrine*

In 1967, the Court expanded the protections of the Fourth Amendment.⁸¹ In *Katz v. United States*, the Court held that FBI agents conducted a "search" when they attached an electronic listening and recording device to the outside of a public telephone booth and listened in on the petitioner's private conversations, even though the government never physically trespassed on the suspect's property.⁸² In contrast to the trespass-only approach to the Fourth Amendment, the Supreme Court held that the Fourth Amendment "protects people, not plac-

⁷³ *United States v. Jones*, 132 S. Ct. 945, 949–54 (2012).

⁷⁴ *Id.* at 950; *see also* *Florida v. Jardines*, 133 S. Ct. 1409, 1414 (2013) (quoting and affirming *Jones*).

⁷⁵ *Jones*, 132 S. Ct. at 952.

⁷⁶ *Id.* at 949 (footnote omitted).

⁷⁷ *Jardines*, 133 S. Ct. at 1414.

⁷⁸ *United States v. Knotts*, 460 U.S. 276, 281 (1983); *see Jones*, 132 S. Ct. at 951–52.

⁷⁹ *Jones*, 132 S. Ct. at 950 n.3.

⁸⁰ *See* U.S. CONST. amend. IV. *See generally Jones*, 132 S. Ct. 945.

⁸¹ *See Katz v. United States*, 389 U.S. 347, 353 (1967) ("We conclude that the underpinnings of [the trespass doctrine] have been so eroded by our subsequent decisions that [it] can no longer be regarded as controlling.").

⁸² *Id.* at 348–53.

es,” concluding that the government’s wiretapping was a “search” for the purposes of the Fourth Amendment.⁸³ The Court reasoned that electronically listening to and recording a person’s conversations violates the privacy upon which the person “justifiably relie[s]” when using a telephone booth.⁸⁴ “[W]hat he sought to exclude when he entered the booth was . . . the uninvited ear. He did not shed his right to do so simply because he made his calls from a place where he might be seen.”⁸⁵

Justice Harlan’s concurrence in *Katz* explained that government activity is a search, for the purposes of the Fourth Amendment, if it intrudes on a person’s “reasonable expectation of privacy.”⁸⁶ Later courts have adopted Justice Harlan’s approach in *Katz*: to have a reasonable expectation of privacy, a suspect must actually have a subjective “expectation of privacy[,] and... that expectation [must] be one that society is prepared to recognize as [objectively] ‘reasonable.’”⁸⁷

C. *Limitations on the Common-Law Trespass and the Reasonable Expectation of Privacy Doctrines*

Some have criticized the *Katz* test for being circular, overly subjective, and lacking textual and historical foundation.⁸⁸ In its practical application, it often fails to protect the privacy interests of individuals. This is true despite the Court’s assurance in *Katz* that “the Fourth Amendment protects people, not places,” and “what [a person] seeks to preserve as private, even in an area accessible to the public, may be constitutionally protected.”⁸⁹ Similarly, some

⁸³ *Id.* at 350–53.

⁸⁴ *Id.* at 353.

⁸⁵ *Id.* at 352. Therefore, one relevant consideration in a warrantless UAS surveillance case is if the suspect reasonably sought to exclude the uninvited eye from a low altitude aerial vantage point. A person seeks auditory seclusion when she enters a phone booth; she cannot reasonably expect visible seclusion. Therefore, in *Katz*, the defendant did not shed his right to *auditory privacy*, even though he likely shed his right to visible privacy. *See id.* In a UAS surveillance case, the question of whether the suspect shed her right to visible privacy from aerial vantage point is going to be much less clear, and will probably depend on the precise location of the object of the search.

⁸⁶ *Id.* at 360 (Harlan, J., concurring).

⁸⁷ *Id.* The Supreme Court later expressly adopted Justice Harlan’s concurrence in *Katz*, clarifying that the reasonable expectation of privacy doctrine is a two-part inquiry. *See Smith v. Maryland*, 442 U.S. 735, 740–41 (1979); *see also Bond v. United States*, 529 U.S. 334, 338 (2000); *California v. Rooney*, 483 U.S. 307, 320 (1987) (White, J., dissenting).

⁸⁸ *See Kyllo v. United States*, 533 U.S. 27, 34 (2001) (“The *Katz* test . . . has often been criticized as circular, and hence subjective and unpredictable.”); *Minnesota v. Carter*, 525 U.S. 83, 97–98 (1998) (Scalia, J., concurring) (“In my view, the only thing the past three decades have established about the *Katz* test . . . is that, unsurprisingly, those ‘actual (subjective) expectation[s] of privacy’ ‘that society is prepared to recognize as “reasonable,”’ . . . bear an uncanny resemblance to those expectations of privacy that this Court considers reasonable.” (alteration in original) (citation omitted)).

⁸⁹ *Katz*, 389 U.S. at 351–52.

have criticized the common-law physical trespass test for being overly formulaic and unable to capture the realities of modern law enforcement techniques.⁹⁰

Three lines of cases that reveal the limitations of these doctrines will be of particular importance to a UAS surveillance case: (1) the open fields doctrine cases; (2) the aerial surveillance cases; and (3) the public exposure doctrine cases.

1. Open Fields Doctrine

The Supreme Court first enunciated the open fields doctrine in *Hester v. United States*⁹¹ in 1924 under the common-law trespass doctrine, and later reaffirmed the doctrine in *Oliver v. United States*⁹² in 1984 under the *Katz* reasonable expectation of privacy test. Pursuant to this case law, the act of entering and searching an “open field”—even when the open field is on private property—does not constitute a “search,” without more, for the purposes of the Fourth Amendment.⁹³ Under this doctrine, the Supreme Court recognizes two types of real property: the home and its “curtilage,”⁹⁴ wherein the government needs a warrant to enter and search, and all other real property, considered analogous to an “open field,” wherein the government may enter and search without a warrant.⁹⁵

In *United States v. Dunn*, the Court enunciated a four-factor test to determine whether a defendant’s real property is part of the curtilage of the home or

⁹⁰ See *id.* at 362 (Harlan, J., concurring).

In . . . *Goldman v. United States*, [we] had held that electronic surveillance accomplished without the physical penetration of petitioner’s premises by a tangible object did not violate the Fourth Amendment. [*Goldman*] should now be overruled. Its limitation on Fourth Amendment protection is, in the present day, bad physics as well as bad law, for reasonable expectations of privacy may be defeated by electronic as well as physical invasion.

Id. (citation and footnote omitted).

⁹¹ See *Hester v. United States*, 265 U.S. 57, 59 (1924) (“[T]he special protection accorded by the Fourth Amendment to the people in their ‘persons, houses, papers, and effects,’ is not extended to the open fields. The distinction between the latter and the house is as old as the common law.”).

⁹² See *Oliver v. United States*, 466 U.S. 170, 176–77, 181 (1984).

⁹³ *Id.* at 181 (“[A]n individual has no legitimate expectation that open fields will remain free from warrantless intrusion by government officers.”).

⁹⁴ Simply put, the “curtilage” is usually the area immediately surrounding the home. *Id.* at 180.

⁹⁵ Some contend that the Supreme Court undermined the logical foundation of *Katz* when it reaffirmed what we know as the “open fields doctrine” under the reasonable expectation of privacy context. See *id.* at 189–90 (Marshall, J., dissenting) (noting that the Court has afforded protection in many places not specifically enumerated in the text of the Amendment, such as public telephone booths, and that “privacy interests are not coterminous with property rights. However, because ‘property rights reflect society’s explicit recognition of a person’s authority to act as he wishes in certain areas, [they] should be considered in determining whether an individual’s expectations of privacy are reasonable.’” (alteration in original) (citation omitted) (quoting *Rakas v. Illinois*, 439 U.S. 128, 153 (1978) (Powell, J., concurring))).

part of the defendant's unprotected property: (1) physical proximity to the home; (2) whether the area is inside an enclosure surrounding the home (i.e., a porch); (3) the defendant's use of the area; and (4) the steps taken by the defendant to preserve her privacy in this area.⁹⁶ In *Dunn*, the Court found that a barn was not part of the respondent's curtilage because it was sixty yards from the house, outside of the fence surrounding the house, and the officers had good information that the barn was not being used as part of the respondent's home.⁹⁷ Additionally, the Court considered the fact that the respondent had done little to protect the barn area from observation by those standing outside.⁹⁸

The open fields doctrine affects the common-law trespass doctrine and the reasonable expectation of privacy doctrine differently, and this distinction may have an impact on future UAS surveillance cases. In applying the open fields doctrine to the common-law physical trespass test, the Court will examine the physical location of the *government agents*—or perhaps the location of the government's surveillance equipment (i.e., drones)—during the alleged search. Under this test, the government does not engage in a “search” by trespassing into an open field. In applying the open fields doctrine to the reasonable expectation of privacy test, the Court will examine the physical location of the *object of the search* (i.e., the evidence) during the challenged investigation.⁹⁹ Under this test, the government does not engage in a “search” simply by observing evidence found within an open field.

In *Oliver v. United States*, the Court applied the open fields doctrine to the reasonable expectation of privacy test. Police officers did not violate the Fourth Amendment when they trespassed in a privately owned “open field” for several hours without a warrant.¹⁰⁰ The officers eventually found a patch of marijuana plants in a private field over one mile from the petitioner's home, which was otherwise obstructed from view. The lower court found that the petitioner “had done all that could be expected of him to assert his privacy in the area of farm that was searched.”¹⁰¹ Nonetheless, the Supreme Court held that “an individual may not legitimately demand privacy for activities conducted out of doors in fields, except in the area immediately surrounding the home.”¹⁰² The court thus

⁹⁶ *United States v. Dunn*, 480 U.S. 294, 301 (1987).

⁹⁷ *Id.* at 301–02.

⁹⁸ *Id.* at 303. *See also Oliver*, 466 U.S. at 173–75.

⁹⁹ *See United States v. Jones*, 132 S. Ct. 945, 953 (2012).

¹⁰⁰ *See Oliver*, 466 U.S. at 173–75.

¹⁰¹ *Id.* at 173. However, the Supreme Court must not have been satisfied with this lower court finding because it said that fences and “No Trespassing” signs do not effectively bar open fields from public view (even though the police had to go several hundred feet to discover the marijuana, and there was no allegation that the police, in this case, could see the marijuana without trespassing). *See id.* at 179. The Court considered this alleged public visibility central to its holding. *See id.* No doubt, the distinction the Court attempted to draw here was between the assertion of your intention to keep your property private (or, as some would say, invoking your right to privacy), and actually doing all you can to keep your property private (for example, encapsulating your property in a windowless, steel dome).

¹⁰² *Id.* at 178.

analyzed the location of the evidence at issue, not the location of the government agents.

2. *Aerial Surveillance Cases*

The Supreme Court's seminal aerial surveillance cases held that the government did not engage in a Fourth Amendment "search" when it engaged in warrantless aerial surveillance.¹⁰³ The Court applied the *Katz* reasonable expectation of privacy doctrine in each of these cases and declared it unreasonable to expect privacy from a manned aircraft operating at a lawful aerial vantage point. The Court did not apply the *Kyllo* technological trespass doctrine in any of these cases, which might have altered the result.

