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Game of Drones: Rolling the Dice with Unmanned Aerial Vehicles and Privacy

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GAME OF DRONES: ROLLING THE DICE WITH UNMANNED AERIAL VEHICLES AND PRIVACY

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INTRODUCTION

Looking out the window, is it a bird, a plane, a . . . drone? The advent and proliferation of unmanned aerial vehicles,[1] commonly known as drones, presents real opportunities for positive societal contributions. Yet, as with many emergent technologies, the challenges are undeniable. Undoubtedly, the breathtaking speed of scientific and technological advances outpaces the ability of government actors to keep stride. We have not determined the appropriate avenues for regulating them. And while the potential regulatory issues are numerous given the wide variety of nonmilitary[2] uses alone,[3] no use is more controversial than the use of drones by law enforcement and its potential to harm individual privacy.

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[1] A variety of terms are used to describe "unmanned" aircraft: Drones, Unmanned Aerial Vehicle ("UAV"), Unmanned Aircraft ("UA"), Unmanned Aerial Systems ("UAS"), which refers either "to the system [or] systems in the aircraft or the aircraft ground station system." Donna A. Dulo, *Aeronautical Foundations of the Unmanned Aircraft*, *in* UNMANNED AIRCRAFT IN THE NATIONAL AIRSPACE 21, 21 n.1 (Donna A. Dulo ed., 2015). The term "drone" is used throughout this Article for purposes of consistency and gender neutrality.

[2] Certainly, one of the principal uses for drones is for a wide variety of military engagements. Discussion of military drone use, generally, is beyond the scope of this Article. That said, to the extent that the military is responsible for the creation and unveiling of drones and developing drone technology, there are drones and drone-associated technology currently in use by the military that may be available to the public in the near future. For example, the U.S. Army has created a drone that carries a 1.8-gigapixel color camera called an ARGUS-IS. Donna Miles, *Warfighters to Get Improved 'Eyes in the Sky*,*'* U.S. ARMY (Dec. 17, 2010), http://www.army.mil/article/49594 [https://perma.cc/U8KH-RQE6]. That camera has a video sensor that can cover nearly twenty-five square miles from 20,000 feet above, tracking sixty-five separate targets at the same time. *Id.*

[3] In addition to the hobbyist recreational uses of drones, drones are being used in weather forecasting, topographical mapping, firefighting, cinematography, farming, infrastructure inspection and real estate photography, just to name a few. The variety of uses will continue to increase as the technology advances and the price decreases.

The surveillance technology already available on drones is vast. In fact, drones are "simply the platform for enabling surveillance."[4] Drones allow law enforcement to track the movements of large swathes of individuals at once, employing facial recognition software and recording scores of data to be retained indefinitely. They are equipped with high resolution still and video cameras with increasingly high-powered zoom lenses. In essence, they are flying computers with GPS, sensors, thermal imaging devices, license plate readers, and even facial recognition software. And they are routinely designed to be undetectable.

Moreover, it is not only the cutting-edge surveillance technology that is at issue, but the pure physics involved. The ability of drones to hover, to fly at varying altitudes and airspace, and to stay aloft for ever-lengthening time periods creates the ideal surveillance agent. In fact, the time is not far off when drones may be "filling our skies, engaged in myriad video surveillance tasks."[5] As this time draws nearer and police engage in increasingly sophisticated and pervasive surveillance using drones, one question remains: What role does the Fourth Amendment play in balancing individual privacy and law enforcement in this brave new world?[6]

A single drone could invoke almost all the technological advances that the Supreme Court has previously analyzed in its Fourth Amendment jurisprudence.[7] For example, the United States Supreme Court's most recent forays into Fourth Amendment technological surveillance have involved a singular category of technology, such as a thermal imagery device[8] or Global Positioning System ("GPS").[9] With law enforcement agencies across the country increasingly deploying drones as surveillance agents, the potential to use many of the traditional technological surveillance tools[10] simultaneously leaves courts ill prepared to address the level of Fourth Amendment scrutiny to prescribe.

At the present time, there is a dearth of case law explicitly addressing the Fourth Amendment and drones, and Congress has not yet entered the fray in any meaningful

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[4] Hillary B. Farber, *Keep Out! The Efficacy of Trespass, Nuisance and Privacy Torts as Applied to Drones*, 33 GA. ST. U. L. REV. 359, 370 (2017).

[5] *UAV Video Surveillance Drones Prepped for Take-off*, SECURITY NEWS DESK (Feb. 3, 2012), http://www.securitynewsdesk.com/2012/02/03/uav-video-surveillance-drones-prepped-for-take-off [https://perma.cc/SXC2-VEAH].

[6] Brendan Sasso, *Senators Fear Drones 'Buzzing Overhead,'* HILL (Mar. 20, 2013), http://thehill.com/blogs/hillicon-valley/technology/289337-senators-worry-about-domestic-drone-surveillance [https://perma.cc/Q4B7-H7BZ] (quoting Senator Chuck Grassley: "The thought of government drones buzzing overhead, monitoring the activity of law abiding citizens, runs contrary to the notion of what it means to live in a free society.").

[7] *See infra* Part III.

[8] *See* Kyllo v. United States, 533 U.S. 27, 34–35 (2001).

[9] *See* United States v. Jones, 565 U.S. 400, 403–04 (2012).

[10] Drones employing cameras could "magnify and video record [a woman strolling down the street]'s movements, actions, and the details of her vehicle's license plate, or the items she is carrying out of a store." Marc Jonathan Blitz, *The Fourth Amendment Future Public Surveillance: Remote Recording and Other Searches in Public Space*, 63 AM. U. L. REV. 21, 24 (2013).

way.[11] Many states have attempted to fill the void[12] and have passed state laws regulating drones.[13] In the meantime, lower courts, which will be the first to address

[11] Notably, "in *Jones*, Alito stressed what Professor Daniel Solove and others have argued, which is that it would be ideal for legislatures to take a first stab at these complicated questions, after which courts can review whether those solutions meet the constitutional floor." Stephen E. Henderson, *Real-Time and Historic Location Surveillance After* United States v. Jones: *An Administrable, Mildly Mosaic Approach*, 103 J. CRIM. L. & CRIMINOLOGY 803, 809–10 (2013). For Professor Solove's argument, see Daniel J. Solove, *Fourth Amendment Pragmatism*, 51 B.C. L. REV. 1511, 1515, 1535–37 (2010). The very suggestion that it is primarily the role of the Court, rather than Congress, to address the intersection of evolving technologies and privacy is not without controversy. *Compare* Orin S. Kerr, *The Fourth Amendment and New Technologies: Constitutional Myths and the Case for Caution*, 102 MICH. L. REV. 801, 805 (2014) (arguing that "statutory rules rather than constitutional rules should provide the primary source of privacy protections regulating law-enforcement use of rapidly developing technologies"), *with* Blitz, *supra* note 10, at 22 (explaining the need for courts to take the lead in developing a "technology-based" or "design-based" approach to defining law enforcement's use of surveillance under the Fourth Amendment).

[12] That said, states do so at their own peril as issues of federal preemption loom large. The Federal Aviation Administration ("FAA") has acknowledged that state and local law enforcement is in the "best position to deter, detect, immediately investigate, and, as appropriate, pursue enforcement actions to stop unauthorized or unsafe UAS operations." FED. AVIATION ADMIN., U.S. DEP'T OF TRANSP., LAW ENFORCEMENT GUIDANCE FOR SUSPECTED UNAUTHORIZED UAS OPERATIONS 1 (2017), https://www.faa.gov/uas/resources/law_enforcement/media/faa_uas-po_lea_guidance.pdf [https://perma.cc/QDS2-3JCA]. On the other hand, a UAV is an "aircraft" under the definitions of the FAA's authorizing statutes and therefore subject to regulation by the FAA. 49 U.S.C. § 40102(a)(6) (2012). Moreover, according to the FAA,

> [s]ubstantial air safety issues are raised when state or local governments attempt to regulate the operation or flight of aircraft. . . . A navigable airspace free from inconsistent state and local restrictions is essential to the maintenance of a safe and sound air transportation system. *See Montalvo v. Spirit Airlines*, 508 F.3d 464 (9th Cir. 2007), and *French v. Pan Am Express, Inc.*, 869 F.2d 1 (1st Cir. 1989); *see also Arizona v. U.S.*, 567 U.S. ___, 132 S.Ct. 2492, 2502 (2012) ("Where Congress occupies an entire field . . . even complimentary state regulation is impermissible. Field preemption reflects a congressional decision to foreclose any state regulation in the area, even if it is parallel to federal standards."); *Morales v. Trans World Airlines, Inc.*, 504 U.S. 374, 386–87 (1992).

FED. AVIATION ADMIN., STATE AND LOCAL REGULATION OF UNMANNED AIRCRAFT SYSTEMS (UAS) FACT SHEET 2–3 (2015), https://www.faa.gov/uas/resources/uas_regulations_policy/media/uas_fact_sheet_final.pdf [https://perma.cc/HAM7-D36G].

[13] *See, e.g.*, Joe Sutton & Catherine E. Shoichet, *Florida Gov. Rick Scott Signs Laws Restricting Drones*, CNN (Apr. 28, 2013), http://www.cnn.com/2013/04/25/us/florida-drone-law/index.html [https://perma.cc/CA29-B9PD] (describing the enactment of the Freedom from Unwanted Surveillance Act, which provides limitations on law enforcement's use of drones in Florida). Currently 31 states have passed laws directly related to drones.

these issues, are left with little guidance as to where to draw the line. Moreover, with the Federal Aviation Administration ("FAA") finalizing the first round of regulations on drones in the summer of 2016 (albeit only tangentially touching on privacy issues), the use of drones is likely to increase exponentially in the very near future.[14]

Such an increase in the use of drones will likely put pressure on courts to determine what level of Fourth Amendment scrutiny to apply given that drones do not easily fit into any defined technological category the Supreme Court has previously addressed. And yet, the very nature of the technology that a drone engages in is not simply an issue of first impression for courts; although drones have their own unique characteristics, the technology they employ is largely an amalgamation of technology that the Supreme Court has previously analyzed. Since a drone is basically an instrument that allows other technologies—such as facial recognition, photography, thermal imagining, etc.—to be used more freely, stealthily, and quickly, the Supreme Court is faced with issues stemming from the use of the countless amalgamations of these ever-developing technologies.

Given the unique surveillance capabilities of the drone, the question becomes how much leeway law enforcement should be given in employing drones for surveillance before a search violates the protection an individual is accorded under the Fourth Amendment. As Marc Jonathan Blitz queries, "[a]s police gain the ability to technologically monitor individuals' public movements and activities, does the Fourth Amendment's protection against 'unreasonable searches' place any hurdles in their way?"[15]

Since a drone is in fact an "aerial vehicle," should courts simply treat drones as any other aerial vehicle merely taking photographs—in which case no warrant would be required? Or, given the pervasive technological abilities of drones, as well as their potential to engage in lengthy surveillance,[16] is a drone more like GPS in

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Farber, *supra* note 4, at 374; *see also* SARAH NILSSON, DRONES ACROSS AMERICA: UNMANNED AIRCRAFT SYSTEMS (UAS) REGULATION AND STATE LAWS 82–280 (2017) (providing the text for all of the state laws and city ordinances related to drones).

[14] Pursuant to Congress's mandate in the FAA Modernization and Reform Act of 2012, Pub. L. No. 122-95, § 333, 126 Stat. 11, 76, the FAA amended its regulations to adopt specific rules for the operation of small UAS (less than 50 lbs.) UAS in the National Airspace System. These changes address areas of remote pilot certification (14 C.F.R. § 107.61 (2018)), aircraft registration and marking (14 C.F.R. § 107.13), aircraft airworthiness (14 C.F.R. § 107.49) and operational limitations (14 C.F.R. § 107.51). The regulations do not address privacy issues although the FAA in its Advisory Circular accompanying the regulations articulated that small UAS operators "should be aware that state and local authorities may enact privacy-related laws specific to Unmanned Aircraft System (UAS) operations. The FAA encourages [small UAS] operators to review those laws prior to operating their UAS." FED. AVIATION ADMIN., U.S. DEP'T OF TRANSP., ADVISORY CIRCULAR: SMALL UNMANNED AIRCRAFT SYSTEMS (sUAS) 1 (2016), https://www.faa.gov/uas/media/AC_107-2_AFS-1_Signed.pdf [https://perma.cc/9KQX-K6ZB].

[15] Blitz, *supra* note 10, at 21.

[16] *See infra* Part I.

that a warrantless search is at odds with the Fourth Amendment? In fact, drones are simply not like any other technology and their potential for wreaking havoc on the fabric of privacy in our society is too great for their use to continue without additional guidelines.

This Article builds on the work of other scholars who have urged courts to adopt a "technology-based" definition of what constitutes a search.[17] This Article proposes the following multifactor test as a way of guiding both courts and law enforcement as to how to use drones effectively while still protecting privacy:[18]

(1) What type of technology is the drone employing in the search? Camera,[19] video,[20] facial recognition software, GPS/cell phone tracking?
(2) What is the extent of the surveillance?
(3) How pervasive is the privacy intrusion?

Essentially, courts should apply a presumption that a warrant is necessary, absent exigent circumstances,[21] in instances where the police are surveying homes

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[17] *See* Susan Freiwald, *First Principles of Communications Privacy*, 2007 STAN. TECH. L. REV. 3, ¶¶ 50–70 (2007) (creating a test pre-*Jones* for determining whether new surveillance methods should be considered a search); David Gray & Danielle Citron, A Technology-Centered Approach to Quantitative Privacy 5 (Aug. 14, 2012) (unpublished manuscript), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2129439 [https://perma.cc/D8FF-4TXC]; Blitz, *supra* note 10, at 27–28 (advocating for a two-part design-based definition of a Fourth Amendment search which takes place in a public space). *But see* Gregory S. McNeal, *Drones and the Future of Aerial Surveillance*, 84 GEO. WASH. L. REV. 354, 361 (2016) (arguing that "scholars and legislators should move beyond a warrant-based, technology-centric approach to protecting privacy from aerial surveillance").