In *California v. Ciraolo*, the government flew over the respondent's house at an altitude of 1,000 feet in order to inspect the respondent's backyard, which was shielded from view at ground level.¹⁰⁴ The officers, trained in marijuana identification, spotted marijuana plants growing in the backyard.¹⁰⁵ The Court found that the backyard was part of the respondent's curtilage, and that the respondent manifested a subjective expectation of privacy in his backyard.¹⁰⁶ This left the Court to determine whether society was willing to recognize that expectation as reasonable, which it answered in the negative.¹⁰⁷ In making this determination, the Court relied on several important factors: the observation was made from a *lawful public vantage point* within publically navigable airspace, the observations were conducted "in a physically nonintrusive manner," and the observations were made by the *naked eye*.¹⁰⁸

On the same day as *Ciraolo*, the Supreme Court handed down another important warrantless aerial surveillance decision: *Dow Chemical Co. v. United States*.¹⁰⁹ In *Dow Chemical*, the Environmental Protection Agency ("EPA") operated a fixed-wing aircraft at the altitudes of 12,000; 3,000; and 1,200 feet, and utilized a high-resolution aerial mapping camera to investigate and photo-

¹⁰³ See *Florida v. Riley*, 488 U.S. 445 (1989); *California v. Ciraolo*, 476 U.S. 207 (1986); *Dow Chem. Co. v. United States*, 476 U.S. 227 (1986).

¹⁰⁴ *Ciraolo*, 476 U.S. at 209.

¹⁰⁵ *Id.*

¹⁰⁶ *Id.* at 212–14.

¹⁰⁷ *Id.* The Court concluded that observations of the curtilage, made from lawful vantage points, are permissible under the Fourth Amendment:

The Fourth Amendment protection of the home has never been extended to require law enforcement officers to shield their eyes when passing by a home on public thoroughfares. Nor does the mere fact that an individual has taken measures to restrict some views of his activities preclude an officer's observations from a public vantage point where he has a right to be and which renders the activities clearly visible.

Id. at 213.

¹⁰⁸ *Id.*

¹⁰⁹ *Dow Chem. Co. v. United States*, 476 U.S. 227, 228 (1986).

graph a chemical company's industrial complex.¹¹⁰ Dow Chemical Company ("Dow") operated a 2,000-acre chemical plant consisting of "numerous covered buildings, with manufacturing equipment and piping conduits located between the various buildings exposed to visual observations from the air."¹¹¹ Dow took extensive steps to assert its interest in maintaining its privacy and obscure *ground-level* public view of the facility:

At all times, Dow has maintained elaborate security around the perimeter of the complex barring *ground-level* public views of these areas. . . . Dow has not undertaken, however, to conceal all manufacturing equipment within the complex from aerial views. Dow maintains that the cost of covering its exposed equipment would be prohibitive.¹¹²

The Court found the surveillance constitutional, holding that the common-law curtilage doctrine therefore does not apply to a large industrial complex of closed buildings.¹¹³ Unlike *Ciraolo*, the government in *Dow Chemical* conducted aerial surveillance of a constitutionally *unprotected* area, and therefore Dow did not have a reasonable expectation of privacy in the industrial plant.

The district court in *Dow Chemical* found that the government's surveillance camera was "the finest precision aerial camera available," which allowed the EPA to capture "a great deal more than the human eye could ever see."¹¹⁴ However, the camera's precision was not relevant to the Supreme Court's analysis, because the object of the search was not in the suspect's curtilage and the aircraft was in lawful public airspace.¹¹⁵ Therefore, *Ciraolo* and *Dow Chemical* teach that the reasonable expectation of privacy doctrine does not prevent the government, operating at a "lawful" vantage point, from making naked-eye aerial observations of the curtilage or high-resolution camera observations of non-curtilage property.

In *Florida v. Riley*, the Court once again found a warrantless aerial surveillance not to be a "search" under the Fourth Amendment.¹¹⁶ Like *Ciraolo*, the officers could not observe the suspected marijuana crop from ground level.¹¹⁷ The police flew a helicopter twice over the respondent's property only 400 feet above the ground, making *naked-eye* observations of the marijuana through openings in a greenhouse roof and its open sides.¹¹⁸

A plurality of the Court held that the Fourth Amendment does not require the police, traveling in public airways at an altitude of 400 feet, to obtain a war-

¹¹⁰ The Court described this camera as a "standard floor-mounted, precision aerial mapping camera." *Id.* at 229.

¹¹¹ *Id.*

¹¹² *Id.*

¹¹³ *See id.* at 239.

¹¹⁴ *Id.* at 230.

¹¹⁵ *See id.* at 239.

¹¹⁶ *Florida v. Riley*, 488 U.S. 445, 450–51 (1989).

¹¹⁷ *See id.*

¹¹⁸ *See id.* at 448.

rant in order to observe what is visible to the naked eye.¹¹⁹ The plurality reasoned that the respondent should not have left the greenhouse's sides and roof partially open, revealing its interior to helicopter flights in lawful airspace.¹²⁰ Based on the plurality's approach, we do not know what steps a person must take to protect her reasonable expectations of privacy.¹²¹ The plurality in *Riley* further reasoned that "there [was] nothing in the record . . . to suggest that helicopters flying at 400 feet" were so rare that the respondent's expectations of privacy were, in fact, reasonable.¹²² Additionally, there was no evidence that the helicopter interfered with respondent's normal use of his greenhouse, or other parts of his curtilage, as well as no evidence that the police observed "intimate details connected with the use of the home or curtilage . . . [or created] undue noise . . . wind, dust, or threat of injury."¹²³

A critical, undecided issue from *Riley* is whether the lawfulness of the flight alone is enough to validate naked-eye surveillance, or whether the government flight must have occurred in a place in which the public travels at some minimum frequency. A majority of the Court in *Riley* (Justice O'Connor's concurrence and four dissenters) held instead that the proper inquiry is not whether the police flew the aircraft where aircraft lawfully *could* be—unless a defendant can demonstrate that flights were sufficiently *rare*—but

¹¹⁹ *Id.* at 450.

¹²⁰ *Id.* Respondents suggested that police should be required to obtain a warrant for flights below 500 feet, because that is the lowest lawful altitude for fixed-wing aircraft operating in navigable airspace, according to Federal Aviation Administration's ("FAA") regulations. The Court rejected this suggestion, however, because FAA regulations permit helicopters to fly below that limit. The helicopter did not violate FAA regulations, and therefore any member of the public or the police *could* legally have observed the respondent's greenhouse from that altitude. *Id.* at 450–51, 451 n.3.

¹²¹ "To require individuals to completely cover and enclose their curtilage is to demand more than the 'precautions customarily taken by those seeking privacy.'" *Id.* at 454 (O'Connor, J., concurring) (quoting *Rakas v. Illinois*, 439 U.S. 128, 152 (1978) (Powell, J., concurring)). See also *Rakas*, 439 U.S. at 152 ("In considering the reasonableness of asserted privacy expectations, the Court has recognized that no single factor invariably will be determinative. Thus, the Court has examined whether a person invoking the protection of the Fourth Amendment took normal precautions to maintain his privacy—that is, precautions customarily taken by those seeking privacy.").

¹²² *Riley*, 488 U.S. at 451.

¹²³ *Id.* at 452. In contrast, the Court in *Kyllo* held that the Court should not inquire into the quality and nature of the activities observed within the *curtilage*, because this would require the Court to make policy judgments about what details are intimate, and what are not. *Kyllo v. United States*, 533 U.S. 26, 37–38 (2001) ("The Fourth Amendment's protection of the home has never been tied to measurement of the quality or quantity of information obtained. . . . In the home, our cases show, *all* details are intimate details, because the entire area is held safe from prying government eyes. . . . Limiting the prohibition of thermal imaging to 'intimate details' would not only be wrong in principle; it would be impractical in application . . ."). The Court in *Kyllo* may have intended to expressly repudiate the "intimate details" analysis from *Riley*. See Andrew Guthrie Ferguson, *Personal Curtilage: Fourth Amendment Security in Public*, 55 WM. & MARY L. REV. 1283, 1335 (2014) ("*Kyllo*, in fact, seemed to challenge the entire construct of intimate details, calling into question the reasoning in *Florida v. Riley*").

whether the aircraft is somewhere where one might expect it to be with *sufficient regularity*.¹²⁴ Justice Blackmun indicated that he would burden the government with proving that flights are sufficiently regular as to remove a reasonable expectation of privacy.¹²⁵ Justice O'Connor appeared to leave the burden on the defendant to prove that the aircraft did not meet the “sufficient regularity” test.¹²⁶ This issue will become a central question in unmanned aerial surveillance cases.

The Court has not since clarified whether the “sufficient regularity” test is controlling or if law enforcement and lower courts need only consider whether the flight is in publically navigable airspace. And even though a majority of the Court agreed upon the “sufficient regularity” test, there was no consensus as to where the burden of persuasion should rest for this issue. Furthermore, the Court left little guidance on how frequent the flights must be in order to satisfy this test. So it remains to be seen whether the Court would apply this test to a UAS surveillance case, and how it would do so.

Also, if the Court does adopt this test, it is unclear whether it would wholly replace the “lawful airspace” test. In other words, will a surveillance flight comply with the Fourth Amendment if it violates FAA regulations or state privacy law, but nonetheless occurs in airspace frequented by the public with “sufficient regularity”?¹²⁷ Moreover, what if the government uses UAS in a lawful, popular area but in an uncommon manner?¹²⁸ Current case law gives no clear answer.

¹²⁴ Florida v. Riley, 488 U.S. 445, 454 (1989) (O'Connor, J., concurring) (“In determining whether Riley had a reasonable expectation of privacy from aerial observation, the relevant inquiry after *Ciraolo* is not whether the helicopter was where it had a right to be under FAA regulations. Rather, consistent with *Katz*, we must ask 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 is prepared to recognize as reasonable.’”); *id.* at 460 (Brennan, J., dissenting) (“The question before us must be . . . whether public observation of Riley’s curtilage was so commonplace that Riley’s expectation of privacy in his backyard could not be considered reasonable.”); *id.* at 467–68 (Blackmun, J., dissenting) (pointing out that a majority of the Court agrees that the lawfulness of the flight (i.e., compliance with FAA regulations) is irrelevant for Fourth Amendment purposes, and that he would place the burden of proof on the government to disprove the presumption that any helicopter flying below 1,000 feet is rare).

¹²⁵ *Id.* at 468 (Blackmun, J., dissenting).

¹²⁶ See *id.* at 454, 455 (O'Connor, J., concurring) (determining that there was nothing in the record to suggest that the helicopter was in airspace *not* frequented by other helicopters or aircraft—apparently expecting the petitioner to demonstrate that the airspace in question was usually plane-free).

¹²⁷ In other words, if regulatory efforts to control private drone flights fail, will the police nonetheless need to comply with the unenforced drone regulations in order to comply with the Fourth Amendment?

¹²⁸ For example, can the government engage in drone surveillance in airspace frequented by the public but for surveillance if the public does not commonly utilize drones in that area for video recording or photography?

Finally, what types of laws dictate whether certain airspace is “publically navigable” or “lawful”? If the “sufficient regularity” test does not hold sway, the only relevant inquiry will be whether the flight was “lawful”—i.e., whether the flight was in publicly “navigable airspace.”¹²⁹ The Supreme Court and many states recognize a property interest in the airspace above our properties, usually up to about 500 feet.¹³⁰ In some states, such as Nevada, these airspace rights are “subject to intrusion by lawful air flight.”¹³¹ For states without this limitation, flights through someone’s private airspace are likely violations of the state law tort of trespass. This may be enough for the Court to find that the flight was unlawful and therefore a violation of our reasonable expectations of privacy. However, the FAA maintains a potentially conflicting¹³² claim of power to regulate all airspace “from the ground up.”¹³³ Perhaps the only relevant laws to the “publically navigable airspace” calculation are FAA regulations. It remains to be seen whether the flight must merely be “lawful” or if it must occur in airspace frequented by the public with “sufficient regularity.” Both of these tests require further clarification.

In contrast with the aerial surveillance cases, the Court found in *Kyllo v. United States* that the government violated the Fourth Amendment when it peered, from a public place, into otherwise unobservable curtilage by means of technology that was “not in general public use” at the time.¹³⁴ This technology was a thermal imaging device used to gain evidence of suspected marijuana growth within a home; the device detected the increased temperatures within the structure often associated with marijuana growing lights.¹³⁵ In both the aerial surveillance cases and *Kyllo*, the government utilized technology to see inside the home or curtilage, because it could not otherwise view inside without physically trespassing.

Professor Morgan Cloud observed the apparent paradox that arises between the aerial surveillance cases and *Kyllo*:

Flying a helicopter or an airplane at low altitudes so police officers can see into parts of a home or its curtilage that would otherwise be hidden from public view

¹²⁹ The “lawfulness” of a flight will be the exclusive inquiry unless the claimant can prove that the flight was “sufficiently rare in this country to lend substance to [the suspect’s] claim that he reasonably anticipated that his greenhouse would not be subject to observation from that altitude.” *Riley*, 488 U.S. at 451–52 (considering FAA regulations on helicopter flight controlling).

¹³⁰ See *United States v. Causby*, 328 U.S. 256, 263–64 (1946).

¹³¹ *McCarran Int’l Airport v. Sisolak*, 137 P.3d 1110, 1120 (Nev. 2006) (“Thus, the land-owners own the usable airspace above their property up to 500 feet, subject to intrusion by lawful air flight.”).

¹³² Consider the Court’s conclusion in *Causby* that we are to have “exclusive control” of the airspace within the “immediate reaches” of the ground. See *Causby*, 328 U.S. at 264.

¹³³ *Busting Myths*, *supra* note 60 (“The FAA is responsible for air safety from the ground up. . . . [T]he FAA presently has regulations that apply to the operation of all aircraft, whether manned or unmanned, and irrespective of the altitude at which the aircraft is operating.”).

¹³⁴ *Kyllo v. United States*, 533 U.S. 27, 34 (2001).

¹³⁵ *Id.* at 29–30.

is not a search. But using a commercially available machine that only measures the heat emitted from the same house is a Fourth Amendment search.¹³⁶

The most important explanation for this disparity is that the Supreme Court relied on the *Katz* reasonable expectation of privacy test for the aerial surveillance cases, but relied on an expansion of the common-law trespass doctrine for *Kyllo*. Another possibly relevant distinction between these cases is that the police utilized a unique *means* of observation in *Kyllo*, but simply utilized a unique *vantage point* in the aerial surveillance cases. In a UAS case, the government will do both.

Based on the aerial surveillance cases, the *Katz* reasonable expectation of privacy doctrine appears to allow the government, without a warrant, to fly aircraft in areas accessible to the public in order to make *naked-eye* observations of the curtilage and high-resolution observations of open fields; the government, however, might be restricted to flying only in airspace in which the public flies with “sufficient regularity.” Nonetheless, it is quite unclear, based on these cases, what the Fourth Amendment allows regarding *unmanned aircraft*, which cannot make naked-eye observations, which normally fly at much lower altitudes than manned aircraft, which achieve much more revealing vantage points into windows and other parts of the curtilage, and which will soon be much more common than helicopters or airplanes in low-altitude airspace (absent sufficiently enforced legislation).

3. *The Public Exposure Doctrine*

Generally, the government does not engage in an unreasonable “search” when it inspects something that a suspect “knowingly” exposes to the public. In *Katz*, the Court declared, “What a person knowingly exposes to the public, even in his own home or office, is not a subject of Fourth Amendment protection.”¹³⁷ In *Smith v. Maryland*, the police did not engage in a “search” when they installed a “pen register” to record the phone numbers that a suspect dialed, which led to incriminating evidence.¹³⁸ Even though the suspect exhibited a subjective expectation of privacy in these numbers, the Court held that such an expectation was not one that society would deem reasonable.

Similarly, in *United States v. Knotts*, the Court held that one does not have a reasonable expectation of privacy on a public road.¹³⁹ The Supreme Court

¹³⁶ Morgan Cloud, *Rube Goldberg Meets the Constitution: The Supreme Court, Technology and the Fourth Amendment*, 72 MISS. L.J. 5, 7–8 (2002) (footnotes omitted).

¹³⁷ *Katz v. United States*, 389 U.S. 347, 351 (1967). The Supreme Court relied on this quote from *Katz*, in part, in *California v. Ciraolo*, one of the aerial surveillance cases. See *California v. Ciraolo*, 476 U.S. 207, 213–14 (1986) (quoting *Katz* and finding that marijuana growth in a suspect’s backyard was “knowingly exposed” to members of the public traversing the sky).

¹³⁸ *Smith v. Maryland*, 442 U.S. 735, 744 (1979) (“[P]etitioner assumed the risk that the company would reveal to police the numbers he dialed.”).

¹³⁹ *United States v. Knotts*, 460 U.S. 276, 281 (1983).

found that the surveillance in this case amounted principally to “the following of an automobile on public streets and highways.”¹⁴⁰ In relevant part, the Court held that “[a] person traveling in an automobile on public thoroughfares has no reasonable expectation of privacy in his movements from one place to another. When [the suspect] traveled over the public streets he *voluntarily conveyed*” the details of his travels.¹⁴¹

The Supreme Court in *California v. Ciraolo* and *Florida v. Riley* (the aerial surveillance cases) could have relied on this “public exposure” doctrine: the suspects in those cases “knowingly exposed” contents in their curtilage to members of the public flying at lawful aerial vantage points.¹⁴² After all, the Court has analogized airspace to a public highway.¹⁴³ But in *Knotts*, the defendants themselves were personally present on the public highways. In the aerial surveillance cases, only *the government* was on the “public highway”—the evidence was located in constitutionally protected areas. What *Knotts*, *Ciraolo*, and *Riley* have in common is that the government found incriminating evidence located in places somewhat exposed to observation from a public vantage point. In sum, it is unclear whether the public exposure doctrine would apply to observations of the interior of the home or curtilage by a low-flying, nearby drone.

D. *The Technological Trespass Doctrine*

The most important precedent for a warrantless UAS surveillance case, even more so than the aerial surveillance cases, may be *Kyllo v. United States*.¹⁴⁴ *Kyllo* is an expansion of the definition of “trespass” under the common-law trespass doctrine of the Fourth Amendment: even if a government agent does not enter into a constitutionally protected area with her physical person, she nonetheless engages in an unconstitutional trespass where she, without a warrant, “obtain[s] by sense-enhancing technology any information regarding the home’s interior that could not otherwise have been obtained without physical ‘intrusion into a constitutionally protected area,’ . . . at least where . . . the

¹⁴⁰ *Id.* Then the Court cited its previous holding that one has a “lesser” expectation of privacy in a motor vehicle,

One has a lesser expectation of privacy in a motor vehicle because its function is transportation and it seldom serves as one’s residence or as the repository of personal effects. A car has little capacity for escaping public scrutiny. It travels public thoroughfares where both its occupants and its contents are in plain view.

Id. (quoting *Cardwell v. Lewis*, 417 U.S. 583, 590 (1974)).

¹⁴¹ *Id.* (emphasis added).

¹⁴² See *Florida v. Riley*, 488 U.S. 445, 449–50 (1989); *California v. Ciraolo*, 476 U.S. 207, 213–14 (1986).

¹⁴³ See *United States v. Causby*, 328 U.S. 256, 264 (1946).

¹⁴⁴ *Kyllo v. United States*, 533 U.S. 26 (2001).

technology in question is not in general public use.”¹⁴⁵ The Court in *Kyllo* declared,

It would be foolish to contend that the degree of privacy secured to citizens by the Fourth Amendment has been entirely unaffected by the advance of technology. For example, . . . the technology enabling human flight has exposed to public view (and hence, we have said, to official observation) uncovered portions of the house and its curtilage that once were private. The question we confront today is what limits there are upon this power of technology to shrink the realm of guaranteed privacy.¹⁴⁶

The Court in *Kyllo* thus sought to create a Fourth Amendment doctrine better suited to address emerging surveillance technologies. In *Kyllo*, federal agents observed the interior of a home with a thermal-imaging device that was not in general public use.¹⁴⁷ The federal agents observed the home from across the street (a public vantage point), and observed that part of the home was substantially warmer than neighboring homes.¹⁴⁸ From this information, and other evidence, the agents obtained a warrant and discovered an indoor marijuana growing operation.¹⁴⁹ The Court held that this was an unconstitutional search: “Where, as here, the Government uses a device that is not in general public use, to explore details of the home that would previously have been unknowable without physical intrusion, the surveillance is a ‘search’ and is presumptively unreasonable without a warrant.”¹⁵⁰

The Court explained, “‘At the very core’ of the Fourth Amendment ‘stands the right of a man to retreat into his own home and there be free from unreasonable governmental intrusion.’ With few exceptions, the question whether a warrantless search of a home is reasonable and hence constitutional must be answered no.”¹⁵¹ The Court then explored the difference between its new holding in *Kyllo* and the common-law physical trespass doctrine. The Court admitted that under the common law, “[v]isual surveillance was unquestionably lawful because ‘the eye cannot by the laws of England be guilty of a trespass.’”¹⁵² However, the Court determined that an expansion of the common-law trespass doctrine was both proper and necessary in light of new surveillance technology.

Justice Scalia, writing for the Court, also explored the weakness of the *Katz* reasonable expectation of privacy test in protecting against new police surveillance techniques.¹⁵³ The Court pointed out that “[t]he *Katz* test . . . has often

¹⁴⁵ See *id.* at 28 (citation omitted) (quoting *Silverman v. United States*, 365 U.S. 505, 512 (1961)).

¹⁴⁶ *Id.* at 33–34 (citation omitted).

¹⁴⁷ *Id.* at 29–30, 40.

¹⁴⁸ *Id.* at 30.

¹⁴⁹ *Id.*

¹⁵⁰ *Id.* at 40.

¹⁵¹ *Id.* at 31 (citations omitted) (quoting *Silverman v. United States*, 365 U.S. 505, 511 (1961)).

¹⁵² *Id.* at 31–32 (quoting *Boyd v. United States*, 116 U.S. 616, 628 (1886)).