[18] Other legal scholars have proposed guidelines regarding the proper test for what constitutes a search when police engage in technological surveillance. None of those, however, have focused primarily on surveillance by drones. *See, e.g.*, Christopher Slobogin, *Making the Most of* United States v. Jones *in a Surveillance Society: A Statutory Implementation of Mosaic Theory*, 8 DUKE J. CONST. L. & PUB. POL'Y 1, 16 (2012) (providing a codification of Fourth Amendment search-related doctrine post-*Jones*); Blitz, *supra* note 10, at 28; Freiwald, *supra* note 17, at ¶¶ 50–70 (creating a pre-*Jones* test for determining whether new surveillance methods should be considered a search); Gray & Citron, *supra* note 17, at 30 ("[W]e recommend a technology-centered approach to identifying and defending Fourth Amendment interests in quantitative privacy."); Henderson, *supra* note 11, at 811–13.

[19] *See Chicago's High-Tech Cameras Spark Privacy Fears*, PHYS.ORG (Feb. 8, 2011), http://www.phys.org/news/2011-02-chicago-high-tech-cameras-privacy.html#nRlv [https://perma.cc/U84V-NT73] ("At least 1,250 of [Chicago's cameras] are powerful enough to zoom in and read the text of a book." The camera system is also capable of searching for images like an unattended package or a specific license plate.).

[20] *See* Jeremy Brown, *Pan, Tilt, Zoom: Regulating the Use of Video Surveillance of Public Places*, 23 BERKELEY TECH. L.J. 755, 761–62 (2008) (describing how law enforcement has increasingly used more sophisticated video surveillance).

[21] United States v. Martinez, 406 F.3d 1160, 1164 (9th Cir. 2005) ("As a general rule, 'we define exigent circumstances as those circumstances that would cause a reasonable person to believe that entry was necessary to prevent physical harm to the officers or other persons, the destruction of relevant evidence, the escape of the suspect, or some other

or its curtilage when using drones. Drones are simply not like any other technology and their potential for wreaking havoc on the fabric of privacy in our society is too great. Therefore, a presumption that a warrant is required will combat the increased potential of Fourth Amendment violations and provide a framework for law enforcement and courts. The burden would then be on law enforcement to demonstrate why it should not have been required to obtain a warrant given the multifactor test.

To support this multifactor test, this Article addresses the history of Supreme Court Fourth Amendment jurisprudence to explain how the Court has addressed privacy concerns regarding law enforcement's use of a singular surveillance technology, such as wiretapping or thermal imagery. Understanding the various issues that arise out of law enforcement's use of a singular technology serves to highlight the real danger privacy rights are under when law enforcement engages in warrantless searches employing drones with multiple technologies. Part I introduces the vast potential of combining drones and surveillance technology. Part II addresses the current status and connection between technological advancements and their effects on individual privacy rights. Part III explores the Supreme Court's Fourth Amendment jurisprudence. After a brief description of the history of the early electronic surveillance cases, the discussion focuses on *United States v. Katz* and the seminal reasonable expectation of privacy test. This is followed by a discussion of the cases commonly referred to as the "Aerial Surveillance Trilogy," *California v. Ciraolo*, *Dow Chemical v. United States*, and *Florida v. Riley*, the advanced technology cases, *Kyllo v. United States* and *United States v. Jones*, concluding with a discussion on several post-*Jones* decisions. Lastly, Part IV details the multifactor test outlined above in order to provide guidance and reasoning for courts and law enforcement agencies.

I. DRONES AND SURVEILLANCE POTENTIAL

The surveillance capability of drones is infinitely comprehensive and adaptive, able to record not only location information, but photograph (including taking screen shots of computer screens), videotape, audiotape, use thermal imaging, engage facial recognition technology, and intercept cell phone information. These capabilities have greatly expanded with each model and technological advancement[22] but also, the sheer number of drones available and in use today has far surpassed predictions.

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consequence improperly frustrating legitimate law enforcement efforts.'") (quoting United States v. McConney, 728 F.2d 1195, 1199 (9th Cir. 1984).

[22] Drone technology has increased dramatically in recent years. Specifically, drones can now travel farther, both in distance and in height, and stay aloft for longer periods of time. S. Alex Spelman, *Drones: Updating the Fourth Amendment and the Technological Trespass Doctrine*, 16 NEV. L.J. 373, 411–12 (2015) ("[C]urrent drone technology typically operates aloft only for a matter of hours, 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 such as our backyards and other parts of

> [Drones] threaten to perfect the art of surveillance. Drones are capable of finding or following a specific person. They can fly patterns in search of suspicious activities or hover over a location in wait. Some are as small as birds or insects, others as big as blimps. In addition to high-resolution cameras and microphones, drones can be equipped with thermal imaging and the capacity to intercept wireless communications.[23]

Technologically, drones continue to break new barriers. Some such "barriers" may have little effect on privacy.[24] Others, particularly those related to duration and longevity, greatly increase the chance of the drone acting as the prototypical surveillance agent. Specifically, one drone recently stayed aloft for four days straight without refueling,[25] while Boeing has plans to make a drone that would be capable of staying aloft for ten days.[26] Moreover, development has started on drones able to remain airborne for years.[27]

Sensor platforms on drones also continue to become more sophisticated, increasing their ability to conduct a variety of different types of surveillance. Multispectral sensors are used to capture unseen information.[28] Drones may carry

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the curtilage . . . ."); *see also* Shane Crotty, *The Aerial Dragnet: A Drone-ing Need for Fourth Amendment Change*, 49 VAL. U. L. REV. 219, 227 (2014) (citing the time periods various drones can stay afloat: "Drones are also capable of staying airborne for long periods of time, several in excess of twenty-four hours"); William C. Marra & Sonia K. McNeil, *Understanding "The Loop": Regulating the Next Generation of War Machines*, 36 HARV. J. L. & PUB. POL'Y 1139, 1169 (2013) (citing various military drones and how long each can stay aloft); Melanie Reid, *Grounding Drones: Big Brother's Tool Box Needs Regulation Not Elimination*, 20 RICH. J.L. & TECH. 9, 8 (2014) (same).

[23] M. Ryan Calo, *The Drone as Privacy Catalyst*, 64 STAN. L. REV. ONLINE 29, 30 (2011).

[24] For example, one company has developed a drone worn on the wrist until the user wishes to take photographs. At that point, the user would release the drone into the air where it can take selfies. Kelsey D. Atherton, *Wearable Drone Nixie Flies Up from Your Wrist*, POPULAR SCI. (Sept. 30, 2014), http://www.popsci.com/article/technology/wearable-drone-nixie-flies-your-wrist [https://perma.cc/U9T9-XLBK].

[25] Allison Barrie, *Enormous Phantom Eye Drone Can Stay Aloft for 4 Days*, FOX NEWS (June 6, 2012), [https://perma.cc/4VF8-JKX9].

[26] *Id.*

[27] Nidhi Goyal, *New Solar Powered Drones Will Remain Airborne for Years*, INDUSTRY TAP (Sept. 6, 2013), http://www.industrytap.com/new-solar-powered-drones-will-remain-airborne-for-years/12492 [https://perma.cc/X42D-3T5J]. Facebook wants a drone close to the size of a 747 that could stay aloft for months and beam down wireless signals. Clay Dillow, *Get Ready for 'Drone Nation,'* FORTUNE (Oct. 8, 2014), http://fortune.com/2014/10/08/drone-nation-air-droid/ [https://perma.cc/FKC5-MHTT].

[28] Dillow, *supra* note 27. Multispectral sensor and imaging technology collects data across "the electromagnetic spectrum, usually including light that is visible and invisible to the human eye." James Schlett, *Drones with Multispectral Cameras Bring Efficiency to High-Throughput Plant Phenotyping*, PHOTONICS, https://www.photonics.com/Article.aspx?AID=58350 [https://perma.cc/82DB-SMC5] (last visited Feb. 11, 2018).

platforms that allow live video feeds, infrared cameras, heat sensors, radar, Wi-Fi crackers,[29] and which can spoof (impersonate) cell phone towers.[30] The Department of Rehabilitation and Corrections in Ohio started to test the use of balloon drones to provide continuous monitoring of two prisons.[31] The United States Air Force developed a sensor platform, called Gorgon Stare, which allows monitoring of twenty square miles at a time using "electro-optical and infrared sensors."[32]

The fact that private industry is taking notice and increasingly using drones will likely lead to ever-increasing advances in the technology employed by drones. Industries such as agriculture, construction, energy, mining, and film show great interest in drones.[33] For example, the construction industry plans to use drones on large projects as an extra set of eyes to monitor construction progress and quality.[34] Agriculture in California is determining if cloud seeding (a form of weather modification that attempts to change the amount of precipitation that falls by adding specific chemicals to the clouds) may be done via drone to alleviate drought

[29] Wi-Fi crackers are devices that can defeat a local Wi-Fi network security system.

[30] *Surveillance Drones*, ELEC. FRONTIER FOUND., https://www.eff.org/issues/surveillance-drones [https://perma.cc/S7PD-ZEHY] (last visited Feb. 11, 2018).

[31] *See* Amanda Seitz, *Ohio No Longer Testing Security Drones at Local Prison Sites*, GOV'T TECH. (Mar. 23, 2015), http://www.govtech.com/state/Ohio-No-Longer-Testing-Security-Drones-at-Local-Prison-Sites.html [https://perma.cc/48QQ-8ANM].

[32] David Cenciotti & David Axe, *This New Drone Sensor Can Scan a Whole City at Once*, MEDIUM (Sept. 9, 2014), https://medium.com/war-is-boring/the-new-sensor-on-this-drone-can-scan-a-whole-city-at-once-33c314d4c763 [https://perma.cc/6B2E-QRDH]. While not technically a sensor platform, drones may also be used to carry lethal or non-lethal payloads such as missiles, tasers, or rubber bullets. *Surveillance Drones*, *supra* note 30.

[33] Dillow, *supra* note 27. In 2014, the FAA authorized six movie studios to use drones for filming, the FAA's first commercial authorization of drones in the continental United States. Jack Nicas, *FAA Clears Six Film Companies to Use Drones*, WALL ST. J. (Sept. 25, 2014), http://online.wsj.com/articles/faa-set-to-approve-filmmaking-drones-1411667976 [https://perma.cc/S4M2-NMA4].

[34] John Babel, *Up in the Air: The Emerging Risk of Drones in the Construction Industry*, XL CATLIN (July 21, 2014), http://xlgroup.com/fast-fast-forward/articles/up-in-the-air-the-emerging-risk-of-drones-in-the-construction-industry [https://perma.cc/MT3M-E5AC]. Moreover, despite efforts to keep construction out of public view, one authorized drone captured aerial photographs of Apple's new headquarters. Mark Prigg, *The Spaceship Takes Shape: Drone Footage Reveals the Foundations of Apple's New 'Donut' HQ on the Futuristic 175 Acre Building Site*, DAILY MAIL (Oct. 7, 2014), http://www.dailymail.co.uk/sciencetech/article-2784069/The-spaceship-takes-shape-Drone-footage-reveals-foundations-Apples-new-donut-HQ-futuristic-175-acre-building-site.html [https://perma.cc/2WR9-YEMK].

conditions.[35] Further, energy companies have already been given permission for commercial drone use in Alaska to survey roads and pipelines in remote locations.[36]

Some experts opine that "the extent of [UAV's] potential domestic application is bound only by human ingenuity."[37] Many predict that drone surveillance will eventually provide law enforcement with astounding information about individuals, simply by drones' ability to track a large number of people for a significant period of time, employing high definition cameras and facial recognition software.[38] Drones can conduct surveillance far beyond what helicopters and manned aerial vehicles can do. Furthermore, with technological advancements in data retention software, such tracking information can be retained indefinitely, creating the possibility of future privacy issues.

From a law enforcement standpoint, drones have, at a minimum, three distinct advantages over other types of surveillance: size, cost, and safety. All three can have ramifications for an individual's privacy. First, the variations in the sizes of drones are enormous. There are drones, for example, that are being put to use by the Israeli military, which have a wingspan of over eighty-five feet and weigh four-and-a-half tons.[39] And there are drones the size of a hummingbird equipped with the ability to sound like birds or insects, allowing them to move undetected.[40] It is these smaller

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[35] Brian Fung, *Grow Lights and Drones: How California's Drought Is Driving Farms Into High-Tech*, WASH. POST (Oct. 10, 2014), http://www.washingtonpost.com/blogs/the-switch/wp/2014/10/10/grow-lights-and-drones-how-californias-drought-is-driving-farmers-into-high-tech/ [https://perma.cc/UQV9-YC57]; *see also American Farmers to FAA: Hey, We Want Drones!*, NBC NEWS (Oct. 9, 2014), http://www.nbcnews.com/tech/innovation/american-farmers-faa-hey-we-want-drones-n222296 [https://perma.cc/E8HC-SXAS]; Sydney Brownstone, *Could Drones Help Make Clouds Give Us Rain?*, FAST COMPANY (June 23, 2014), http://www.fastcoexist.com/3032061/could-drones-help-make-clouds-give-us-rain [https://perma.cc/2326-676C]. The University of Illinois is using drones to determine the growth rate of crops and whether those crops need additional attention. Mary Kuhlman, *Farming Takes Flight: Drones Save IL Farmers Time and Money/Public News Service*, PUB. NEWS SERV. (July 21, 2014), http://www.publicnewsservice.org/2014-07-21/environment/farming-takes-flight-drones-save-il-farmers-time-and-money/a40409-1 [https://perma.cc/7NWU-M4PE].

[36] Mike Ahlers, *FAA OKs First Commercial Drone Flights over Land—For BP, in Alaska*, CNN (June 11, 2014), http://www.cnn.com/2014/06/10/us/faa-commercial-drone-approval/ [https://perma.cc/U59J-EPTE].