¹⁵³ See *id.* at 34.

been criticized as circular, and hence subjective and unpredictable.”¹⁵⁴ Furthermore, the Court observed that it had previously “applied [*Katz*] to hold that a Fourth Amendment search does *not* occur—even when the explicitly protected location of a *house* is concerned,” referencing two of the aerial surveillance cases.¹⁵⁵ The *Kyllo* majority apparently believed that its new technological trespass doctrine would be better suited to stop the diminution of privacy rights by technology.

Surely, the technological trespass doctrine takes at least a small step to prevent the age of advancing technology from erasing our currently enjoyed protections under the Fourth Amendment. However, the “not in general public use” dicta from *Kyllo* remains an important limitation of this doctrine, and may reduce the effectiveness of this test to protect privacy rights from technologies that have diffused into the public sphere.¹⁵⁶ Many electronic surveillance technologies, like drones, may soon be in “general public use,” if they are not already. Thus, this limitation may expose the *Kyllo* technological trespass doctrine to the exact same trouble as the *Katz* reasonable expectation of privacy test, diminishing its protections when technologies become popular.¹⁵⁷ But even if the Supreme Court adopts the “not in general public use”¹⁵⁸ limitation in cases going forward, litigants might still convince the Supreme Court that the gov-

¹⁵⁴ *Id.*

¹⁵⁵ *Id.* at 33 (first citing *California v. Ciraolo*, 476 U.S. 207, 211 (1986); and then citing *Florida v. Riley*, 488 U.S. 445 (1989)).

¹⁵⁶ See Villasenor, *supra* note 33, at 487–89 (concluding that a “not in general public use test” will diminish our privacy upon the proliferation of UAS platforms). On the other hand, some would argue, as would I, that it is still possible, under *Kyllo*, that the Court could extend the technological trespass doctrine to proscribe some technology that *is* in general public use, especially because such a case was not before the Court in *Kyllo*. See *id.* at 488 (“[T]o conclude from *Kyllo* that use of a widely available technology to examine a home will necessarily be constitutional is not an entirely fair reading of Justice Scalia’s opinion.”).

¹⁵⁷ Justice Stevens, dissenting in *Kyllo*, argued that the Court’s new standard in *Kyllo* would diminish privacy protection as “intrusive equipment becomes more readily available.” See *Kyllo*, 533 U.S. at 47 (Stevens, J., dissenting). Of course, this is the exact same trouble that the *Katz* test will suffer, because one’s expectations of privacy are certainly less reasonable when a particular means of surveillance becomes increasingly common in the private sector. In *Florida v. Riley*, a majority of the Court held that a surveillance flight in lawful airspace would nonetheless be a “search” unless the aircraft flew in an area in which the public operates with “sufficient regularity.” See *Florida v. Riley*, 488 U.S. 445, 454 (1989) (O’Connor, J., concurring); *id.* at 460 (Brennan, J., dissenting, with whom Marshall, J., and Stevens, J., join); *id.* at 467–68 (Blackmun, J., dissenting).

¹⁵⁸ The Court in *Kyllo* did not expressly declare how it would rule on a future case in which the technology in question *was* in general public use—to do so would have been dicta because such a case was not before the Court. However, the Court did self-limit its holding in *Kyllo* to the situation in which the technology is *not* in general public use. See *Kyllo*, 533 U.S. at 34.

ernment's specific use of the technology is nonetheless a technological trespass when the government uses it in a manner uncommon of the public.¹⁵⁹

In sum, under the *Kyllo* technological trespass doctrine, the government "trespasses" into the curtilage of a home, thus engaging in a "search," when it utilizes sense-enhancing technology—even from a public vantage point—to gain information about the interior of the home that would otherwise only be attainable via a physical intrusion (at least where the technology is not in general public use). Defendants subject to warrantless UAS surveillance of their homes might successfully argue that the surveillance is an unconstitutional search under the *Kyllo* technological trespass doctrine, discussed *infra* in Part III, Section C.

III. APPLICATION OF MODERN FOURTH AMENDMENT JURISPRUDENCE TO WARRANTLESS UAS SURVEILLANCE

In the coming years, it is likely that courts will be asked to decide the constitutionality of warrantless UAS surveillance of the home or curtilage. In the typical scenario, the UAS might wield a high-resolution camera, or instead a lower-resolution camera that mimics 20/20 naked-eye capabilities. The situation I explore below is one in which the drone flies at a relatively low altitude compared to the lawful flight capabilities of manned aircraft—say approximately 100 feet from the ground. The drone will be able to achieve unique vantage points previously impractical or unattainable by ground or manned flight observations. The drone might even fly directly above the suspect's yard or home. Perhaps the drone will fly as low as eye-level over the suspect's property, or from public airspace above the street or a park.

Some drones may have the capability to remain aloft for extended periods of time, revealing a different set of information that short-term or momentary aerial observation could not reveal (i.e., daily or weekly routine information). Some drones will be loud, large, and quite conspicuous, but others will be entirely inconspicuous to the untrained eye, no larger than a hummingbird or bee.¹⁶⁰ On some drones, the government might equip advanced imaging technology, such as thermal imaging.¹⁶¹

¹⁵⁹ For example, if state and local legislatures ban the public from spying on one another with drones, and effectively enforce these laws, there is little reason to hold that the Fourth Amendment allows the government to engage in such conduct without a warrant.

¹⁶⁰ See discussion *supra* Part I.A.

¹⁶¹ In addition to imaging technology, it is theoretically possible for the police to equip "laser microphone[s]" onto drones, which allow users to pick up audio occurring within a home. See Arthur, *supra* note 35. However, the Supreme Court warned in *Dow Chemical* that such technology would raise serious constitutional questions, "An electronic device to penetrate walls or windows so as to hear and record confidential discussions of chemical formulae or other trade secrets would raise very different and far more serious questions." *Dow Chem. Co. v. United States*, 476 U.S. 227, 239 (1986).

Both manned aircraft surveillance and drone surveillance occur from up in the sky, but the similarities between these surveillance techniques end there. Drones can fly lower, closer, and quieter—offering investigators unique vantage points into the home and curtilage. Further, drones are significantly cheaper than helicopters and airplanes, and will soon be able to remain aloft for much longer. For these reasons, drones present an unprecedented challenge to individual privacy.

A. *The Jones Physical Trespass Analysis*

The *Jones* common-law physical trespass test will probably not invalidate a UAS surveillance, unless the government flies the drone at very low altitude, such as within and below the backyard walls (i.e., below ten feet) or just a few feet from a home window.¹⁶² Although we do have property rights several hundred feet above our homes,¹⁶³ the airspace above a certain height and beyond a very short distance from the house will almost certainly *not* receive Fourth Amendment protection. Whether a drone entered constitutionally protected airspace will depend on whether it is part of the “curtilage” of the home, which the Court determines by applying the four *Dunn* factors: (1) the physical proximity of the area to the home; (2) whether the area is inside an enclosure surrounding the home; (3) the property-owner’s use of this area; and (4) the steps the property-owner has taken to preserve her privacy in this area.¹⁶⁴ Therefore, the physical trespass analysis is wholly irrelevant unless the drone flies within the curtilage.¹⁶⁵ Also, if the drone trespasses in the airspace owned by a third

¹⁶² As discussed above in Part I.A, there are drones currently in development that will be the size of a hummingbird, and some even the size of bees. See Ravindran, *supra* note 29; *The Surveillance Hummingbird*, *supra* note 27. Whether by the *Jones* doctrine or *Katz*, the police might violate the Fourth Amendment simply by flying a drone into the very-low altitude (a few feet) airspace directly above our house and other areas of the curtilage. See *United States v. Causby*, 328 U.S. 256, 264 (1946) (“We have said that the airspace is a public highway. Yet it is obvious that if the landowner is to have full enjoyment of the land, he must have exclusive control of the immediate reaches of the enveloping atmosphere.”); Villasenor, *supra* note 33, at 491 (noting that based on *Causby*, “it could be argued that a warrantless government-operated UAS that dips into a backyard at eye level to obtain photographs into the house through a back window would be operating outside of public navigable airspace, and that the images it acquired would be unconstitutional for that reason (among others).”).

¹⁶³ *Causby*, 328 U.S. at 264–65; *McCarran Int’l Airport v. Sisolak*, 137 P.3d 1110, 1120 (Nev. 2006).

¹⁶⁴ *Dunn* concerned a barn that was sixty yards from the suspect’s house, and the Court determined that it was not part of the “curtilage” of the home. *United States v. Dunn*, 480 U.S. 294, 301–02 (1987).

¹⁶⁵ *Causby*, 328 U.S. at 260–61, 264 (declaring the “ancient doctrine” at common law, that one’s ownership of his land extended to the periphery of the universe, has no place in the modern world, but instead held that “[t]he landowner owns at least as much of the space above the ground as the [sic] can occupy or use in connection with the land.”). Due to the quality of cameras that are easily attachable to drones, there is no reason to presume the drone must fly directly over our backyards or homes—they might fly from over the street or a nearby park.

party, the defendant would not be able to exclude this evidence even if the airspace was part of the third party's "curtilage."¹⁶⁶ Therefore, for a UAS surveillance case, the central question under the common-law physical trespass analysis will be whether the airspace in which the drone flies is part of the home's "curtilage."¹⁶⁷

1. Above Roof-Level Flight

First, let us consider the airspace directly above the house and backyard, and above the altitude of the roof of the house, up to 100 feet. Because the property in question in *Dunn* was over sixty yards from the house, *Dunn* might stand for the proposition that sixty yards from the house is too far.¹⁶⁸ But *Dunn* teaches that the distance from the house is only one factor among many.¹⁶⁹ One hundred yards is probably too far to be within the curtilage, but the airspace immediately above the roof may be close enough to satisfy the "physical proximity" *Dunn* factor. Nonetheless, this airspace is not part of the curtilage because it does not satisfy the other three *Dunn* factors. First, the airspace higher than a house is not within an enclosure surrounding the home. Second, people do not use this private airspace for the sort of intimate things as they would the interior of a home. Private airspace may have some reasonable private uses, but these uses are akin to those of an open field—best for hobby or consumer purposes. People do not use their airspace for the intimate activities normally associated with the "curtilage" of the home.¹⁷⁰

Finally, it would be interesting to see how anyone could take steps to preserve the privacy of their private airspace, unless they erected 500-foot tall nets or fences to prevent drones from trespassing.¹⁷¹ For all of these reasons, the air-

¹⁶⁶ See *Minnesota v. Carter*, 525 U.S. 83, 89 (1998) ("The text of the Amendment suggests that its protections extend only to people in 'their' houses.").

¹⁶⁷ See Sean M. Kilbane, Note, *Drones and Jones: Rethinking Curtilage Flyover in Light of the Revived Fourth Amendment Trespass Doctrine*, 42 CAP. U. L. REV. 249, 280 (2014) ("In aerial surveillance cases, the ultimate decision as to whether vertical curtilage of the home receives such protection depends on if the Supreme Court declares vertical curtilage of the home to be a constitutionally protected area."). This author uses the term "vertical curtilage" to describe the airspace above our homes for which we have property rights. I do not agree with the use of the term "vertical curtilage," which seems to conclude that the airspace above our homes is part of the curtilage—an assumption that is probably wrong.

¹⁶⁸ See *Dunn*, 480 U.S. at 302.

¹⁶⁹ See *id.* at 301–03.

¹⁷⁰ Additionally, like an open field, the Court will not find private airspace to be an "effect," which is currently limited to tangible personal property (i.e., chattels). See *Oliver v. United States*, 466 U.S. 170, 176 (1984) (finding that open fields are not "effects").

¹⁷¹ Boeing just developed a laser weapon designed to incinerate drones. See *Silent Strike: Boeing's Compact Laser Weapons System Tracks and Disables UAVs*, BOEING (Aug. 27, 2015) <http://www.boeing.com/features/2015/08/bds-compact-laser-08-15.page>. Also, a company named "DroneShield" provided an electronic means of drone enforcement—or at least drone detection. See Shawn Musgrave, *Boston Police Set Up 'Drone Shields' Along the 2015 Marathon Route*, MOTHERBOARD (Apr. 22, 2015, 12:20 PM), motherboard.vice.com/read/boston-police-set-up-drone-shields-along-the-2015-marathon-route. DroneShield set up

space above our homes is not part of its “curtilage.” Therefore, the government does not engage in a “search” just because it trespasses into one’s private airspace higher than the roof of her house. Even though this very well may constitute a trespass at common law, it does not result in a violation of the Fourth Amendment under the physical trespass analysis.

Notwithstanding, some scholars argue that the *Jones* common-law trespass doctrine will play a critical role in a UAS surveillance case.¹⁷² One commentator concluded that the Supreme Court might invoke the *Jones* physical trespass test to invalidate government UAS surveillance, believing the airspace above the landowner’s property to be “vertical curtilage.”¹⁷³ However, the “open fields doctrine” precludes this conclusion¹⁷⁴ in the airspace above the height of the roof of our homes.¹⁷⁵ However, the airspace below the roof, and within the perimeter of our property walls, might be part of the home’s “curtilage.”

sensing devices around the Boston Marathon course to attempt to detect any drones flying in the area. *Id.* DroneShield also offers law enforcement net guns, which are essentially shot-guns that shoot nets into the air for the purpose of taking down a drone. *See id.* Or, venturing near the world of science fiction, perhaps one could disable a drone by some form of electromagnetic pulse that disables electronics. *See* Nic Halverson, *Drone Missile Kills Electronics, Not People*, DISCOVERY NEWS, (Oct. 26, 2012, 1:04 PM), <http://news.discovery.com/tech/champ-drone-emp-121026.htm> (discussing a weapon Boeing is working on that disables electronics by firing a burst of high power microwaves).

¹⁷² *See* Villasenor, *supra* note 33, at 495–97. For an excellent overview of Fourth Amendment doctrine and how *Jones* may apply to a drone surveillance case, see Kilbane, *supra* note 167, at 280–81 (concluding that the Court will invoke the *Jones* doctrine to hold police drone surveillance unconstitutional because a drone fly-over is a trespass upon a homeowner’s airspace property rights).

¹⁷³ *See* Kilbane, *supra* note 167, at 280–81 (concluding that the Court must find the “vertical curtilage” of the home to be a constitutionally protected area due to *Jones* and the Fourth Amendment’s historical context).

¹⁷⁴ All property rights grant “exclusive control” of the land or property to the property owner, but the idea of “exclusive control” is not paramount to having a *Fourth Amendment* right in the property, which we only enjoy in our “persons, houses, papers, and effects” and those things logically derived from that list.

¹⁷⁵ “Quite simply, an open field, unlike the curtilage of a home is not one of those protected areas enumerated in the Fourth Amendment.” *United States v. Jones*, 132 S. Ct. 945, 953 (2012) (citation omitted). Despite the fact that *Jones* revived strict protection of our home and curtilage, persons, papers, and effects, we are still left with no constitutional protection against government trespass on our non-curtilage real property. In *Jones*, Justice Scalia assured us of the continuing vitality of the “open fields doctrine” under the common-law trespass doctrine by distinguishing the strict protection for “effects” by the Fourth Amendment from the Amendment’s failure to protect our non-curtilage real property:

[T]he Fourth Amendment is [not] concerned with “any technical trespass that led to the gathering of evidence.” The Fourth Amendment protects against trespassory searches only with regard to those items (“persons, houses, papers, and effects”) that it enumerates. The trespass that occurred in *Oliver* may properly be understood as a “search,” but not one “in the constitutional sense.”

Id. at 953 n.8.

2. *Eye-Level Altitude Flights*

The *Dunn* factors most favor constitutional protection of the extremely low airspace above private property, such as the airspace at eye level in the backyard (or within a few feet of someone's home window). This airspace is probably part of the curtilage of the home. First, this airspace is in close proximity to the home. Second, the lower the flight, the more likely the airspace is within an enclosure surrounding the home (especially if flying below the level of the wall in the backyard, or at least below any trees in the backyard). Third, property owners certainly use the low-altitude airspace in their yards for intimate private purposes—it is where they walk through their backyard curtilage, erect structures, and simply enjoy the fresh air in the privacy of their property.

However, it is hard to predict how a landowner might take steps to preserve the privacy of this airspace.¹⁷⁶ But inquiring into whether the homeowner took steps to preserve the privacy of the airspace itself should be irrelevant for the purposes of the Fourth Amendment, and shows one of the weaknesses of the common-law physical trespass test. Rather than preserving the privacy of the airspace itself, the homeowner will almost certainly have taken steps to preserve the privacy of that which is viewable *from* that airspace and below. But under the common-law physical trespass test, the only relevant question is the location of the government's drone, not the subject of the search.¹⁷⁷ Nonetheless, the sum total of the factors—and common sense—dictates that a drone hovering at about eye level in one's backyard is within the curtilage.

3. *Mid-Altitude Flights (Above Eye-Level, Below Roof-Level)*

Whether the airspace directly above private property, below the altitude of the house's roof, and above the backyard walls (somewhere between ten and thirty feet above the ground) is a constitutionally protected area is quite unclear. This is a constitutional shade of gray, but the answer is probably no. Although the airspace is quite close to the home, it is a stretch to say it is "within" an enclosure surrounding the home. The airspace is closer to the home than that which is above the roof of the house, which weighs in favor of constitutional protection. But it is hard to imagine how a homeowner can take steps to preserve the privacy of this airspace. And perhaps most importantly, this airspace

¹⁷⁶ There actually may be ways to preserve the privacy of one's airspace from physical intrusion. For example, a recent technology allows homeowners to register their address in a database that will be programmed into future drones, which should block the drone from entering the airspace above their property. See Lily Hay Newman, *Here's How to Set Up a No-Fly Drone Zone Over Your House*, SLATE: FUTURE TENSE (Feb. 10, 2015, 6:16 PM), http://www.slate.com/blogs/future_tense/2015/02/10/noflyzone_org_lets_you_geofence_the_area_over_your_house_for_drones_to_avoid.html.

¹⁷⁷ The technological trespass doctrine expands upon the common-law trespass doctrine to invalidate certain government surveillances of the interior of the home taken from outside the home. The next section considers this doctrine, which does not rely on the location of the surveillance equipment itself.

is simply not used for the intimate, private activities enjoyed within one's home—for which the constitution grants protection. The airspace might have some occasional private use, such as to grow a tree or build a tree house (this will vary on a case-by-case basis), but on the whole these uses are not meaningfully different from our uses for “open fields.” Therefore, this mid-altitude airspace is probably not in the curtilage.

4. *Common-Law Trespass Conclusion*

In most cases then, the Court will not find that drone surveillance is a “search” based on the *Jones* physical trespass analysis, unless the drone flies very low or within the immediate reaches of a house.

B. *The Katz Reasonable Expectation of Privacy Analysis*

Likewise, the *Katz* reasonable expectation of privacy doctrine probably will not invalidate drone surveillance unless the drone flies at an uncommonly intrusive vantage point. The *Katz* test grants a Fourth Amendment right to our “reasonable expectations of privacy,” requiring that (1) the suspect harbor a subjective (actual) expectation of privacy, and (2) this expectation be one that society is prepared to recognize as reasonable.¹⁷⁸ Private, low-altitude drone flights are becoming increasingly common, as is drone-spying between members of the public.¹⁷⁹ As a result, our “reasonable expectations of privacy” from most of the common uses of drones, including filming at low altitudes, are probably eroding.

If the Supreme Court does not address whether a UAS flight occurs in airspace frequented by the public with “sufficient regularity,” and instead limits the inquiry into whether the flight is “lawful,”—or in “publically navigable airspace”—the flight might be unconstitutional if it crosses into privately owned airspace. However, since some states, like Nevada, limit these property rights to be “subject to intrusion by lawful air flight,”¹⁸⁰ an otherwise lawful flight through the private airspace will not constitute a tort. Therefore, in such states, the only relevant inquiries into a flight's “lawfulness” would be applicable FAA regulations and any drone laws¹⁸¹ enacted in the coming years. Or the Court might wholly ignore whether the flight constituted a trespass under the reasonable expectation of privacy test, and consider only whether the flight complied with FAA regulations.

Drone flights may be “unlawful” under the Supreme Court aerial surveillance cases. The government likely will not run afoul of the FAA's operational regulations (i.e., altitude and location requirements), but may very well conflict

¹⁷⁸ *Katz v. United States*, 389 U.S. 347, 361 (1967) (Harlan, J., concurring).

¹⁷⁹ See discussion *supra* Part I.C and notes 3–5 and accompanying text.

¹⁸⁰ *McCarran Int'l Airport v. Sisolak*, 137 P.3d 1110, 1120 (Nev. 2006).

¹⁸¹ Those specifically controlling *private* conduct, not the conduct of the police. The law must control private conduct because that affects our reasonable expectation of privacy.

with future FAA or state *privacy* regulations. Effective enforcement of a law that prevents the public from using drones to spy could preserve a reasonable expectation of privacy from drones. Thus the government will need to obey these privacy laws in order to comply with the Fourth Amendment under *Katz*, even if the laws expressly exempt law enforcement. So under the “lawful flight” analysis alone, the government will not violate our reasonable expectation of privacy with a UAS surveillance that complies with drone flight regulations unless these regulations include privacy protections that preclude home surveillance.

But a majority of the Court in *Riley* held that the government’s surveillance flights must be limited to areas in which members of the public actually fly with sufficient regularity.¹⁸² If this is the sole question, and the lawfulness of the flight is irrelevant, then our reasonable expectations of privacy rely on the success of drone flight and privacy regulation *enforcement*. If drone laws are insufficiently enforced, and privacy-diminishing drone flights remain “sufficiently regular,” then we will not have a reasonable expectation of privacy from them. But if the Court considers both the lawfulness of the flight *and* whether such flights are sufficiently regular, then the lawlessness of the flight alone may be enough to invalidate the flight. Under the current lack of drone laws, though, UAS flight likely will not violate the reasonable expectation of privacy doctrine wherever drone flights are currently common (such as neighborhoods in major cities), but a drone flight will violate our reasonable expectations of privacy in places where drones are not sufficiently regular (perhaps in more rural towns).