[37] ALISSA M. DOLAN & RICHARD M. THOMPSON II., CONG. RESEARCH SERV., R42940, INTEGRATION OF DRONES INTO DOMESTIC AIRSPACE: SELECTED LEGAL ISSUES 1 (2013).

[38] Hillary B. Farber, *Eyes in the Sky: Constitutional and Regulatory Approaches to Domestic Drone Deployment*, 64 SYRACUSE L. REV. 1, 4 (2014).

[39] Joe Pappalardo, *How Israel's Biggest Drone Could Take Out Iranian Nukes*, POPULAR MECHANICS (Feb. 23, 2010), https://www.popularmechanics.com/military/a5056/4346921/ [https://perma.cc/A7QB-BGWD].

[40] The "Nano Hummingbird" weighs 19 grams and has a wingspan of 6.5 inches and it can fly sideways, backwards and hover at a speed of up to eleven miles per hour. *AeroVironment Develops World's First Fully Operational Life-Size Hummingbird-Like Unmanned Aircraft for DARPA*, AEROVIRONMENT (Feb. 17, 2011), http://investor.avinc.com/releasedetail.cfm?releaseid=550835 [https://perma.cc/LLS2-DY3S].

drones with the potential to fly undetected and mask their appearance that pose some of the largest threats to individual privacy.

Second, drones are more cost-effective than helicopters or other aerial surveillance, which involve the cost of personnel, maintenance, and fuel at the very least. Drones can be purchased commercially, through Amazon.com, for as little as $37.99,[41] obviously considerably cheaper than any "manned aircraft." As with most advances in technology, the price of drones should be expected to decrease over time. The extremely low cost to both law enforcement and private individuals is undoubtedly one of the primary catalysts for the huge surge in the number of drones. As drones become ubiquitous there will unquestionably be a further loss of privacy.

Third, deploying drones can be helpful in situations where there is risk to human life, such as missing person searches, as well as combatting forest fires and other natural disasters.[42] For example, the Federal Bureau of Investigation ("FBI") admits to using drones "in a limited capacity" for surveillance[43] in instances where it was necessary for "critical information that otherwise would be difficult to obtain without introducing serious risk to law enforcement personnel."[44]

In addition to the FBI's use of drones for safety reasons, multiple other federal, state, and local law enforcement agencies use drones as surveillance tools. For example, Customs and Border Protection ("CBP") has used drones for surveillance on behalf of numerous federal, state, and local agencies, including: the U.S. Immigration and Law Enforcement, the Federal Emergency Management Agency, the U.S. Secret Service, the Drug Enforcement Agency, U.S. Forest Service, the U.S.

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[41] Product Page for RC Quadcopter, *RC Quadcopter, FPVRC X5C-1, 2.4G 4Ch Headless Mode RC Drone with Altitude Mode and HD Camera (White)*, AMAZON, https://www.amazon.com/Quadcopter-FPVRC-Headless-Altitude-Camera/dp/B01MREFVDG/ref=sr_1_2?s=toys-and-games&ie=UTF8&qid=1488144039&sr=1-2-spons&keywords=drones+with+camera&psc=1 [https://perma.cc/98HU-VRFL] (last visited Feb. 11, 2018).

[42] *See, e.g.*, THERESE SKRZYPIETZ, BRANDENBURG INST. FOR SOC' & SEC., BIGS POLICY PAPER: UNMANNED AIRCRAFT SYSTEMS FOR CIVILIAN MISSIONS 10–15 (2012), http://www.bigs-potsdam.org/images/Policy%20Paper/PolicyPaper-No.1_Civil-Use-of-UAS_Bildschirmversion%20interaktiv.pdf [https://perma.cc/W8HH-SGKK]; Robin Murphy, *Drones Save Lives in Disasters, When They're Allowed to Fly (Op-Ed)*, SPACE.COM (Sept. 16, 2015), http://www.space.com/30555-beginning-with-katrina-drones-save-lives-in-disasters.html [https://perma.cc/6YJU-S4TA].

[43] Phil Mattingly, *FBI Uses Drones in Domestic Surveillance, Mueller Says*, WASH. POST (June 19, 2013), http://articles.washingtonpost.com/2013-06-19/world/40070544_1_drones-mueller-privacy-guidelines [https://perma.cc/L7CQ-DPK3].

[44] Kevin Johnson, *Mueller Tells Lawmakers FBI Has Used Drones in U.S.*, USA TODAY (June 19, 2013), https://www.usatoday.com/story/news/politics/2013/06/19/fbi-mueller-irs-investigation-drones/2437993/ [https://perma.cc/TDD7-5XN3].

Department of Energy, the Minnesota Bureau of Criminal Investigation, and the Texas Department of Public Safety, among others.[45] The surveillance has ranged from aerial reconnaissance to missing person searches to drug-related investigations.[46]

In many ways, data collection may be the biggest danger to privacy. While the non-law-enforcement missions involving the surveying of land may appear to be an innocuous use as far as privacy considerations, in conducting the surveys, the drones necessarily collect data on individuals and their privacy. For example, the CBP has announced plans to make the data gathered through its drone surveillance widely available to outside agencies.[47]

Overall, drones bring convenience and adaptability to many physically difficult or unrealistic tasks like never before. However, unfettered use of drones by law enforcement in connection with technology will likely cause a damaging and long-term effect on individual Fourth Amendment privacy rights.

II. DRONES AND PRIVACY

Drones pose complicated questions regarding privacy and security. As with the technological advances at issue throughout the history of the United States, drones evoke questions regarding an individual's "reasonable expectation of privacy" when a technological advancement is not yet "in general public use."[48] Since individuals

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[45] Jennifer Lynch, *Customs & Border Protection Logged Eight-Fold increase in Drone Surveillance for Other Agencies*, ELECTRONIC FRONTIER FOUND. (July 3, 2013), https://www.eff.org/deeplinks/2013/07/customs-border-protection-significantly-increases-drone-surveillance-other [https://perma.cc/74AW-23CC]. This is despite the fact that the CBP's direct mission is to prevent illegal immigrants from crossing the border or smuggling drugs, the CBP allows other law enforcement agencies use its drones for other, unrelated purposes. Kimberly Dvorak, *Homeland Security Increasingly Lending Drones to Local Police*, WASH. TIMES (Dec. 10, 2012), https://www.washingtontimes.com/news/2012/dec/10/homeland-security-increasingly-loaning-drones-to-l/ [https://perma.cc/9ZGR-LUH5].

[46] Lynch, *supra* note 45. Moreover, the predator drones used by the CBP have "highly sophisticated, high resolution Synthetic Aperture Radar ("SAR"), color video, and electron optical ("EO") and infrared cameras, ("IR") and are capable of performing Reconnaissance, Surveillance, Targeting and Acquisition ("RSTA") on and tracking of multiple moving and stationary targets of interest." *Id.* The CBP was also considering equipping its drones with "non-lethal weapons designed to immobilize." *Id.* The CBP also reports using its predator drones for non-law enforcement missions. It has conducted extensive electro-optical, thermal infrared imagery and synthetic aperture radar of levees along the Mississippi River across several states, along with surveying land for the U.S. Geological Survey, the Bureau of Land Management, and the Department of Natural Resources. *Id.*

[47] DEP'T OF HOMELAND SEC., CONCEPT OF OPERATIONS FOR CBP'S PREDATOR B UNMANNED AIRCRAFT SYSTEMS: FISCAL YEAR 2010 REPORT TO CONGRESS 2 (2010), https://www.eff.org/document/customs-border-protection-2010-drone-concept-operations-report-congress [https://perma.cc/CJ4X-XQHQ].

[48] Kyllo v. United States, 533 U.S. 27, 31, 41 (2001).

have at best a limited expectation of privacy in a matter held out to the public,[49] government searches are largely restricted based on the methods and media law enforcement uses compared to the evolving societally accepted expectation of privacy. To put it simply, the more widely available the particular technology is, the less the privacy the individual is afforded against government use.[50] Or, as Joseph J. Vacek aptly states, "the test seems to turn on whether Wal-Mart sells it or not."[51]

Such variations in technology show that courts may struggle with what constitutes a search when drones are involved, particularly given that drones can fly at a much lower altitude than helicopters and planes.[52] Individuals may not be able to take actions to protect their privacy because they are not aware of the capabilities of drones. For example, if a person not wishing to be identified sitting outside in her backyard were aware that a drone could be employing facial recognition technology she may choose to sit inside or otherwise cover her backyard.

In 2010, the FAA predicted there would be 15,000 drones purchased annually in the United States alone by 2020.[53] Instead, there were *616,000* drones registered in 2016[54] and the FAA now predicts *seven million* drones could be purchased annually by 2020.[55]

Seven million drones. The fact that a federal agency issued a report pointing to this possibility alone should have set off alarms from those concerned with privacy issues, let alone the general public. Yet few alarms have sounded. Some scholars have, of course, recognized the threat to privacy posed by drones. Professor M. Ryan Calo, former Director for Privacy and Robotics at Stanford Law School's Center for Internet & Society, in his essay, *The Drone as Privacy Catalyst*, accurately predicted over five years ago the threat drones pose to privacy, and the fact that "[e]xisting privacy law will not stand in its way."[56] Yet, amidst the dark picture Calo paints with references to Orwell's Oceania, there are hints of optimism in his essay as well. After bemoaning the stagnation of privacy law generally, he turns hopeful that the sheer visibility of drones will serve as a wakeup call to the public: "But unlike the

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[49] *See infra* Part III.B.; *Kyllo*, 533 U.S. at 34.

[50] *Kyllo*, 533 U.S. at 35–41.

[51] Joseph J. Vacek, *Big Brother Will Soon Be Watching—Or Will He? Constitutional, Regulatory, and Operational Issues Surrounding the Use of Unmanned Aerial Vehicles in Law Enforcement*, 85 N.D. L. REV. 673, 683 (2009).

[52] At least one scholar has predicted that "[e]ventually, the UAV will replace the helicopter as the preferred method for conducting aerial surveillance." Farber, *supra* note 38, at 8.

[53] FED. AVIATION ADMIN., FAA AEROSPACE FORECAST: FISCAL YEARS 2010–2030 48 (2010), https://www.faa.gov/data_research/aviation/aerospace_forecasts/2010-2030/media/2010%20Forecast%20Doc.pdf [https://perma.cc/2Z7S-2EPN].

[54] Fed. Aviation Admin., *Drone Registration Marks First Anniversary*, https://www.faa.gov/news/updates/?newsId=87049 [https://perma.cc/3X6G-F8MR] (last modified Dec. 21, 2016).

[55] FED. AVIATION ADMIN., FAA AEROSPACE FORECAST: FISCAL YEARS 2016–2036 31 (2016), https://www.faa.gov/data_research/aviation/aerospace_forecasts/media/FY2016-36_FAA_Aerospace_Forecast.pdf [https://perma.cc/7QUY-YQQX].

[56] Calo, *supra* note 23, at 29.

debates [surrounding privacy and technology] of recent decades, I think these arguments [that drones threaten our dwindling individual and collective privacy] will gain serious traction among courts, regulators, and the general public."[57] That has yet to happen. Instead, Calo's more ominous prediction that the government would make few efforts to protect privacy while "FAA restrictions relax and private and public drones quickly fill the sky," has seemingly come true.[58]

At this moment in time when the FAA has just issued regulations involving small unmanned aircraft systems,[59] we stand on the precipice of the unmanned aircrafts going into "the general public use."[60] This first round of FAA regulations, which became effective in August 2016, does not reference privacy.[61] Rather, privacy concerns have been left to legislators.[62]

According to Professor Calo, drones could be just "the visceral jolt society needs to drag privacy law into the twenty-first century."[63] Moreover, Calo states that, "the development of American privacy law has been slow and uneven; the advancement of information technology has not. The result is a widening chasm between our collective and individual capacity to observe one another and the protections available to consumers and citizens under the law."[64]

When considering the privacy implications of drones, the potential implications are numerous, but one of the most obvious is video surveillance. Some scholars have opined that there is no difference between government surveillance through undercover agents and electronic surveillance. Anthony Amsterdam, for example, claims to see very little difference in that

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[57] *Id.* at 32.

[58] *Id.*

[59] Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed Reg. 9544-01 (Feb. 23, 2015) (to be codified at 14 C.F.R. pt. 107).

[60] In August 2016, the FAA issued regulations governing drones under 55 lbs. 14 C.F.R. pt. 107. They make no reference to privacy, but some of the key points include requiring that drones not to fly directly above an individual who is not operating the drone; the drones may not fly above 400 feet; and requiring that the drones must be within the "line of sight" of the operator. *Id.* That said, the regulations also include a process to grant waivers from the requirements. *Id.* As of July 2017, over 1,000 UAS operators have been granted waivers. *More than 1,000 FAA Part 107 Drone Waivers Granted*, POINT OF BEGINNING (Sept. 5, 2017), https://www.pobonline.com/articles/101090-more-than-1000-faa-part-107-drone-waivers-granted [https://perma.cc/5VZL-NEL4].

[61] *See* 14 C.F.R. pt. 107.

[62] *See Minutes of the Meeting of the Assembly Committee on Judiciary*, 2015 Leg., 78th Sess. 20 (Nev. 2015) (statement of Assemblyman Elliot T. Anderson), https://www.leg.state.nv.us/Session/78th2015/Minutes/Assembly/JUD/Final/563.pdf [https://perma.cc/Z37F-7GSW].

[63] Calo, *supra* note 23, at 29.

[64] *Id.* at 30.

> [b]oth tend to repress crime in the same way, by making people distrustful and unwilling to talk to one another. The only difference is that under electronic surveillance you are afraid to talk to anybody in your office or over the phone, while under a spy system you are afraid to talk to anybody at all.[65]

However, the legal implications of electronic surveillance versus physical surveillance diverge at the point where technology exceeds physical capabilities, including in scope of observation, location, longevity, and resources.