Further, there are several other considerations the Court will likely make when considering the constitutionality of a UAS surveillance of the interior of someone’s home or curtilage. The subjects of drone surveillance will have to argue that they were within a constitutionally protected area and that they did not knowingly expose themselves to a low altitude device peering into their home or backyard. For example, a person who the government films within her house through a sunroof or a second story window might argue that she did not knowingly expose herself through that window because she did not reasonably expect a person or filming device to fly-by—at least not one that would be close enough to observe her with any detail. This claim, of course, becomes increasingly tenuous as drones proliferate amongst private consumers, and we come to expect their presence. How might a defendant successfully claim that she had a reasonable expectation of privacy from a commonly used, unregulated¹⁸³ technology?

A controlling question will be how private and commercial users commonly use drones. This important factor drives our “reasonable expectations of pri-

¹⁸² See *Florida v. Riley*, 488 U.S. 445, 454 (1989) (O’Connor, J., concurring); *id.* at 460 (Brennan, J., dissenting, with whom Marshall, J., and Stevens, J., join); *id.* at 467–68 (Blackmun, J., dissenting).

¹⁸³ Or, more likely in the future, unregulated due to lack of effective drone regulation enforcement.

vacy.” In the light of unclear law, private drones will continue to fly generally unfettered. The FAA currently maintains a right to ban *commercial* use of drones without a Certificate of Waiver or Authorization (“COA”), but does not require approval or a waiver for hobby drone flying. The FAA “strongly encourage[s]” UAS hobbyists to follow the agency’s UAS safety guidelines,¹⁸⁴ but the agency says little about flying around people’s homes. As long as private hobby drone operators safely fly drones below 400 feet,¹⁸⁵ they appear to have little reason to worry about federal regulations at the present time.

What about state and local regulations? Many states have enacted, or are considering enacting, drone regulations.¹⁸⁶ And laws already exist that may already proscribe private drone spying. For example, a creative California prosecutor might charge a private drone-using peeping tom with a misdemeanor under existing privacy laws.¹⁸⁷

If enforcement of drone privacy regulations proves inadequate, and the public continues to engage in intrusive drone activities largely unfettered, do we still have a reasonable expectation of privacy from drone flights? This is where conflict emerges between the plurality’s approach in *Riley*, which requires the government’s flight to simply be “lawful,”¹⁸⁸ and the O’Connor approach agreed upon by a majority of the *Riley* Court, which would require the government’s flight to occur in a place frequented by private citizens with “sufficient regularity.”¹⁸⁹

The popularity of drones for private and commercial use leaves it in the hands of legislators and law enforcement to regulate where and how the public fly drones. Unfortunately, enforcing drone flight regulations will probably present a severe challenge. On one hand, there may be a federalism problem. Whose job is it to promulgate and enforce such drone regulations, which implicate national, state, and local concerns? Does the FAA have exclusive authority to regulate anything above the ground? Or can state and local governments enact and enforce laws to protect the safety and privacy of their citizens?¹⁹⁰

¹⁸⁴ See *Model Aircraft Operations*, FED. AVIATION ADMIN., <https://www.faa.gov/uas/model-aircraft> (last modified Mar. 4, 2015, 1:17 PM).

¹⁸⁵ See FED. AVIATION ADMIN., *supra* note 66.

¹⁸⁶ See *supra* note 71 and accompanying text.

¹⁸⁷ See *supra* note 7 and accompanying text. See also *Drone Leads to Criminal Case Over Privacy in Middle Tennessee*, LOCAL8NOW.COM (June 2, 2015, 6:53 PM), <http://www.local8now.com/home/headlines/Drone-leads-to-criminal-case-over-privacy-in-Middle-Tennessee-305910091.html>.

¹⁸⁸ See *Florida v. Riley*, 488 U.S. 445, 450–51 (1989).

¹⁸⁹ See *id.* at 454 (O’Connor, J., concurring); *id.* at 460 (Brennan, J., dissenting, with whom Marshall, J., and Stevens, J., join); *id.* at 467–68 (Blackmun, J., dissenting).

¹⁹⁰ “[T]he protection of a person’s *general* right to privacy—his right to be let alone by other people—is, like the protection of his property and of his very life, left largely to the law of the individual States.” *Katz v. United States*, 389 U.S. 347, 350–51 (1967) (footnote omitted).

There are also practical limitations to drone regulation.¹⁹¹ Will federal agents really have the resources to pursue a meaningful number of reported violations of federal drone regulations by private hobbyists? Even on the local level, the stealth manner in which users can operate their drones might prove to be a significant obstacle to local law enforcement. Drones provide a particularly effective way to spy while avoiding personal detection. Even when the location of the drone itself is conspicuous, the operator herself might fly the drone from an out-of-sight position, using first person view (“FPV”),¹⁹² or she could sneakily fly the drone by line-of-sight¹⁹³ from a well-concealed location. Currently, NASA and Verizon Wireless are exploring a potentially promising enforcement solution: using cell phone towers to track drones.¹⁹⁴ And the military is exploring other enforcement solutions.¹⁹⁵

But if drone privacy laws are not enacted, or not adequately enforced against private drone operators, courts may simply cite how private hobbyists and commercial users fly drones around our neighborhoods with “sufficient regularity,” thus destroying any reasonable expectation of privacy from drones. Alternatively, the Court might take the plurality’s approach in *Riley*, citing the lawfulness of the drone flight, and affirming that we have no reasonable expectation of privacy from observations made from a lawful vantage point—at least by the naked eye.¹⁹⁶ A low-resolution camera on a drone might be equivalent to the naked eye.

However, the equation changes if the government attaches more advanced imaging equipment on the drone, or if it flies in entirely uncommon or unlawful airspace. For example, if the government equips the drone with a thermal imaging camera, the Court could resolve the case under the *Kyllo* technological trespass standard, likely deeming the surveillance unconstitutional.¹⁹⁷ Or if the

¹⁹¹ See Craig Whitlock, *Near-Collisions Between Drones, Airlines Surge*, *New FAA Reports Show*, WASH. POST (Nov. 26, 2014), http://www.washingtonpost.com/world/national-security/near-collisions-between-drones-airliners-surge-new-faa-reports-show/2014/11/26/9a8c1716-758c-11e4-bd1b-03009bd3e984_story.html (“The aviation-safety agency lacks the manpower to police airports or effectively track down offenders. Only a handful of rogue drone operators have been apprehended or penalized across the country.”).

¹⁹² See, e.g., *Parrot Bebop Drone*, PARROT, <http://www.parrot.com/usa/products/bebop-drone> (last visited Nov. 24, 2015).

¹⁹³ FAA guidance says that hobby drone operators should fly drones within visual line of sight. *UAS Frequently Asked Questions*, *supra* note 2.

¹⁹⁴ Mark Harris, *NASA and Verizon Plan to Monitor U.S. Drone Network from Phone Towers*, GUARDIAN (June 3, 2015, 11:39 AM), <http://www.theguardian.com/technology/2015/jun/03/verizon-nasa-drones-cellphone-towers>.

¹⁹⁵ See Richard Whittle, *Military Exercise Black Dart to Tackle Nightmare Drone Scenario*, N.Y. POST (July 25, 2015, 4:00 PM), <http://nypost.com/2015/07/25/military-operation-black-dart-to-tackle-nightmare-drone-scenario>.

¹⁹⁶ *Florida v. Riley*, 488 U.S. 445, 450–51 (1989).

¹⁹⁷ On the other hand, thermal-imaging devices might no longer create a per se constitutional violation. At the time that the Supreme Court decided *Kyllo*, thermal imaging was an expensive and less common technology. Now, it is much more common. See Katie Barlow, *Thermal Imaging Gets More Common but the Courts Haven’t Caught Up*, NPR (Feb. 27,

government uses high-resolution cameras, which can make detailed observations that would be impossible by the naked eye, the Court might decide that the suspect had a reasonable expectation of privacy from such observation. Also, if the drone flies a few feet away from someone's window, a few inches from the ground, above 400 feet, or in another area the Court may deem "unlawful," it is quite likely that the Court will recognize the suspect's reasonable expectations of privacy, deeming the drone flight to be a violation of the Fourth Amendment.

But will the subject of drone surveillance be able to demonstrate an actual, subjective expectation of privacy from drones? To assert a reasonable expectation of privacy, the subject of drone surveillance will have to prove that she sought privacy from the *particular medium of government invasion* (i.e., in *Katz*, the "uninvited ear"). In a drone surveillance case, the suspect will have to assert that she sought privacy from the "uninvited eye" or "uninvited camera." Framed broadly, it seems plausible that a person in her home or curtilage has a subjective expectation of privacy from the uninvited eye or camera. But the Court will likely frame the issue more narrowly, as it did in its previous aerial surveillance cases: did the defendant seek to exclude the uninvited eye *from above*?¹⁹⁸ The answer here might be no. Without taking certain unusual privacy measures, like drawing all curtains or extending a covered patio over her entire backyard, how will the suspect demonstrate a subjective expectation of privacy from a drone flying closely above? Is this what is required to preserve our privacy?¹⁹⁹

With drones in wide public and private circulation, some in the judiciary may believe that we have to adjust our expectations of privacy to accommodate them.²⁰⁰ Paradoxically, our constitutional interests in privacy under the *Katz* reasonable expectation of privacy test are at the ever-dwindling mercy of "society"²⁰¹—a society that is rapidly embracing electronic surveillance technology for private use. Thus, due to the wide circulation of drones, and the potential difficulties in enforcing drone regulations against private users, the Court will not find a government UAS surveillance to be a "search" under the *Katz* rea-

2014, 12:43 PM), <http://www.npr.org/blogs/alltechconsidered/2014/02/25/282523377> (describing an iPhone attachment that will let you carry a thermal imaging camera in your pocket for less than \$350). "[T]echnology often changes faster than the law, and now thermal imaging technology is available at our fingertips." *Id.* Therefore, if the Court limits the *Kyllo* technological trespass doctrine to technologies that are "not in general public use," thermal imaging might now pass constitutional muster.

¹⁹⁸ See *California v. Ciraolo*, 476 U.S. 207, 211–12 (1986).

¹⁹⁹ In *Riley*, the suspect had no reasonable expectation of privacy in part because of slight openings in the backyard greenhouse visible by helicopter. *Riley*, 488 U.S. at 448–49.

²⁰⁰ See, e.g., *United States v. Jones*, 132 S. Ct. 945, 962 (2012) (Alito, J., concurring) ("New technology may provide increased convenience or security at the expense of privacy . . .").

²⁰¹ The second prong of the *Katz* analysis, according to Justice Harlan, is that our privacy expectations only receive constitutional protection if they are ones that *society* is prepared to recognize as reasonable. See *Katz v. United States*, 389 U.S. 347, 361 (1967) (Harlan, J., concurring).

sonable expectation of privacy test. Only well-enforced drone regulations against private users might change this outcome under the reasonable expectation of privacy doctrine. Or the Court might apply an entirely different Fourth Amendment analysis to drone surveillance.

C. *The Kyllo Technological Trespass Analysis*

In *Kyllo*, Justice Scalia rejected the *Katz* test as ineffective and overly subjective, and also lamented that the common-law physical trespass test will become outdated and ineffective if not adapted to advancing technology.²⁰² Therefore, Justice Scalia, writing for the Court, expanded upon the definition of a “trespass” under the common-law trespass test.²⁰³ Under this expanded definition of trespass, the government engages in a “search” when it utilizes sense-enhancing technology to gather information about the interior of the home, which would otherwise only be obtainable by physical entry into a constitutionally protected area.²⁰⁴ The Court indicated it might limit this doctrine to technologies that are “not in general public use.”²⁰⁵ If the Court expands the doctrine in a logical manner to proscribe technologies that may actually be in general public use—like UAS—it would create a normative doctrine that does not diminish its protections due to the changing activities and norms of society.

Due to the irrelevance of the reasonable expectation of privacy and common-law physical trespass tests to modern popular technologies,²⁰⁶ privacy advocates might consider arguing that drone surveillance violates the Fourth Amendment under the the *Kyllo* technological trespass doctrine. This is likely the best doctrine by which future courts may address technological surveillance. However, whether the *Kyllo* technological trespass doctrine will proscribe warrantless UAS surveillance will depend on whether the Supreme Court limits the doctrine to technologies that are not in “general public use.”²⁰⁷

If the Supreme Court abandons this “general public use” limitation, criminal defendants may successfully argue that surveillance by a low flying drone is a technological trespass, and therefore a “search” under the Fourth Amendment. But if the Court limits the application of the doctrine to technologies “not

²⁰² *Kyllo v. United States*, 533 U.S. 26, 34 (2001).

²⁰³ *See id.*

²⁰⁴ *See id.*

²⁰⁵ *See id.*

²⁰⁶ *See* discussion *supra* Part II.

²⁰⁷ For a thorough discussion of the “general public use” prong of the *Kyllo* technological trespass doctrine, see Christopher Slobogin, *Peeping Techno-Toms and the Fourth Amendment: Seeing Through Kyllo’s Rules Governing Technological Surveillance*, 86 MINN. L. REV. 1393, 1396 (2002) (arguing that “the extent to which a particular technological device is used by the general public, and the related inquiries into whether it is ‘generally available’ or ‘highly sophisticated,’ should be irrelevant to Fourth Amendment analysis”). Accordingly, if the Court chooses to exclude the technological trespass doctrine from devices in “general public use,” the doctrine will be no more useful than the reasonable expectation of privacy doctrine to address UAS surveillance.

in general public use,” the doctrine will suffer the same ineffectiveness as the reasonable expectation of privacy test at addressing new technologies that become popular. Because of the popularity of drones, drones are likely in “general public use.”

If privacy advocates succeed in expanding the *Kyllo* technological trespass doctrine to encompass technologies that *are* in general public use, they will probably succeed in arguing that drone technology fits within the sort of technology contemplated by the Court in *Kyllo*. Drones, like thermal imaging devices, allow the government to obtain information about the inside of the home that it otherwise could only obtain by physical entry. Both the UAS and the thermal imaging device in *Kyllo* gather this information by utilizing unusual perspectives into the home, apart from the traditional street-level or high-altitude viewing points. Also, both technologies are fully effective from public lawful vantage points.²⁰⁸

Drones can conduct surveillance from virtually any angle and at low altitude right near the home. This reality eviscerates previous notions that no one can see through certain windows or into the home from certain angles except by far away aircraft with binoculars or high-resolution cameras, just as thermal imaging eviscerates previous notions that no one can see (or infer) the internal temperature of the home without entering. Indeed, UAS grant far more information to the government about the interior of a home than a thermal imaging device can grant. And because of the potentially clandestine nature of a drone flight, drones may provide a desirable alternative to physical entry (i.e., the observer is more likely to catch people in truly vulnerable, private moments). UAS will be able to reveal untold reaches of the interior of the home or curtilage by utilizing unusual vantage points from which home dwellers are not accustomed to obscuring view.²⁰⁹ Thus, drones and thermal imaging devices both grant observers super-human ability—here, flight—that allows them to collect vast amounts of information about the interior of the home otherwise only attainable by physical entry.

Moreover, current drone technology typically operates aloft only for a matter of hours,²¹⁰ but certain UAS devices, called high-altitude long-endurance (HALE) UAS, will have the potential to operate in the air for extremely prolonged periods of time (even years), which will enable them to gather long-term information about the ground, including constitutionally protected areas

²⁰⁸ In the case of UAS, lawfully navigable airspace for unmanned aircraft. In the case of thermal imaging devices, from public streets or sidewalks.

²⁰⁹ For example, a drone would have little trouble peering down into a sunroof above one’s living room. Sunroofs often do not come with curtains. Along the same line of logic, drones will have little trouble peering into our second-story windows at angles that no one else in the neighborhood could see, without climbing onto the roof of their home or hauling a ladder into the middle of the street. Additionally, even smaller openings in sheds and greenhouses will be more revealing than the openings in *Florida v. Riley*, because drones could have a closer view. See *Florida v. Riley*, 488 U.S. 445, 448 (1989).

²¹⁰ Villasenor, *supra* note 33.

such as our backyards and other parts of the curtilage.²¹¹ Without secretly camping out in someone's backyard for several days, one could not gather the sort of intimate information that the government will be able to gather with these long-term HALE UAS operations. For now, however, HALE technology is not as pressing as small low-altitude UAS.²¹²

Additionally, the fact that there are other less practical—or illegal—non-trespassory means by which to gather this information is irrelevant to the technological trespass doctrine. In *Kyllo*, the Court was not persuaded by the fact that one could have learned about the heat within the house by observing, via visible light, heat waves emitting off the home or snow melting on the roof.²¹³ Likewise, one could utilize a ladder to achieve at least a few of the unique vantage points available to UAS—although a ladder would be far more conspicuous, impractical, and would often not be as close-up to a window as a drone can be. Moreover, such activity is socially unacceptable, uncommon, and may violate many states' privacy laws.²¹⁴ These facts keep this alternative to drone use, and others like it, nonviable for the police and thus constitutionally irrelevant.²¹⁵

Of course, UAS technology is different from thermal imaging technology in several significant ways. First, when the police use a simple (or even high-resolution) camera on a UAS, they will be conducting surveillance of visible light (albeit from unique angles and possibly in improved resolution). Visible light observations are the exact sort of observations home dwellers are accustomed to and are most prepared to protect against, unlike observations of their thermal emissions. In *Kyllo*, the Court weighed in the defendant's favor because thermal imaging technology detected emissions from the home other than visible light—that is, the technology made observations that passersby were unlikely to make.²¹⁶ However, although UAS normally will make visible light observations, they will do so from unusual and intrusive vantage points.

²¹¹ The solar-powered QinetiQ Zephyr stayed aloft for over two continuous weeks. *See* Chuter, *supra* note 33. Also, Boeing is working on a HALE UAS called the SolarEagle, which will remain aloft in the stratosphere for up to five years. *See* Press Release, Boeing Co., *supra* note 33.

²¹² *See* Villasenor, *supra* note 33 (“It will likely be much later in the decade before HALE technology becomes sufficiently advanced and cost-effective to make it practical to install a permanent HALE presence above an American city. Currently, there is no indication that any government agency plans to do so.”).

²¹³ *See* *Kyllo v. United States*, 533 U.S. 27, 35 n.2, 43 (2001).

²¹⁴ *See supra* note 7 and accompanying text.

²¹⁵ It is hardly conceivable that the Court would deem a violation of state privacy laws to be a viable alternative to the electronic surveillance in question and a physical intrusion. Therefore, under the *Kyllo* non-alternative analysis (that the police may not use technology that permits them to gather information *only otherwise attainable* by physical intrusion into the home), the existence of illegal means (per state law) to achieve the same surveillance objectives cannot serve as a satisfactory alternative to physical intrusion into the home, which would validate the use of drones.

²¹⁶ *See Kyllo*, 533 U.S. at 29.

Also, the government might be able to use thermal imaging in a more clandestine manner than flying many low-altitude, four-rotor (“quadcopter”) UAS. Depending on the model, many quadcopter UAS generate a significant amount of noise, at least for now.²¹⁷ This fact offers little solace to someone inside her home, who might not hear it, or to one who is out while a drone scours her backyard.

1. General Public Use

For a drone surveillance analysis, a critically important development in Fourth Amendment jurisprudence remains to be seen: whether the Court will adopt the “not in general public use” limitation to the technological trespass doctrine. The Court was not confronted with a technology that *was* in general public use in *Kyllo*, so when the Court commented that its doctrine applied “at least where . . . the technology in question is not in general public use,” this comment might simply have been dicta, and not controlling on a drone case.²¹⁸ And even if this limitation is the law, what “general public use” means is entirely unclear.²¹⁹ Professor Slobogin suggests, “There are at least three broad definitions of that phrase (general availability, general use, and general use for a particular purpose) and each of those definitions can be subdivided into alternative definitions that vary widely.”²²⁰ Let us consider the possibility that “in general public use” means either the popularity of a product (which relies, in part, on its availability), or that the phrase regards a device’s “general use for a particular purpose.” Either of these meanings create a doctrine that dwindles its protections upon the proliferation of technology.

In *Kyllo*, the Court concluded that the government utilized an invasive technology that was not in general public use.²²¹ In contrast, the Court will like-

²¹⁷ For a crude example of the noise made by one of the most common brands of quadcopters, see kd7und, *How Loud Is a DJI Phantom?*, YOUTUBE (Apr. 24, 2013), <https://www.youtube.com/watch?v=afi4tSZw-kc> (showing a private individual recording eighty-two decibels from a quadcopter one foot away). A sergeant with the Miami-Dade Police Department described the department’s eighteen-pound drone to the National Journal: “Our drone looks like a flying garbage can, and it sounds like a weed whacker. This thing is very, very noisy. It wouldn’t allow you to sneak up on anybody.” Jay Stanley, *If Drones Get Quiet*, ACLU: FREE FUTURE (May 2, 2012, 5:48 PM), <https://www.aclu.org/blog/if-drones-get-quiet>. Some worry, therefore, about the inevitable development of quiet drones. *See id.*

(speculating that silencing drones will erase the primary form of notice that a drone is present, and commenting that notice is “one of the key principles of privacy”).

²¹⁸ *See Kyllo*, 533 U.S. at 34; *see also* Slobogin, *supra* note 207, at 1432 n.179.

²¹⁹ Slobogin, *supra* note 207, at 1402 (“Despite the number of cases mentioning the issue, the general public use concept remains amorphous. As noted above, a number of courts seem to believe that flashlights and binoculars, and perhaps night scopes as well, are in general public use. The Supreme Court has indicated that airplanes (in navigable airspace) and mapmaking cameras are as well, but that thermal imagers and (probably) beepers are not. But no court has put forth a more general definition of the concept.”).

²²⁰ *Id.* at 1411.

²²¹ *Kyllo*, 533 U.S. at 40.

ly find drones to be in general public use, and drone surveillance to be the particular purpose for the public's drone use. Not only are many models of drones substantially less expensive²²² and more readily available to the public than thermal imaging technology was at the time of *Kyllo*, drones are far more popular (due to their entertainment value).²²³ In the United States, the integration of UAS into the national airspace "is expected to have enormous economic and job creation impacts in the United States," and is expected to be an industry worth \$82.1 billion.²²⁴ Drones are already popular for private use, and will soon be popular for commercial use as well. Therefore, the Court will probably find drones to be in "general public use" if the Court adopts a broad meaning for this phrase. The popularity of drones may thus dispose of a technological trespass claim.