In modern society, people can, and do, use cell phones to take videos all the time.[66] Such cell phone video is largely subject to the state laws governing torts and privacy. In theory, video taken by drones would be subject to the same tort law. Although some scholars have opined that there is no meaningful connection between the right to informational privacy in constitutional law and the privacy torts,[67] Richard C. Turkington posits that:

> [t]he connection . . . between informational privacy rights in constitutional law and torts is in the nature of the injury and not in the character of the actor that causes the injury. It is the loss of the condition of privacy and the intellectual tradition that is the foundation of the privacy rights that links informational privacy rights in tort and constitutional law.[68]

In considering the privacy implications of drones, the sky is the limit as far as the ways in which advances in surveillance technology and the way they interface with drones will increase exponentially. Therefore, it is incumbent upon policymakers to be forward-thinking and creative in envisioning the privacy implications for increased numbers of drones in the airspace.

A. Privacy Generally

Privacy is a commonly held value given that all individuals have some common perceptions about privacy[69] and value some degree of privacy. And yet privacy is

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[65] Anthony G. Amsterdam, *Perspectives on the Fourth Amendment*, 58 MINN. L. REV. 349, 407 (1974).

[66] Interestingly, in several recent high profile criminal cases it is the video of a private citizen that led police to charge an individual police officer with a crime. Of course, police can subpoena video and could subpoena video from drones.

[67] *See* J. T. MCCARTHY, THE RIGHTS OF PUBLICITY AND PRIVACY § 5.7(B) 5–54 (2d ed. 2001).

[68] Richard C. Turkington, *Legacy of the Warren and Brandeis Article: The Emerging Unencumbered Constitutional Right to Informational Privacy*, 10 N. ILL. U. L. REV. 479, 490–91 (1990).

[69] PRISCILLA M. REGAN, LEGISLATING PRIVACY: TECHNOLOGY, SOCIAL VALUES, AND PUBLIC POLICY 213, 225 (1995).

not monolithic. For example, in his seminal law review article titled *Privacy*, Charles Fried describes privacy as:

> control over knowledge about oneself. But it is not simply control over the quantity of information abroad; there are modulations in the quality of the knowledge as well. We may not mind that a person knows a general fact about us, and yet feel our privacy invaded if he knows the details.[70]

In addition to having individual personal value, privacy is also a public societal value in that it is at the core of securing the promises of a democratic society. That is, it not only protects the individual "as a restraint on the government or on the use of power."[71]

Undoubtedly, much of the legal discussion around privacy protections revolves around the U.S. Constitution and the Fourth Amendment.[72] But does the Fourth Amendment protect the individual or society? As Anthony Amsterdam provocatively writes:

> Does [the Fourth Amendment] safeguard *my* person and *your* house and *her* papers and *his* effects against unreasonable searches and seizures; or is it essentially a regulatory canon requiring government to order its law enforcement procedures in a fashion that keeps us collectively secure in our persons, houses, papers, and effects, against unreasonable searches and seizures?[73]

The Constitution does "protect us from government fishing expeditions whereby police invade the private realms of our life in search of details that would justify subjecting us to an arrest or other seizure."[74]

What is deemed to be private—and afforded Fourth Amendment protections—is continually evolving with the incorporation of technology into our society. The meaning of "persons, houses, papers, and effects" is expansive, and the judicial system struggles with balancing an individual's right to privacy and the government's need for law and order.

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[70] Charles Fried, *Privacy*, 77 YALE L.J. 475, 483 (1968).

[71] REGAN, *supra* note 69, at 225.

[72] U.S. CONST. amend IV ("The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.").

[73] Amsterdam, *supra* note 65, at 367.

[74] Blitz, *supra* note 10, at 84.

B. Influences of Technological Advancements on Privacy

One of the primary changes around privacy law in the electronic age is how one demonstrates a "reasonable expectation of privacy." When individuals were attempting primarily to protect physical objects such as diaries, bank statements, or private letters, they could exhibit that expectation of privacy by keeping them in a safe deposit box or a locked drawer or putting them under a mattress. If the government wanted to find out about what books individuals were reading, their personal hobbies and interests, or individuals corresponded with, it would be required to obtain a search warrant under the Fourth Amendment.[75]

Now, of course, people keep journals and diaries, bank statements, books, Google searches and emails on telephones, which are carried with them from place to place. The fact that this information is not locked away in a secret place makes it more difficult to establish a privacy interest. These technological advances have influenced privacy law. To claim, however, that there was only one wave of "technology" that influenced privacy law, however, would be overly simplistic. Starting with the invention of the telegraph in 1844,[76] which was the first technological advancement to facilitate private conversations almost instantaneously, technology quickly developed to tap those communications.[77] Determined to be "an outrage upon the liberties of the citizen,"[78] Congress debated whether this new medium of communication should be afforded the protections of a mailed letter.[79] After a failed congressional attempt to protect the privacy of telegram users, the judiciary branch took control, refusing to issue subpoenas, analogizing law enforcement's intercepting telegrams to its opening of a mailed letter.[80] States soon followed the courts' rulings, enacting laws that barred disclosure of telegram communications—an early predicate to handling the many technological advancements to come.[81]

Thereafter, as detailed in Samuel Warren and Louis Brandeis' article, *The Right to Privacy*, referred to by some as the most influential law review article ever written,[82] legal scholars and the judiciary continued to struggle with protecting

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[75] DANIEL J. SOLOVE, NOTHING TO HIDE: THE FALSE TRADEOFF BETWEEN PRIVACY AND SECURITY 102 (2011).

[76] *Samuel F. B. Morse Papers at the Library of Congress, 1793 to 1919*, LIB. CONGRESS, https://www.loc.gov/collections/samuel-morse-papers/articles-and-essays/invention-of-the-telegraph/ [https://perma.cc/2H2M-TKRN] (last visited Feb. 11, 2018).

[77] DANIEL J. SOLOVE, A BRIEF HISTORY OF INFORMATION PRIVACY LAW § 1:3.1 (2006), http://scholarship.law.gwu.edu/cgi/viewcontent.cgi?article=2076&context=faculty_publications [https://perma.cc/KTV2-9BJ6].

[78] DAVID J. SEIPP, THE RIGHT TO PRIVACY IN AMERICAN HISTORY 31 (1978).

[79] SOLOVE, *supra* note 77, at § 1:3.1.

[80] *Id.*

[81] *Id.*

[82] Harry Kalven, Jr., *Privacy in Tort Law—Were Warren and Brandeis Wrong?*, 31 L. & CONTEMP. PROBS. 326, 327 (1966) (Warren and Brandeis's "The Right to Privacy" is the "most influential law review article of all."); *see also* William L. Prosser, *Privacy*, 48 CAL.

privacy[83] from the encroachments of technological advancements. In 1890, Warren and Brandeis bemoaned the invention of cameras with the ability to take "instantaneous photographs."[84] Warren and Brandeis concerned themselves with the "numerous mechanical devices [that] threaten to make good the prediction that 'what is whispered in the closet shall be proclaimed from the house-tops.'"[85]

In his book, *Privacy and Freedom*, Alan Westin refers to three specific technological advances of the late nineteenth century, which, he claimed "altered the balance between personal expression and third-party surveillance that had prevailed since antiquity."[86] The first was the invention of the telephone and "its development into an indispensable instrument of personal, business, political, and governmental life."[87] Indeed, within ten years of the invention of the telephone in the 1880s, wiretapping began and police were listening in on criminal investigations. The second innovation was the invention of the microphone and "dictograph recorder," which allowed third parties to listen in from far away and to record those conversations. "The age of hidden microphones had begun."[88]

The third technological innovation was that of "instantaneous photography."[89] Prior to Kodak's invention of fixed-focus photography, individuals were required to

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L. REV. 383, 383 (1960); MCCARTHY, *supra* note 67, at 1–8; Turkington, *supra* note 68, at 481 ("It is likely that *The Right To Privacy* has had as much impact on the development of law as any single publication in legal periodicals.").

[83] *See* Hyman Gross, *The Concept of Privacy*, 42 N.Y.U. L. REV. 34, 36 (1967) ("The law does not determine what privacy is, but only what situations of privacy will be afforded legal protection.").

[84] The "instantaneous photographs" refers to advances in photography that took place in the 1880s that allowed for an individual to take snapshots. Prior to this point, it would take several minutes to take a photograph, with the individual sitting still the entire time. RICHARD C. TURKINGTON & ANITA L. ALLEN, PRIVACY LAW CASES AND MATERIALS 45 (2d ed. 2002); *see also* ALAN F. WESTIN, PRIVACY AND FREEDOM 336, 338 (1967). The telephone, microphone, and digital recorder, with ability to tap telephone lines were also invented/developed in the later decades of the nineteenth century. TURKINGTON & ALLEN, *supra,* at x.

[85] Samuel D. Warren & Louis D. Brandeis, *The Right to Privacy*, 4 HARV. L. REV. 193, 195 (1890). The Warren and Brandeis seminal privacy article was undoubtedly influenced by changes in technology in the late nineteenth century:

> Recent inventions and business methods call attention to the next step which must be taken for the protection of the person, and for securing to the individual what Judge Cooley calls the right "to be let alone." Instantaneous photographs and newspaper enterprise have invaded the sacred precincts of private and domestic life; and numerous mechanical devices threaten to make good the prediction that "what is whispered in the closet shall be proclaimed from the house-tops."

Id. (internal citations omitted); *see* Turkington, *supra* note 68, at 489.

[86] WESTIN, *supra* note 84, at 338.

[87] *Id.*

[88] *Id.*

[89] *Id.*

sit still for several minutes while the photographer prepared the plate. Once Kodak created "fixed-focus" photography, "[a]mateurs could now make candid snapshots of people and events, enabling man's physical state, expressions, and actions to be captured on permanent film without his prior consent."[90] Westin posits that the American legal system did not respond to the threats to privacy from these technological advances until the 1950s,[91] some seventy years after their introduction in the 1880s, thus demonstrating the difficulty courts may have in catching up with technological advances affecting privacy.

Protecting an individual's privacy in the late nineteenth century was largely governed by traditional tort and contract doctrines, such as asserting claims of "trespass, assault, deceit, and contract."[92] Judge Thomas Cooley's treatise on torts emphasized the right "to be let alone," which routinely appeared in the early common-law based privacy actions prior to the 1950s.[93] Slowly through judicial opinions and influential legal scholarship, privacy rights changed from protecting one's "person and tangible property"[94] to protecting one's sensations, emotions, and spiritual nature.[95] The following years brought roughly three hundred privacy cases[96] to state courts around the country, adopting common law principles,[97] similar to that detailed by Warren and Brandeis in 1890:

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[90] *Id.*

[91] *Id.* at 338–39.

[92] *Id.* at 344–45 ("Several state courts had spoken of a right of privacy during the late 1800s in cases involving intrusion by the owner of a house into a guest's room for purposes of sexual assault; the introduction of a young unmarried man by an attending doctor at a birth in a private home, assumed by the mother to be a medical assistant; and the attempt of a promoter who took a photograph of an actress on stage in tights to use the picture for advertising purposes without her consent.").

[93] *Id.* at 344.

[94] Ronald J. Bacigal, *Some Observations and Proposals on the Nature of the Fourth Amendment*, 46 GEO. WASH. L. REV. 529 (1978).

[95] Warren & Brandeis, *supra* note 85, at 193, 206.

[96] Westin postulates several reasons for the lack of surveillance-based claims including an individual's ignorance of the government's intrusion on their telephone calls and the inability to prove that an intrusion occurred without any tangible evidence, like a circulated photograph. WESTIN, *supra* note 84, at 347; *see also* SOLOVE, *supra* note 77, at § 1:4.1[A][1] (discussing Roberson v. Rochester Folding Box Co., 64 N.E. 442 (N.Y. 1902), where a woman sued for being humiliated after her photograph was used for an advertisement, and the court and the court "refused to recognize a cause of action because there was 'no precedent for such an action to be found in the decisions of this court.'"). Further, under the available common law principles it was difficult to determine who actually had a right to assert a claim and the extent of the actual injury. WESTIN, *supra* note 84, at 347. Evolving and conflicting values involving private law enforcement, circulating mass media, and the delay in technological expansion across the country also played a part in why so few cases explored this type of privacy right claims. *Id.* at 348–49.

[97] WESTIN, *supra* note 84, at 346.

> [T]he existing law affords a principle which may be invoked to protect the privacy of the individual from invasion either by the too enterprising press, the photographer, or the possessor of any other modern device for recording or reproducing scenes or sounds. For the protection afforded is not confined by the authorities to those cases where any particular medium or form of expression has been adopted, nor to products of the intellect.[98]

III. FOURTH AMENDMENT SUPREME COURT PRIVACY JURISPRUDENCE

A. The Early Electronic Surveillance Cases

Privacy rights have developed over time, often in response to the government's use of new technologies. In the late nineteenth century, the United States Supreme Court first began addressing individuals' privacy rights vis-a-vis their personal writings in the context of the Fourth Amendment. First, in *Ex parte Jackson*,[99] the United States Supreme Court held that when an individual placed a sealed letter in the mail, the contents of that letter were subject to the warrant requirements of the Fourth Amendment.[100] A decade later, in *Boyd v. United States*,[101] the Supreme Court further held that a government's request to produce and hand over an individual's private papers violated the Fourth and Fifth Amendments.[102] It was not until the twentieth century, however, that the Supreme Court began addressing privacy rights in light of the great technological advancements made in the late nineteenth century.[103]

Since the outset of the twentieth century, the Supreme Court has struggled with the parameters of the Fourth Amendment as they apply when technological advancements and individual privacy interests intersect. Beginning with *Olmstead v. United States*,[104] the Supreme Court addressed numerous cases involving mechanical wiretapping of telephones.[105] In those cases, the Supreme Court focused

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[98] Warren & Brandeis, *supra* note 85, at 206.

[99] 96 U.S. 727 (1877).

[100] *Id.* at 733 ("The Constitutional guarant[ee] of the right of the people to be secure in their papers against unreasonable searches and seizures extends to their papers, thus closed against inspection, wherever they may be.").

[101] Boyd v. United States, 116 U.S. 616 (1886).