Alternatively, the Court might choose to adopt a narrower meaning for the "general public use" limitation, and instead focus the test on *how* the government used the drone technology. Specifically, the Court might hold that when a technology that is in "general public use" for one purpose—such as, for recreation—that does not mean that the technology is in "general public use" for all purposes—such as, for surveillance. For example, even if drones are generally popular for recreational flying at a park or other public venue, this does not mean that the general public use for drones is to conduct surveillance on your neighbor's home. Under this narrower test, the "general public use" exception to the technological trespass doctrine would exist only if the government uses the technology in the same manner as the general public.

Narrowing the "general public use" test in this way would make the technological trespass doctrine practically indistinguishable from the reasonable expectation of privacy test, at least where popular technology is concerned. The

²²² I was quickly able to find a drone with a camera available, on sale, for only \$49.95. See *RC Helicopters w/ Camera*, THINK RC, <http://www.thinkrc.com/24ghz-4ch-hubsan-h107c-mini-quadcopter-camera-blackgreen-p-2680.html> (last visited Nov. 25, 2015). Admittedly, this is quite cheap. One of the most popular drone brands right now, the "DJI Phantom" runs roughly between \$500 and \$1300. See *All Products: Phantom Series*, DJI, <http://www.dji.com/products> (last visited Nov. 25, 2015).

²²³ Affordable, small drones, affixed with cameras, open the skies up to the everyday person without having to acquire a pilot license and a plane or helicopter. People have thought up many very cool uses for drones. For example, one of the most popular uses for drones is filming yourself doing athletic or extreme sports activities. Drones are being programmed to automatically follow their owners, and film them while they do activities like snowboard or mountain climb. See Stothard, *supra* note 3 ("It would be like having a full TV crew with you when you went snowboarding or mountain climbing . . ."). "Lego was an amazing toy 20 years ago. You could create a whole world. But today's kids are different and they require something more special and technological," said Henri Seydoux, the chief executive of Parrot, a French Technology company that manufactures drones. *Id.*

²²⁴ DARRYL JENKINS & BIJAN VASIGH, ASS'N FOR UNMANNED VEHICLE SYS. INT'L, *THE ECONOMIC IMPACT OF UNMANNED AERIAL SYSTEMS INTEGRATION IN THE UNITED STATES* 20 (2013), <http://www.auvsi.org/econreport> (follow "To download the full report" hyperlink) (reporting that "[d]uring the 11-year period 2015–2025, UAS integration is expected to contribute \$82.1 billion to the nation's economy" mostly due to the agriculture industry).

standards would rely upon the same factors. Under either doctrine, the Court will invalidate the UAS surveillance if the government uses the technology in an uncommon, and thus reasonably unexpected, manner. For instance, if UAS remain popular, but well-enforced privacy regulations prevent the public from utilizing them to spy on one another, then the government will violate both the reasonable expectation of privacy test and the technological trespass test, because it will use the technology in an uncommon way.²²⁵ But if the government uses the technology in accord with the usage common of the general public—which likely includes filming around a neighborhood—then it will pass this test. Therefore, if the doctrine takes on this meaning, our privacy from UAS surveillance will depend upon the effectiveness of drone legislation in preventing the general public from using drones to spy on one another.

2. *Technological Trespass Doctrine Conclusion*

Therefore, whether and how the Court adopts the “general public use” test in a UAS case will be of central importance to the technological trespass test. Privacy advocates should argue for an abandonment of the “not in general public use” limitation of the *Kyllo* trespass doctrine, arguing that such a limitation would make the doctrine ineffective in addressing advancing technologies as they become popular (just like the *Katz* reasonable expectation of privacy doctrine).

There are likely three possible outcomes under the technological trespass doctrine. First, if the Court does not adopt the “general public use” test in UAS surveillance cases, the technological trespass doctrine will invalidate government surveillance whenever the government utilizes a sense- or ability-enhancing technology to gather information otherwise practically obtainable only by a physical trespass. Under this analysis, the Court will find the use of a UAS to observe the curtilage of the home, even from a lawful vantage point, to be a “search” within the meaning of the Fourth Amendment.

Second, if the Court limits the technological trespass doctrine to only those technologies “not in general public use,” the Court will consider the popularity and accessibility of drones to the public, and may hold that drones are in “general public use.” Thus, UAS surveillance with a drone will not violate the *Kyllo* technological trespass doctrine, and will pass constitutional muster.

Third, if the Court adopts a narrower interpretation of the “general public use” test, requiring the government to use drones in the same manner as the general public, legal surveillance of homes by drone may depend on whether legislatures effectively prevent members of the public from spying on each other’s homes. If the government uses drones to peer into the interior of the home or curtilage, and this activity is not common of the general public, the search

²²⁵ For example, California has a criminal law that very well may apply to a person using a drone to peer into the private areas of another person’s home. *See supra* note 7 and accompanying text.

will violate the technological trespass doctrine and the Fourth Amendment. Under this analysis, the Supreme Court's *Kyllo* doctrine would become practically indistinguishable from the *Katz* reasonable expectation of privacy test, in which our privacy rights depend on the conduct we expect of members of the public.²²⁶

CONCLUSION

Justice Alito recently remarked:

Dramatic technological change may lead to periods in which popular expectations are in flux and may ultimately produce significant changes in popular attitudes. New technology may provide increased convenience or security at the expense of privacy, and many people may find the tradeoff worthwhile. And even if the public does not welcome the diminution of privacy that new technology entails, they may eventually reconcile themselves to this development as inevitable.²²⁷

Others are not satisfied with allowing technology to eviscerate the Fourth Amendment's protections: "To withdraw protection of th[e] minimum expectation [of privacy in the home] would be to permit police technology to erode the privacy guaranteed by the Fourth Amendment."²²⁸ In response, the Supreme Court in *Kyllo* developed a technological trespass doctrine, which may have more potential than any other doctrine to meaningfully limit the government's warrantless use of surveillance technologies in the age of diminishing privacy.

As law enforcement increases the use of UAS for public safety and criminal justice purposes, UAS will serve an important role for our twenty-first century public safety interests.²²⁹ However, like any other law enforcement tool, the usefulness of UAS should come with a strong dose of caution: "The greatest dangers to liberty lurk in insidious encroachment by men of zeal, well-meaning but without understanding."²³⁰ At the very core of our American con-

²²⁶ See discussion *supra* Part III.C.1.

²²⁷ *United States v. Jones*, 132 S. Ct. 945, 962 (2012) (Alito, J., concurring).

²²⁸ See *Kyllo v. United States*, 533 U.S. 26, 34 (2001).

²²⁹ Some of the potential law enforcement uses of UAS include: accident reconstruction, Tactical or SWAT operations, intelligence and evidence gathering, traffic and crowd control, search and rescue, fire control and damage assessment, HAZMAT management, emergency and disaster response, and event and VIP security. See *Considerations in Selecting a Small UAV for Police Operations*, AERYON LABS INC. (May 3, 2011), <http://aeryon.com/whitepapers/whitepaperpolice>. Moreover, UAS allow the police to save substantial amounts of money in accomplishing these tasks, many of which are otherwise impossible, impractical, or only possible with a helicopter. See STANLEY & CRUMP, *supra* note 30, at 6–8; see also Dave Kroetsch, *Choosing the Right UAV*, 5 GEOSPATIAL WORLD, Sept. 2014, at 56, 56 (noting that law enforcement agency budgets for equipment purchases typically are between five and fifteen percent of the total budget).

²³⁰ *Olmstead v. United States*, 277 U.S. 438, 479 (1928) (Brandeis, J., dissenting). Justice Brandeis also observed:

Experience should teach us to be most on our guard to protect liberty when the government's purposes are beneficent. Men born to freedom are naturally alert to repel invasion of their liberty

stitutional system exists the inescapable tension between public safety and our liberty.

As Benjamin Franklin famously declared, “Those who would give up essential Liberty, to purchase a little temporary Safety, deserve neither Liberty nor safety.”²³¹ We must not take this statement to the extreme, however, and allow our principles to be our undoing. It is fundamental to even the most basic social contract that we agree to give up some freedom to purchase some safety.²³² Therefore, the framers ensured that the proper degree of privacy under the Fourth Amendment is always on balance with the People’s legitimate criminal justice and public safety interests.²³³ The trick, then, is finding exactly how much of our Liberty the Framers surrendered in order to purchase the benefits of effective law enforcement.

Unmanned aerial systems will force the United States Supreme Court to reexamine its interpretation and construction of the Fourth Amendment. All of its current doctrines, without modification, appear insufficient to protect the privacy expectations we have come to enjoy.

The doctrine by which the Supreme Court will most likely invalidate warrantless UAS surveillance of the home and curtilage will be an expansion of the *Kyllo* technological trespass doctrine. This expansion must be an adaptation of *Kyllo* that does not diminish its protections simply because a technology is popular, or in “general public use.” Under such an expansion of *Kyllo*, the government will engage in a trespass, and therefore a “search,” when it uses any sense or ability-enhancing technology, however commonly used, to gather information about our “persons, houses, papers, or effects,”²³⁴ which the government otherwise could not collect without a physical trespass. If the Court does not abandon the “not in general public use” dicta, the *Kyllo* doctrine will suffer the same ineffectiveness as the *Katz* reasonable expectation of privacy test to address advancing technology. Alternatively, the Court might invalidate the surveillance if it uses drones in a way that the “general public” does not.²³⁵

by evil-minded rulers. The greatest dangers to liberty lurk in insidious encroachment by men of zeal, well-meaning but without understanding.

Id.

²³¹ Pennsylvania Assembly: Reply to the Governor (Nov. 11, 1755), in 6 THE PAPERS OF BENJAMIN FRANKLIN 238, 242 (Leonard W. Labaree ed., 1963).

²³² For example, we agree not to kill and steal from one another in order to purchase the heightened security that comes from living in groups.

²³³ Otherwise, the framers would not have limited the reach of the Fourth Amendment to “unreasonable” searches. See *Riley v. California*, 134 S. Ct. 2473, 2484 (2014) (“Absent more precise guidance from the founding era, we generally determine whether to exempt a given type of search from the warrant requirement ‘by assessing, on the one hand, the degree to which it intrudes upon an individual’s privacy and, on the other, the degree to which it is needed for the promotion of legitimate governmental interests.’” (quoting *Wyoming v. Houghton*, 526 U.S. 295, 300 (1999))).

²³⁴ U.S. CONST. amend. IV.

²³⁵ In other words, if the Court retains the “not in general public use” limitation to the technological trespass doctrine, it may nonetheless invalidate warrantless use of popular technol-

Absent this legal development, civil rights advocates have but one practical avenue through which to prevent warrantless UAS surveillance under the Fourth Amendment: legislation. If legislators direct drone privacy laws at preventing private citizens from spying on one another, they might preserve our “reasonable expectations of privacy” from drones. But this legislation must come with effective enforcement, or it might do little for our constitutional rights. Such legislation would impact both the *Katz* reasonable expectation of privacy test and the *Kyllo* technological trespass test, allowing civil rights advocates to argue that the government was using the technology in a manner not common among the general public, and thus reasonably unexpected.

ogies if the police use the technology in an uncommon way (i.e., spying on your neighbor with a drone, where local law prohibits the public from spying with a drone).