[102] *Id.* at 630 (linking the Fourth Amendments' prohibition against Unreasonable search and seizure to the guarantee against self-incrimination protected in the Fifth Amendment so as to provide protection to "the sanctity of a man's home and the privacies of life").

[103] Warren & Brandeis, *supra* note 85, at 195.

[104] 277 U.S. 438 (1928).

[105] *Id.* at 475; Lopez v. United States, 373 U.S. 427, 438–40 (1963) (finding that police recording conversations between agent and defendant on an electronic device did not violate defendant's Fourth Amendment rights); Silverman v. United States, 365 U.S. 505, 509–11 (1961) (holding that law enforcement violated the Fourth Amendment when they used "spike mike" inserted into the baseboard of an attached house on the wall adjoining the defendant's house because it was an "unauthorized physical encroachment" into defendant's house); Goldman v. United States, 316 U.S. 129, 134–36 (1942) (holding there was no Fourth

primarily on where the wiretap was placed—and the concomitant physical intrusion on to the property—rather than the perceived level of privacy that was invaded.[106]

In *Olmstead*, for the first time, the United States Supreme Court addressed a case involving *electronic* surveillance. There, the Supreme Court concluded that the Fourth Amendment protections were limited to circumstances where there was a physical trespass, which, it held, did not include a wiretap attached to the outside of an individual's house.[107] In essence, the *Olmstead* Court found that the Fourth Amendment was not violated "unless there has been an official search and seizure of [a] person or such a seizure of his papers or his tangible material effects or an actual physical invasion of his house 'or curtilage'[108] for the purpose of making a seizure."[109]

B. United States v. Katz *and the Reasonable Expectation of Privacy Test*

The Supreme Court continued to apply the *Olmstead* physical trespass doctrine throughout the twentieth century to cases involving technology such as "detectaphones" and "spike mikes."[110] In *Katz v. United States*,[111] however, the Court explicitly altered course, rejecting the *Olmstead* reasoning and the bedrock physical intrusion (trespass) theory for finding a search to violate the Fourth

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Amendment violation when police used a device called a "detectaphone" to listen to an individual's conversation in an adjacent office because there was no physical trespass).

[106] *See* Olmstead v. United States, 277 U.S. 438, 475 (1928) (Brandeis, J., dissenting) ("[E]vil incident to invasion of the privacy of the telephone is far greater than that involved in tampering with the mails."). Not surprisingly, Justice Brandeis objected to the majority's focus on physical trespass, opining that "[i]t is, of course, immaterial where the physical connection with the telephone wires leading into the defendant's premises was made." *Id.*

[107] *Id.* at 466.

[108] Curtilage is generally considered the "land immediately surrounding and associated with the home." Oliver v. United States, 466 U.S. 170, 180 (1984). For a more detailed analysis of the Supreme Court's four-factor curtilage test, see *United States v. Dunn*, 480 U.S. 294 (1987).

[109] *Olmstead*, 277 U.S. at 466. In his dissenting opinion in *Olmstead*, Justice Brandeis continued to forcefully argue—in a vein similar to which he had argued some thirty years prior—that the Supreme Court needed to be forward-thinking in its conceptualization of the Fourth Amendment and technological advancements:

> '[I]n the application of a Constitution, our contemplation cannot be only of what has been but of what may be.' The progress of science in furnishing the Government with means of espionage is not likely to stop with wire-tapping. Ways may someday be developed by which the Government, without removing papers from secret drawers can reproduce them in court, and by which it will be enabled to expose to a jury the most intimate occurrences of the home.

Id. at 474 (Brandeis, J., dissenting).

[110] *See, e.g.*, *supra* note 105 and accompanying text.

[111] 389 U.S. 347 (1967).

Amendment.[112] *Katz* involved wiretapping technology similar to that at issue in *Olmstead*,[113] although the conversations at issue took place inside a public telephone booth. In its holding, the Court explicitly overruled its decades-old opinion in *Olmstead*.[114]

The majority held that whether the police action constituted a search in violation of the Fourth Amendment depended on whether the information had been "knowingly expose[d] to the public,"[115] irrespective of the physical location or whether the individual had sought to keep the information private.[116] The *Katz* Court, rejecting the "physical trespass" property construct, declared that the Fourth Amendment "protects people, not places."[117] It further limited the Fourth Amendment protection[118] by stating that "[w]hat a person knowingly exposes to the public, even in his own home or office, is not a subject of Fourth Amendment protection. But what he seeks to preserve as private, even in an area accessible to the public, may be constitutionally protected."[119]

The "reasonable expectation of privacy test" became the core of Supreme Court jurisprudence surrounding Fourth Amendment protection[120] after *Katz*.[121] Justice Harlan constructed a two-part test to determine when a person has a reasonable expectation of privacy.[122] Under this test, (1) the person must "have exhibited an actual (subjective) expectation of privacy"; and (2) the expectation must be "one that society is prepared to recognize as 'reasonable.'"[123] Justice Harlan's concurrence is intriguing on several levels. It is best known for the articulation of the "reasonable expectation of privacy" construct. And while it purported to agree with the majority's opinion that the Fourth Amendment "protects people, not

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[112] *Id.* at 512.

[113] At issue in *Katz*, however, was law enforcement's wiretapping of a conversation in a public telephone booth, which would not have constituted a physical trespass or intrusion of Katz's property, and consequently would not have violated the Fourth Amendment. *Id.* at 347.

[114] *Id.* at 353. ("[T]he underpinnings of *Olmstead* . . . have been so eroded by our subsequent decisions that the 'trespass' doctrine there enunciated can no longer be regarded as controlling.").

[115] *Id.* at 351.

[116] *Id.*

[117] *Id.*

[118] Whether *Katz* was intended to limit the protections of the Fourth Amendment is not without dispute. *See* United States v. Jones, 565 U.S. 400, 408 (2012) ("Katz did not narrow the Fourth Amendment's scope.").

[119] *Katz*, 389 U.S. at 351 (citation omitted).

[120] SOLOVE, *supra* note 75, at 114. This is why many commentators were surprised at the majority's reliance on *Olmstead*'s seemingly antiquated trespass doctrine in *United States v. Jones*. *See infra* Part III.D.2.

[121] *Katz*, 389 U.S. at 350–51 ("But the 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.").

[122] *Id.* at 361–62 (Harlan, J., concurring).

[123] *Id.* at 361 (Harlan, J., concurring).

places," it moved the discussion forward by then saying: "The question, however, is what protection it affords those people. Generally, as here, the answer to that question requires reference to a 'place.'"[124] While still rejecting the *Olmstead* trespass doctrine that looked almost exclusively at whether the government had physically trespassed on an individual's property, Justice Harlan clarified that the place where the search occurred is still relevant to whether the expectation of privacy is reasonable.[125]

To this day, the Supreme Court's Fourth Amendment search jurisprudence is strongly aligned with concepts of privacy vis-a-vis property,[126] despite the *Katz* majority's insistence that the Fourth Amendment is about protecting people and not places.

Again, the *Katz* test required both a subjective expectation of privacy and an objective expectation of privacy, or one that society is prepared to recognize as "reasonable." However, the Supreme Court has since parsed much of Justice Harlan's language. First, the Court has read the word "reasonable" as being synonymous with "legitimate."[127] Therefore, an individual in the midst of committing a crime may in fact have exhibited a subjective expectation of privacy, and that expectation may also be reasonable. For example, the individual committing the crime may know there is no one in the bank and that he has completely and correctly disabled the security systems. It may be reasonable for him to believe he

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[124] *Id.*

[125] *Id.*

[126] Stephen E. Henderson, *Beyond the (Current) Fourth Amendment: Protecting Third-Party Information, Third Parties, and the Rest of Us Too*, 34 PEPP. L. REV. 975, 976 (2007); *see also* Susan W. Brenner, *The Fourth Amendment in an Era of Ubiquitous Technology*, 75 MISS. L.J. 1, 31–32, 51 (2005) (arguing that even after the Court's rejection of the physical trespass of property lens for looking at privacy in *Katz*, the Supreme Court "has continued to approach Fourth Amendment privacy as if it is nothing more than a spatial concept; what I seclude from others is private; what I fail to shield is not.").

[127] The Supreme Court first substituted the word "legitimate" for "reasonable" in its majority opinion. United States v. Miller, 425 U.S. 435, 442 (1976). It did so without explanation, citing only to "*Cf. Couch v. United States*." *Id.* (citing Couch v. United States, 409 U.S. 322, 335 (1973)); *see* Smith v. Maryland, 442 U.S. 735, 740 (1979) ("[T]his Court uniformly has held that the application of the Fourth Amendment depends on whether the person invoking its protection can claim a 'justifiable,' a 'reasonable' or a 'legitimate expectation of privacy' that has been invaded by government action."); Rakas v. Illinois, 439 U.S. 128, 148 (1978) (finding that passengers of a vehicle "made no showing that they had any legitimate expectation of privacy in the glove compartment or area under the seat of the car in which they were merely passengers"); *see also* Richard Sobel et al., *The Fourth Amendment Beyond* Katz, Kyllo *and* Jones*: Reinstating Justifiable Reliance as a More Secure Constitutional Standard for Privacy*, 22 B.U. PUB. INT. L.J. 1, 2 (2013) (arguing for "reinstating the *Katz* majority holding a justifiable reliance standard reinforcing that the Fourth Amendment protects 'people not places'—as the better mechanism to secure Fourth Amendment rights").

is utterly alone. There is no doubt, however, that such an expectation of privacy is not a legitimate one and not "one that society is prepared to recognize as reasonable."[128]

Moreover, in *Smith v. Maryland*,[129] Justice Blackmun, writing for the majority, opined that there are some foreseeable circumstances under which a subjective expectation of privacy would not be required.[130] He put forth the example that for an immigrant from a "totalitarian country" who may not have an understanding of "this Nation's traditions, erroneously assum[ing] that police were continuously monitoring his telephone conversations, a subjective expectation of privacy regarding the contents of his calls might be lacking as well."[131] Under such circumstances, Justice Blackmun advocated for abandoning the subjective expectations requirement since "those subjective expectations obviously could play no meaningful role" in determining the scope of Fourth Amendment protection.[132] Instead, he claimed that a "normative inquiry" should be used,[133] leaving unanswered how such an inquiry should be undertaken. Professor Susan Freiwald criticizes the Court's decision in *Smith* precisely because it "avoided normative analysis and failed to consider how much privacy the law *should* actually grant to information."[134]

C. The Aerial Surveillance Trilogy[135]

Less than a decade after *Smith v. Maryland*,[136] the Supreme Court interpreted the expectation of privacy "that society is prepared to recognize as reasonable"[137]

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[128] *Katz*, 389 U.S. at 361 (Harlan, J., concurring); *see also* Illinois v. Caballes, 543 U.S. 405, 408 (2005) ("We have held that any interest in possessing contraband cannot be deemed 'legitimate.'"). "The critical question, then, is whether society is prepared to recognize Skinner's expectation of privacy as legitimate." United States v. Skinner, 690 F.3d 772, 785 (6th Cir. 2012) (Donald, J., concurring) ("[N]umerous courts have held that privacy expectations are not diminished by the criminality of a defendant's activities.").

[129] 442 U.S. 735 (1979).

[130] *Id.* at 741–42.

[131] *Id.* at 740 n.5. Blackmun gave a second more-chilling example, namely, "if the Government were suddenly to announce on nationwide television that all homes henceforth would be subject to warrantless entry, individuals thereafter might not in fact entertain any actual expectation [of] privacy regarding their homes, papers, and effects." *Id.*

[132] *Id.*

[133] *Id.*

[134] Susan Freiwald, *Online Surveillance: Remembering the Lessons of the Wiretap Act*, 56 ALA. L. REV. 9, 40, 66 (2004). For further critiques of *Smith v. Maryland*, see Patricia Bellia, *Surveillance Law Through Cyberlaw's Lens*, 72 GEO. WASH. L. REV. 1375, 1427–33 (2004); Daniel J. Solove, *Digital Dossiers and the Dissipation of Fourth Amendment Privacy*, 75 S. CAL. L. REV. 1083, 1134–38 (2002).

[135] Professor Joseph J. Vacek refers to the *Ciraolo*, *Dow Chemical* and *Florida v. Riley* cases as the "aerial surveillance trilogy." Vacek, *supra* note 51, 681.

[136] 442 U.S. 735 (1979).

[137] *Id.* at 740 (internal citations omitted).

narrowly in a trio of cases involving aerial surveillance.[138] In fact, in this series of cases, the Court found that evidence gathered by law enforcement through aerial surveillance did not constitute a search. That said, in two of the aerial surveillance cases—*California v. Ciraolo*[139] and *Dow Chemical v. United States*[140]—the Court alludes to advances in technology that *could* lead the Court to find that law enforcement's use of sophisticated surveillance equipment, which the public may not even be aware exists, could constitute a search requiring a warrant.[141]

1. California v. Ciraolo

In the first case in this trilogy, the Supreme Court held that there was no Fourth Amendment violation when police took photographs of marijuana plants in the defendant's backyard from a plane one thousand feet above.[142] In *California v. Ciraolo*, the police received an anonymous tip that marijuana was growing in the defendant's backyard.[143] Unable to see through two fences surrounding the backyard, the police obtained a private airplane and a thirty-five-millimeter camera to fly over the backyard and take a photograph of the marijuana plants.[144] The police used their naked-eye observations and photograph of the marijuana to obtain a search warrant.[145]

In determining this was not a search, the Court acknowledged the validity of Ciraolo's subjective expectation of privacy by erecting the fences in his backyard, completely obscuring it from public view at ground level.[146] However, the Court found that society would not accept as reasonable[147] an expectation of privacy from surveillance that "took place within public navigable airspace . . . [given that] [a]ny

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[138] Florida v. Riley, 488 U.S. 445, 447 (1989); California v. Ciraolo, 476 U.S. 207, 210 (1986); Dow Chem. Co. v. United States, 476 U.S. 227, 239 (1986).

[139] 476 U.S. 207 (1986).

[140] 476 U.S. 227 (1986).

[141] *Ciraolo*, 476 U.S. at 215 n.3 ("[A]erial observation . . . may become invasive, either due to physical intrusiveness or through modern technology which discloses to the senses those intimate associations, objects or activities otherwise imperceptible to police or fellow citizens.") (citations omitted). Specifically, in *Dow Chemical*, the Court opined that "surveillance of private property by using highly sophisticated surveillance equipment *not generally available to the public*, such as satellite technology, might be constitutionally proscribed absent a warrant." *Dow Chem.*, 476 U.S. at 238 (emphasis added). In *Florida v. Riley*, although the alleged search involved pictures taken with a telephoto lens, the Court took pains to articulate that the police officer had identified the marijuana with his "naked eye," leaving open the possibility of a different result in a case involving more advanced technology. 488 U.S. at 448–49.

[142] *Ciraolo*, 476 U.S. at 215.

[143] *Id.* at 209.

[144] *Id.*

[145] *Id.* at 209–10.

[146] *Id.* at 211.

[147] *Id.* at 214.

member of the public flying in this airspace who glanced down could have seen everything that these officers observed."[148]

Ciraolo could not escape from the routine of flight and use of public airways one thousand feet above his backyard. However, the Court did note that this type of aerial observation may become invasive by physical intrusiveness or "through modern technology which discloses to the senses those intimate associations, objects or activities otherwise imperceptible to police or fellow citizens."[149]

2. Dow Chemical v. United States

On the same day, the Court held similarly in *Dow Chemical v. United States* that taking aerial photographs from publicly navigable airspace was not a Fourth Amendment violation.[150] The Court determined that mere enhancement of the naked eye through the use of an aerial mapping camera did not constitute a search.[151] In *Dow Chemical*, a chemical manufacturing company, which barred ground level public view of its plant and investigated low-level flights above its plant, denied the EPA's request for an on-site administrative inspection.[152] In response, the EPA hired a commercial aerial photographer with an aerial mapping camera to take photographs of the plant, which Dow Chemical argued was beyond the EPA's statutory right of site inspection.[153]

Holding that taking "aerial photographs of an industrial plant complex from navigable airspace is not a search prohibited by the Fourth Amendment,"[154] the Court looked carefully at the type of camera technology that was used—"a conventional, albeit precise, commercial camera commonly used in mapmaking"—as well as the absence of visible intimate details captured in the picture.[155] Though the Court did not find it applicable in the present case, it hypothesized that there may be some instances where warrantless government surveillance of private property could constitute a search in violation of the Fourth Amendment. Here, though, instead of focusing on physical intrusiveness or technology "which discloses to the senses . . . intimate associations,"[156] as it had in *Ciraolo*, the court focused on the type of technology: "surveillance of private property by using highly sophisticated surveillance equipment not generally available to the public, such as satellite

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[148] *Id.* at 213–14.
[149] *Id.* at 215 n.3.
[150] Dow Chem. Co. v. United States, 476 U.S. 227, 239 (1986).
[151] *Id.* at 238.
[152] *Id.* at 229.
[153] *Id.* at 229–30.
[154] *Id.* at 239.
[155] *Id.* at 238.
[156] California v. Ciraolo, 476 U.S. 207, 215 n.3 (1986). According to *Kyllo*, "in *Dow Chemical* we observed that the enhanced aerial photography did not reveal any 'intimate details.'" Kyllo v. United States, 533 U.S. 27, 37 (2001) (citing *Dow Chem.*, 476 U.S. at 238).

technology . . . [or] [a]n electronic device to penetrate walls or windows as to hear and record confidential discussions"[157] may be unconstitutional without a warrant.[158]

3. Florida v. Riley

Concluding the trilogy, in *Florida v. Riley*,[159] the Supreme Court held that there was no Fourth Amendment violation when police flew a helicopter over defendant's backyard at approximately four hundred feet and took photographs of the marijuana growing below.[160] In *Riley*, after the police were unable to observe Riley's backyard to confirm an anonymous tip that he was growing marijuana, the police used a helicopter to observe the backyard.[161] While four hundred feet above the ground, the police observed two open sides of a greenhouse and took photographs using a telephoto lens of the marijuana growing inside.[162] The officers used the photograph to obtain a search warrant, which resulted in Riley's arrest for possession of marijuana.[163]

The plurality determined that the two exposed sides of the greenhouse subjected Riley to a reasonably objective search from the public airspace above.[164] Similar to the fixed-wing planes in *Ciraolo*, helicopters are routinely used in public airways, and the helicopter stayed at an altitude in accordance with laws and regulations.[165] Further, because of the low altitude, as compared to the plane at one thousand feet in *Ciraolo*, the plurality focused on whether the helicopter interfered with the defendant's normal use of his property during the flight. The Court held that society would accept the use of a helicopter as reasonable because "no intimate details connected with the use of the home or curtilage were observed, and there was no undue noise, and no wind, dust, or threat of injury."[166]

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[157] *Dow Chem.*, 476 U.S. at 238–39.

[158] *Id.* Although partially concurring in the majority opinion, Justice Powell wrote a dissent criticizing the analysis of the majority, claiming the majority had abandoned the principles of *Katz* by focusing on the method of the search rather than the scope of the right being protected. *Id.* at 246–48 (Powell, J., concurring in part and dissenting in part).

[159] 488 U.S. 445 (1989).

[160] *Id.* at 450–52.

[161] *Id.* at 448. The deputy took photographs from the helicopter, but the trial judge accepted that the deputy could identify the marijuana without the use of the camera. State v. Riley, 476 So. 2d 1354, 1355 (Fla. Dist. Ct. App. 1985). The Supreme Court found that the deputy had identified the marijuana with his "naked eye." *Riley*, 488 U.S. at 448–49.

[162] *Riley*, 488 U.S. at 448–49.

[163] *Riley*, 476 So. 2d at 1355.

[164] *Riley*, 488 U.S. at 450.

[165] *Id.* at 451.

[166] *Id.* at 451–52.

4. The Aftermath of the Aerial Surveillance Trilogy

The aerial surveillance trilogy brought new and additional considerations for other courts addressing aerial surveillance issues. The Court in *Ciraolo* focused on whether the surveillance took place within publicly navigable airspace.[167] *Dow Chemical* took the discussion beyond that, focusing on the type of technology used.[168] Lastly, *Riley* focused on the altitude of the aerial surveillance tool and whether the defendant's normal use of property was interfered with.[169]

Although the Supreme Court has never found that any type of aerial surveillance is a search,[170] lower courts have struggled with applying this precedent,[171] particularly when determining the altitude from which an aircraft is allowed to view private property. For example, the Eighth Circuit found it was not a search under the Fourth Amendment when the defendant could not prove that flights at one hundred feet "are so rare as to make aerial surveillance at that level unreasonable."[172] The Fourth Circuit similarly found that a helicopter flying as low as thirty-five feet over a defendant's property did not constitute a Fourth Amendment search where the prosecution proved that the flights were in compliance with FAA regulations and "such flights were a regular occurrence in the area."[173] Conversely, the Sixth Circuit affirmed the trial court's order suppressing evidence in a per curium opinion, stating that "[i]f, in fact, the officers were flying at an altitude of 125 to 150 feet, their disturbance of the home would interfere with the defendant's normal use of his premises."[174]

D. The Advanced Technology Cases

In an unexpected divergence from the aerial surveillance cases decided a mere decade earlier,[175] the Supreme Court found the use of advanced technology constituted a search in violation of an individual's Fourth Amendment right to privacy. Specifically, the Court raised the additional concerns of whether the technology used was in general public use, whether the technology was monitoring the home, and the duration of the surveillance.

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[167] California v. Ciraolo, 476 U.S. 207, 213 (1986).

[168] Dow Chem. Co. v. United States, 476 U.S. 227, 238–39 (1986).

[169] *Riley*, 488 U.S. at 451–52.

[170] *See supra* Part III.C.

[171] *See* Pew v. Scopino, 904 F. Supp. 18, 25 (D. Me. 1995) (criticizing the "unhappy state of Supreme Court precedent" in the area).

[172] United States v. Boyster, 436 F.3d 986, 992 (8th Cir. 2006).

[173] United States v. Breza, 308 F.3d 430, 434–35 (4th Cir. 2002).

[174] United States v. Saltzman, 992 F.2d 1218, 1993 WL 100082, at *3 (6th Cir. 1993) (per curiam).

[175] Vacek, *supra* note 51, at 682–83.

1. Kyllo v. United States

Although the aerial surveillance trio suggests that the government has broad discretion in surveillance of private property, such discretion is not unfettered, at least when it comes to technology that is not yet commonly used by the public.[176] In *Kyllo v. United States*,[177] the Supreme Court held that police use of thermal imaging technology to detect whether marijuana was being grown inside a home was considered a "search" under the Fourth Amendment and "presumptively unreasonable without a warrant."[178]

In *Kyllo*, a federal law enforcement agent suspected Kyllo of growing marijuana in his triplex home.[179] Because indoor marijuana ordinarily requires high-intensity heat lamps to grow, two agents, while sitting in their car across the street, briefly employed a thermal imager to determine whether the amount of heat emanating from Kyllo's home was consistent with high-intensity heat lamps.[180] Based on the readings from the thermal imager, as well as testimony from informants and utility bills, the agents obtained a warrant and searched Kyllo's home, where they found an "indoor growing operation" with over one hundred marijuana plants.[181] Kyllo was charged with manufacturing marijuana[182] and pled guilty after the District Court denied his motion to suppress the evidence seized from his home.[183] On appeal, the Ninth Circuit held that Kyllo had made no attempt to conceal the heat escaping from his home and the imager did not expose any intimate details.[184]

In explaining its holding that using a thermal imaging device to scan an individual's home was presumptively unreasonable without a warrant, the Court declared that "[t]he question we confront today is what limits there are upon this

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[176] The real question is whether the Court would look at unmanned aerial systems as it has in the aerial surveillance cases or whether it will be viewed as "new technology" as in *Kyllo*.

[177] 533 U.S. 27 (2001).

[178] *Id.* at 40.

[179] *Id.* at 29.

[180] *Id.* at 29–30. Thermal imagers detect infrared radiation that is emitted from all objects but is not visible without use of technology such as a thermal imager. *Id.*

[181] *Id.* at 30.

[182] Kyllo was specifically charged with violating 21 U.S.C. § 841(a)(1). *Id.*

[183] *Id.*

[184] "The court held that petitioner had shown no subjective expectation of privacy because he had made no attempt to conceal the heat escaping from his home and even if he had, there was no objectively reasonable expectation of privacy because the imager 'did not expose any intimate details of Kyllo's life.'" *Id.* at 31 (citation omitted). Scalia takes on this "intimate details" argument by implying that it is not whether the details are intimate or not that matters but instead the fact that *Dow Chemical* involved "aerial photography of an industrial complex, which does not share the Fourth Amendment sanctity of the home." *Id.* at 37.

power of technology to shrink the realm of guaranteed privacy."[185] The majority explained that one of the many reasons Kyllo had a reasonable expectation of privacy in his home was that the thermal imaging scanners were not in "general public use."[186]

The Court thus emphasized the importance of privacy given the "sanctity of the home," as the Fourth Amendment protection of the home has never depended on the "quality or quantity of information obtained."[187] Instead, in the home "*all* details are intimate details, because the entire area is held safe from prying government eyes."[188] However, the Court found that limiting the prohibition of the thermal imaging to "intimate details" is incorrect in principle and in practicality.[189] Instead, courts should focus on whether a device is within general public use, and used "to explore details of the home that would previously have been unknowable without physical intrusion."[190]

Justice Stevens' scathing dissent recognizes the possible effects of the majority's decision on the expectation of privacy.[191] The dissent criticized the expansive treatment of the expectation of privacy afforded to the home and disagreed with hinging the determination as to whether government surveillance constitutes a search on whether the device used by the government is "in general public use."[192] Specifically, the dissent argued that thermal imaging technology was readily available for "commercial, personal, or law enforcement purposes, and is just an 800-number away from being rented from 'half a dozen national companies' by anyone who wants one."[193] Inevitable privacy concerns and intrusive technology becoming more readily available supported the dissent's position that looking at

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[185] *Id.* at 34. Although Scalia says this at the beginning of the opinion, he spends most of the opinion elucidating the importance of the "home," which appears to directly contravene the language in the majority opinion in *Katz*, recognizing that the Fourth Amendment protects "people, not places." *Id.* at 49 (Stevens, J., dissenting) (quoting Katz v. U.S., 389 U.S. 347, 351 (1967)).

[186] *Id.* at 40. *See also id.* at 36 ("While the technology used in the present case was relatively crude, the rule we adopt must take account of more sophisticated systems that are already in use or development.").

[187] *Id.* at 37.

[188] *Id.* (emphasis in original). He compares the physical search of the home in *Arizona v. Hicks*, 480 U.S. 321 (1987), which involved the "registration number of a phonograph turntable" with the heat emanating from Kyllo's residence, which seems like a stretch. These were "details of the home, just as was the detail of how warm—or even how relatively warm—Kyllo was heating his residence." *Id.* at 38.

[189] *Id.*

[190] *Id.* at 40.

[191] *Id.* at 41 (Stevens, J., dissenting) ("The supposedly 'bright-line' rule the Court has created in response to its concerns about future technological developments is unnecessary, unwise, and inconsistent with the Fourth Amendment."). Justice Stevens was joined by then Chief Justice Rehnquist, Justices O'Connor and Kennedy.

[192] *Id.* at 46–47.

[193] *Id.* at 47 n.5.

whether technology is in general public use is unnecessary, unwise, and inconsistent with the Fourth Amendment.[194]

2. United States v. Jones

In *United States v. Jones*,[195] the Supreme Court held that using and attaching a GPS tracking device to an individual's vehicle to monitor the vehicle's movements was a Fourth Amendment search.[196] The defendant in *Jones* was suspected of drug trafficking and targeted by the FBI and local police.[197] The government sought evidence to obtain a search warrant for Jones' wife's truck.[198] While parked in a public parking lot, the officers installed a GPS tracker on the under carriage of the truck.[199] For the following twenty-eight days, the government tracked the vehicle's movements through satellite signals, resulting in more than two thousand pages of data.[200] After the government obtained an indictment against him for multiple drug-related offenses, Jones moved to suppress the evidence obtained by the government through the GPS device.[201]

The district court granted Jones' motion to suppress in part concerning the GPS data from when the car was parked in the garage at Jones' residence, and denied in part for the remaining data.[202] In doing so, the district court held that an individual "has no reasonable expectation of privacy in his movements from one place to another."[203] The first trial ended in a hung jury, and after being indicted, charged, and faced with the same GPS data a second time, Jones was sentenced to life in prison.[204]

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[194] *Id.* at 47.

[195] 565 U.S. 400 (2012).

[196] *Id.* at 404–05.

[197] *Id.* at 402. In addition to the GPS device, the police employed a plethora of investigative techniques, including visual and camera surveillance of Jones's place of business and installation of a pen register and wiretap of Jones's cell phone. *Id.*

[198] *Id.* The warrant that issued from the U.S. District Court for the District of Columbia authorized the government to install the device within ten days and to do so in the District of Columbia. *Id.* at 402–03. The fact that the government did not install the device until after the ten days had expired—on the 11th day—and did so in Maryland rather than the District of Columbia, lead the courts to treat this as a warrantless search. *Id.* at 403 n.1 ("In this litigation, the Government has conceded noncompliance with the warrant and has argued only that a warrant was not required.").

[199] *Id.* at 403. Although the vehicle was registered to Jones's wife, the government conceded that Jones was "the exclusive driver." *Id.* at 404 n.2. (internal quotations omitted). The Court of Appeals reached the conclusion that the fact that the car was registered in his wife's name did not preclude Jones from bringing a Fourth Amendment claim. *Id.*

[200] *Id.* at 403.

[201] *See* United States v. Jones, 451 F. Supp. 2d 71, 87 (D. D.C. 2006).

[202] *Id*. at 88.

[203] *Id.* (quoting United States v. Knotts, 460 U.S. 276, 281–82 (1983)).

[204] *Jones*, 565 U.S. at 403–04.

The D.C. Circuit reversed and found that admitting the data obtained by the government through the warrantless use of GPS system constituted a search and thus violated Jones' Fourth Amendment rights in *United States v. Maynard*.[205] The circuit court referenced the use of law enforcement's "mosaic theory" regarding surveillance, finding that "[w]hat may seem trivial to the uninformed, may appear of great moment to one who has a broad view of the scene."[206]

The Court returned to the trespass analysis from *Olmstead*, noting that "[t]he text of the Fourth Amendment reflects its close connection to property," and "[c]onsistent with this understanding, our Fourth Amendment jurisprudence was tied to common-law trespass, at least until the latter half of the 20th century."[207] The Court opined that it need not address the *Katz* reasonable expectation of privacy test because the *Katz* "test has been *added to*, not *substituted for*, the common-law trespassory test."[208] Further, in finding that there was a Fourth Amendment violation, the Supreme Court distinguished the Court's previous rejection of two Fourth

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[205] 615 F.3d 544, 544 (D.C. Cir. 2010).

[206] *Id.* at 562 (quoting C.I.A. v. Sims, 471 U.S. 159, 178 (1985)). Moreover, it distinguished the type of "surveillance" at issue in *Knotts* with the month-long constant prolonged surveillance in *Maynard*:

> Prolonged surveillance reveals types of information not revealed by short-term surveillance, such as what a person does repeatedly, what he does not do, and what he does ensemble. These types of information can each reveal more about a person than does any individual trip viewed in isolation. Repeated visits to a church, a gym, a bar, or a bookie tell a story not told by any single visit, as does one's not visiting any of these places over the course of a month. The sequence of a person's movements can reveal still more; a single trip to a gynecologist's office tells little about a woman, but that trip followed a few weeks later by a visit to a baby supply store tells a different story. A person who knows all of another's travels can deduce whether he is a weekly church goer, a heavy drinker, a regular at the gym, an unfaithful husband, an outpatient receiving medical treatment, an associate of particular individuals or political groups—and not just one such fact about a person, but all such facts.

Id. At issue in *Knotts* was the use of GPS to monitor a "single trip" and the *Knotts* Court "pointedly acknowledged and reserved for another day the question of whether a Fourth Amendment issue would be posed if 'twenty-four hour surveillance of any citizen of this country [were] possible.'" People v. Weaver, 909 N.E.2d 1195, 1200 (N.Y. 2009) (alteration in original) (citation omitted). In *Knotts*, the Supreme Court held there was no Fourth Amendment violation where a beeper was placed in a container of chloroform with the permission of the container's owner before the container came into the defendant's possession. United States v. Knotts, 460 U.S. 276, 281–85 (1983); *see also* Renée McDonald Hutchins, *Tied Up in Knotts? GPS Technology and the Fourth Amendment*, 55 UCLA L. REV. 409, 457 (2007) (The United States Supreme Court decision in *Knotts* should not be read to permit warrantless "twenty-four hour surveillance of any citizen of this country." (quoting *Knotts*, 460 U.S. at 284)).

[207] *Jones*, 565 U.S. at 405.

[208] *Id.* at 409.

Amendment challenges involving the government's placing of "electronic tracking devices" or "beepers" into containers, allowing police officers to monitor the location of the containers.[209]

Other Justices noted various concerns with the majority's holding, which foreshadows the potential effects on the right to privacy in future cases. Specifically, Justice Alito noted that "longer term GPS monitoring in investigations of most offenses impinges on expectations of privacy"[210] and, as such, likely conflicts with the Fourth Amendment.[211] Along the same lines, Justice Sotomayor posited that the majority opinion in *Jones* "provides little guidance on 'cases of electronic or other novel modes of surveillance that do not depend on a physical invasion on property.'"[212] Sotomayor warned of the danger to privacy of long-term surveillance:

> GPS monitoring generates a precise, comprehensive record of a person's public movements that reflects a wealth of detail about her familial, political, professional, religious, and sexual associations. . . . The government can store such records and efficiently mine them for information years into the future. . . . And because GPS monitoring is cheap in comparison to conventional surveillance techniques and, by design, proceeds surreptitiously, it evades the ordinary checks that constrain abusive law enforcement practices: 'limited police resources and community hostility.'[213]

E. Post-Jones Circuit Court Difficulties

1. Seventh Circuit: United States v. Flores-Lopez

Not long after the Supreme Court issued its decision in *Jones*, the lower courts demonstrated the difficulties they would have in following the reasoning of the majority opinion, despite its supposed "bright-line technological search rule."[214] For example, in *United States v. Flores-Lopez*,[215] the Seventh Circuit issued a decision holding that a warrantless search by the police of a defendant's cell phone in order to identify his cell phone number did not violate the Fourth Amendment because the search was only "minimally invasive," a standard the Seventh Circuit created pre-

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[209] *Id.* at 408.

[210] *Id.* at 430 (Alito, J., concurring) (positing that although "short-term monitoring of a person's movements on public streets accords with expectations of privacy that our society has recognized as reasonable . . . [b]ut the use of longer term GPS monitoring in investigations of most offenses impinges on expectations of privacy.").

[211] *Id.* at 430–31.

[212] United States v. Skinner, 690 F.3d 772, 780 (6th Cir. 2012) (quoting *Jones*, 565 U.S. at 414–15 (Sotomayor, J., concurring)).

[213] *Jones*, 565 U.S. at 415–16 (Sotomayor, J., concurring).

[214] *See* Sobel et al., *supra* note 127, at 34.

[215] 670 F.3d 803 (7th Cir. 2012).

Kyllo and *Jones*.[216] The standard, however, was at odds with the majority opinion in *Kyllo*, which stated that Fourth Amendment violations have "never been tied to measurement of the quality or quantity of information obtained."[217]

Although the Seventh Circuit held in *Flores-Lopez* that the warrantless search of the cell phone was reasonable, it did acknowledge that "[t]he potential invasion of privacy in a search of a [smart]phone is greater than in a search of a 'container' in a conventional sense even when the conventional container is a purse that contains an address book (itself a container) and photos."[218] Moreover, the court acknowledged that, for purposes of Fourth Amendment searches, smartphones are unlike other personal objects because they "hold so much personal and sensitive information touching on many private aspects of life [and there] is a far greater potential for the 'inter-mingling' of documents and consequent invasion of privacy when police execute a search for evidence on a computer"[219] because "[e]ven the dumbest of [smart]phones give the user access to large stores of information."[220]

Despite recognizing the level of invasiveness related to a search of a cell phone, the Seventh Circuit upheld the validity of the search primarily because the individual had no expectation of privacy in the telephone number since he had already disclosed the information to a third party, his cell phone company.[221] Such a finding brings to the forefront yet another reason that the third party doctrine is "ill suited to the digital age," as opined by Justice Sotomayor in *Jones*.[222] Nonetheless, the court's reliance on this doctrine in this case was at odds with the Supreme Court's decisions in *Kyllo* and *Jones*.[223]

2. Sixth Circuit: United States v. Skinner

Shortly after *Jones*, the Sixth Circuit found that there was no Fourth Amendment violation when police used GPS technology to track a defendant's phone.[224] In *United States v. Skinner*,[225] the police used GPS technology to track the "pay-as-you-go" cell phone that defendant Skinner used as part of his drug

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[216] *Id.* at 807 (citing United States v. Concepcion, 942 F.2d 1170, 1172–73 (7th Cir. 1991)).

[217] Kyllo v. U.S., 533 U.S. 27, 37 (2001).

[218] *Flores-Lopez*, 670 F.3d at 805.

[219] *Id.* at 806 (quoting United States v. Lucas, 640 F.3d 168, 178 (6th Cir. 2011)).

[220] *Id.*; *see also* Sobel et al., *supra* note 127, at 37 ("Since smartphones contain a wealth of intimate information in the form of text messages, e-mails and other personal data, it is highly likely that an average member of the community would be outraged or at least strongly object to the police rifling through one's smartphone merely as an incident to arrest.").

[221] *Flores-Lopez*, 670 F.3d at 807.

[222] United States v. Jones, 565 U.S. 400, 417 (2012) (Sotomayor, J., concurring).

[223] *See Kyllo*, 533 U.S. at 35 (warning against leaving citizens "at the mercy of advancing technology").

[224] United States v. Skinner, 690 F.3d 772, 775 (6th Cir. 2012).

[225] *Id.*

trafficking courier activities.[226] Law enforcement used the GPS to track the data emanating from Skinner's phone,[227] and tracked him to a motorhome parked at a truck stop. Officers conducted a perimeter dog sniff around the motorhome, which alerted them to possible drugs inside.[228] The officers entered the home, discovered over one thousand one hundred pounds of marijuana, and arrested Skinner.[229] Prior to trial, Skinner moved to suppress the evidence found in the motorhome, alleging that his Fourth Amendment rights were violated by the officers' use of the GPS data emanating from his cell phone.[230] The district court denied the motion to suppress because Skinner did not have a legitimate expectation of privacy in the cell phone or the motorhome because he was traveling on a public thoroughfare.[231]

On appeal, the Sixth Circuit upheld the determination that there was no Fourth Amendment violation because Skinner had no "reasonable expectation of privacy in the data given off by his voluntarily procured pay-as-you-go cell phone."[232] Therefore, "[b]ecause authorities tracked a known number that was voluntarily used while traveling on public thoroughfares, Skinner did not have a reasonable expectation of privacy in the GPS data and location of his cell phone."[233]

The court noted the differences between *Jones* in that the majority opinion "explicitly relied on the trespassory nature of the police action"[234] and "no such physical intrusion occurred in Skinner's case."[235] Additionally, the court acknowledged that Skinner was using the cell phone for criminal purposes, stating "[i]f a tool used to transport contraband gives off a signal that can be tracked for location, certainly the police can track the signal."[236] Thus, the type of technology used, the amount of time monitored, and the location of what was being monitored were all-important factors in the court's decision.

3. Riley v. California

A unanimous Supreme Court in *Riley v. California*[237] held that police should not be permitted to search cell phones without a warrant or exigent circumstances.[238]

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[226] *Id.* at 774.

[227] The law enforcement "authorities obtained an order from a federal magistrate judge . . . authorizing the phone company to release subscriber information, cell site information, GPS real-time location, and 'ping' data" for two pay-as-you-go phones, including the one used by Skinner. *Id.* at 776.

[228] *Id.*

[229] *Id.*

[230] *Id.*

[231] *Id.* at 776–77.

[232] *Id.* at 777.

[233] *Id.* at 781.

[234] *Id.* at 779.

[235] *Id.* at 780.

[236] *Id.* at 777.

[237] 134 S. Ct. 2473 (2014).

[238] *Id.* at 2493–95.

Riley consisted of two cases in which officers seized cell phones from the defendants, and subsequently searched them in detail.[239] The contents on the phone led police to other evidence and ultimately charged both defendants with additional crimes.[240] Riley moved to suppress the cell phone evidence, arguing the officers did not have a warrant and there were no exigent circumstances to support the search.[241]

In finding that the defendant's Fourth Amendment rights were violated when officers searched their cell phone without a warrant or exigent circumstances, the Court had to decide how the search incident to arrest doctrine applied to cell phones.[242] The Court emphasized the pervasiveness of cell phones with their tremendous storage capacity.[243] Additionally, the Court held that the "container doctrine," which established a per se rule that police could seize and open personal objects found on an individual they were arresting,[244] did not extend to "opening" cell phones.[245] There was no risk to the officer that there was a weapon inside the phone (so no necessity based on danger) and there was no danger of losing evidence because the police could seize the phone and likely just turn the phone off.

> There is an element of pervasiveness that characterizes cell phones but not physical records. Prior to the digital age, people did not typically carry a cache of sensitive personal information with them as they went about their day. Now it is the person who is not carrying a cell phone, with all that it contains, who is the exception.[246]

For over a century, courts struggled with and ultimately steered away from the early common law concepts that once protected one's privacy rights. Courts shifted away from the early wiretapping cases that focused primarily on the location of the technology to *Katz* which employed both objective and subjective considerations to determine if one had a reasonable expectation of privacy. More recently, in the advanced technology cases, courts narrowed and refined the broad discretion that had been given to the government in earlier decisions. Focusing heavily on the type of technology used and its availability to the public, the courts in *Kyllo*, *Jones*, and the post-*Jones* opinions deviated from the early technology-based decisions, exploring the perceived level of privacy invaded by the governmental action. As new technologies provide novel ways to pierce the private sphere, the government no longer has to trespass or be seen in order to accumulate information on an individual's life. Given the amalgamation of technologies at issue with drones,

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[239] *Id.* at 2480–82.

[240] *Id.* at 2480–83.

[241] *Id*. at 2481.

[242] *Id.* at 2484.

[243] *Id.* at 2490.

[244] This doctrine was originally established in *United States v. Robinson*, 414 U.S. 218, 233–37 (1973), when the Supreme Court allowed that a cigarette pack an arrestee had on their person could be removed and opened without a warrant.

[245] *Riley*, 134 S. Ct. at 2477–91.

[246] *Id.* at 2490.

courts must ensure that Fourth Amendment rights are protected in the face of rapid technological advances and employment of drones.

V. FACTORS TEST TO ASSIST COURTS WHEN FACED WITH A WARRANTLESS SEARCH BY LAW ENFORCEMENT DEPLOYING DRONES

Now that police have the ability to extensively monitor individuals' public movement and activities by using drones and other technology, how should courts analyze the Fourth Amendment's protection against "unreasonable searches" in the context of drones?

Some scholars argue for a technology-based approach to determining what constitutes a search under the Fourth Amendment. David Gray and Danielle Citron propose that the use of any technology, including aerial drones, would be a search if that technology could "facilitate broad programs of indiscriminate surveillance that intrude upon reasonable expectations of quantitative privacy."[247] According to Gray and Citron, the key is that these broad-based modern surveillance technologies "raise the same specter of authoritarianism for modern citizens that 'broad and indiscriminate use of physically invasive searches and seizures' did for our predecessors."[248]

Although not specifically in the context of drones, Susan Freiwald proposes a four-factor test synthesized from the Supreme Court and lower courts in addressing video surveillance or wiretapping in the home or private spaces.[249] Under this test, police engagement in public surveillance would be considered a search based on the following factors:[250] (1) it is hidden, that is, the surveillance target is not aware of it; (2) it is intrusive, that is, it grants police access to things that individuals would consider private; (3) continuous, that is, it denotes a series of intrusions rather than a single intrusion; (4) indiscriminate, in that it "gathers up more information than necessary to establish guilt."[251]

This Article proposes a series of factors for courts to apply to determine whether a warrantless search by a law enforcement deploying drones has crossed the Constitutional line in violation of an individual's Fourth Amendment right to privacy:

1. What type of technology is the drone employing in the search?[252]
2. What is the extent of the surveillance?
3. How pervasive is the privacy intrusion?

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[247] Gray & Citron, *supra* note 17, at 5.

[248] Blitz, *supra* note 10, at 78 (quoting Gray & Citron, *supra* note 17, at 27).

[249] Unlike Gray and Citron's work, however, Freiwald's work does not specifically discuss unmanned aerial systems.

[250] *Id.*

[251] *Id.*

[252] For example, camera, video, facial recognition software, GPS, thermal imagery recognition technology.

This test, unlike Freiwald's, urges the court to consider the type of technology used, its individual capabilities, and its combined potential when affixed to a drone with other equipment. With each technological advance, the capabilities and precision increases, and these increases must be considered on a case-by-case basis. Further, in contrast to Freiwald's test and the fact-specific precedent of case law where each factor may be considered in isolation or may not apply in every case, this test requires each factor to be considered almost simultaneously, under the totality of the circumstances of the case at hand.

This test seeks to encourage courts to look at how the drone itself, and its equipped technologies, were used. Moreover, the court must consider the interplay of multiple technologies in analyzing the second and third factors, allowing for a totality of the circumstances approach in determining the reasonableness of the surveillance.

A. What Type of Technology Is the Drone Employing in the Search?

A court faced with a drone surveillance issue would first address what type of technology is being used on that specific drone—camera, video, facial recognition software, GPS/Cell Phone[253] tracking—noting that a drone may be fitted with several technologies working in combination. In reviewing the technologies used, the more precise the technology is, the greater implication of privacy rights. As found with law enforcement surveillance tracking, "[w]hat the technology yields and records with breathtaking quality and quantity is a highly detailed profile, not simply of where we go, but by easy reference, of our associations—political, religious, amicable and amorous, to name only a few—and of the pattern of our professional and avocational pursuits."[254]

As technology advances, the ability and opportunity to record private activities increases, requiring courts to take a focused look at the actual technological equipment used in the case before them. Not only are there significant differences in what information can be captured using GPS versus a camera, but the quality of the information varies greatly depending on whether, for example, a camera records standard resolution still images or high definition video.

In *Kyllo*, the Supreme Court stated that the police using sense enhancement technology would not constitute a search if that technology were "in general public use," unless the police used it to surveil a home or other private environment.[255] This general public use test has been criticized heavily by many scholars.[256] As Marc

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[253] 91 percent of adults in the United States own a cellphone. *Cell Phone Ownership Hits 91% of Adults*, PEW RES. CTR., http://www.pewresearch.org/fact-tank/2013/06/06/cell-phone-ownership-hits-91-of-adults/ [https://perma.cc/YMZ4-MPAU] (last visited Apr. 8, 2018).

[254] People v. Weaver, 909 N.E.2d 1195, 1199–2000 (N.Y. 2009).

[255] Kyllo v. U.S., 533 U.S. 27, 40 (2001).

[256] CHRISTOPHER SLOBOGIN, PRIVACY AT RISK: THE NEW GOVERNMENT SURVEILLANCE AND THE FOURTH AMENDMENT 57–58, 62–65 (2007); *see also* Douglas Adkins, *The Supreme Court Announces a Fourth Amendment "General Public Use"*

Blitz writes, "critics are right to argue that the Supreme Court would invite chaos and confusion if what counted as a search changed each year as new technologies and cultural practices transformed the way people interact with public space."[257]

Further, in his concurrence in *Jones*, Justice Alito identified specific problems with *Katz*'s expectation of privacy test particularly as it applies to new developments in technology.

> [T]he *Katz* test rests on the assumption that this hypothetical reasonable person has a well-developed and stable set of privacy expectations. But technology can change those expectations. 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.[258]

"General public use" is a problem for a variety of practical reasons, the least of which is how a court or a magistrate would measure it. Would it, for example, be locality specific, or a national measure? What about technology that was arguably not commonly in the hands of the public at the time of the alleged search but was in the public use at the time of the court challenge? Just such a possibility exists with drones at this very moment. As a result of the FAA regulations, the number of drones within the public use is already skyrocketing, undoubtedly increasing the risks to public privacy. Perversely:

> [t]hat would mean that, even as enhancements to aerial drones and GPS units make these devices a greater threat to privacy, their use by police would paradoxically become subject to less Fourth Amendment oversight—as long as private citizens are able to purchase and use such surveillance technology for their own purposes.[259]

Standard for Emerging Technologies But Fails to Define It: Kyllo v. United States, 27 U. DAYTON L. REV. 245, 262 (2002); David A. Harris, *Superman's X-Ray Vision and the Fourth Amendment: The New Gun Detection Technology*, 69 TEMP. L. REV. 1, 23 (1996) (positing that the kind of "technology the public can possess may change with surprising speed"); Christopher Slobogin, *Peeping Techno-Toms and the Fourth Amendment: Seeing Through* Kyllo's *Rules Governing Technological Surveillance*, 86 MINN. L. REV. 1393, 1412 (2002) (noting that courts will have to "deal with the rapid pace of technological development in deciding whether something is in general public use").

[257] Blitz, *supra* note 10, at 76.

[258] United States v. Jones, 565 U.S. 400, 427 (2012).

[259] Blitz, *supra* note 10, at 77.

Law enforcement agencies have more access to the latest drone technologies, which are not always available to the public.[260] The varied types of surveillance equipment that can be attached to law enforcement drones make such drones potentially much more intrusive than hobbyist drones.[261] Hobbyist and commercial drones may fly at similar heights and record video similar to that of a law enforcement controlled drone, but the law enforcement drone can stay aloft significantly longer, record wider angles and better quality footage, and coexist with other technologies like thermal scanners and biometric tools.[262]

Thus, under this factor, the court in each case should consider the capabilities and characteristics of the drone itself,[263] what surveillance technology was employed by the drone, how precise each type of technology is, and whether the technology is available for public use.

B. What Is the Extent of the Surveillance?

In addressing the second factor, the court should look to the extent of the surveillance—the more invasive the intrusion the more that individuals expect privacy and the less reasonable the search becomes. The court should look to how the information is being collected: the duration of the surveillance, how continuous the surveillance is, the location of the surveillance, etc. After all, "[m]embers of a

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[260] MATTHEW FEENY, CATO IINST., SURVEILLANCE TAKES WING: PRIVACY IN THE AGE OF POLICE DRONES 3 (2016), https://object.cato.org/sites/cato.org/files/pubs/pdf/pa807_1.pdf [https://perma.cc/M89L-MZJK].

[261] *Id.*

[262] *Id.* In looking to whether the technology used is in the "general public use," the court must consider the quality of the technology—not the type. For example, in 2012, the Los Angeles County Sherriff's department tested mass surveillance when it employed a civilian aircraft, capturing a 10-square mile radius of Compton, without informing the public. Conor Friedersdorf, *Eyes Over Compton: How Police Spied on a Whole City*, ATLANTIC (Apr. 21, 2014), https://www.theatlantic.com/national/archive/2014/04/sheriffs-deputy-compares-drone-surveillance-of-compton-to-big-brother/360954/ [https://perma.cc/2ASZ-DUG7]. While this technology was demonstrated on a manned aircraft, if purchased by a law enforcement agency, it would be utilized on drones. An employee of the company owning those drones stated, "[w]e literally watched all of Compton during the times that we were flying, so we could zoom in anywhere within the city of Compton and follow cars and see people." *Id.*

[263] Because of the quick evolution of drone capabilities and the technologies affixed to them, courts have hypothesized how these changes will affect the privacy discussion. For example, the New Mexico Supreme Court in 2015 briefly noted the state appellate court's suggestion that "when considering privacy interests under our State Constitution we move away from an intrusion analysis in anticipation of future surveillance conducted by 'ultra-quiet drones' and other high-tech devices." State v. Davis, 360 P.3d 1161, 1172–73 (N.M. 2015) (finding that the aerial surveillance from a helicopter searching for marijuana plants "amounted to an unconstitutional search under the Fourth Amendment and reverse the Court of Appeals' determination to the contrary").

free society do not expect to be subject to continuous government surveillance, even as they walk or drive on public pathways."[264]

How the information is being collected will likely tie in closely to the first factor when reviewing the type of technology used, but the court must also explore how that technology was used in the particular case in front of them. For example, the duration of the surveillance, regardless of whether cameras, voice recording, or GPS was utilized, becomes more unreasonable the longer the duration. The Court in *Knotts* and *United States v. Jones* both looked at the duration of surveillance, which will act as a base for courts considering durational surveillance with drones under this factor because, unlike the GPS surveillance at issue in *Knotts* and *Jones*, the surveillance capability of drones is substantially more comprehensive.

Before the advent of GPS devices, it would have been close to impossible from a practical and financial standpoint for the government to track every movement an individual made in his car every minute for four weeks. Devices like the GPS at issue in *Jones*, or drones, "make long-term monitoring relatively easy and cheap."[265] Therefore, the "best that we can do . . . is to apply existing Fourth Amendment doctrine and to ask whether the use of GPS tracking in a particular case involved a degree of intrusion that a reasonable person would not have anticipated."[266] Justice Alito concludes that, unlike "relatively short-term monitoring of a person's movements on public streets"[267] the four-week-long secret monitoring and cataloging of every single movement of a vehicle is not in accord with "expectations of privacy that our society has recognized as reasonable."[268]

Further, when surveillance becomes continuous and for extensive durations, the line between monitoring the public and "search" blurs, posing Fourth Amendment issues. Marc Jonathan Blitz puts forth the following Constitutional law query: "As police gain the ability to technologically monitor individuals' public movements and activities, does the Fourth Amendment's protection against 'unreasonable searches' place any hurdles in their way?"[269] Blitz posits that the Supreme Court answered the question affirmatively in *Jones* in two separate concurring opinions signed on by five different justices. However, he critiques the suggestion in the concurring opinions in *Jones* on two primary grounds: first, they do not provide guidance on where the line should be drawn regarding when public surveillance "morphs from a means by which police monitor public space into a Fourth Amendment 'search.'"[270] In other words, the justices did not identify when surveillance becomes so long or

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[264] Blitz, *supra* note 10, at 33.

[265] United Sates v. Jones, 565 U.S. 400, 429 (2012) (Alito, J., concurring) ("In the pre-computer age, the greatest protections of privacy were neither constitutional nor statutory, but practical.").

[266] *Id.* at 430.

[267] *Id.*

[268] *Id.* Moreover, if there is uncertainty as to whether the length of time for the surveillance is too long, police can always get a warrant. *Id.*

[269] Blitz, *supra* note 10, at 21.

[270] *Id.* at 21–22.

so comprehensive that it could be said "to cross the constitutional dividing line."[271] Second, the concurring opinions fail to address why the Fourth Amendment would cover electronic surveillance like that at issue in *Jones*, but not apply to around the clock surveillance by the police.[272]

As technology develops to allow law enforcement to continuously follow individuals and track all of their movements,[273] the importance of considering the duration of the surveillance becomes even more critical. Doing so will address concerns involving privacy. It will place limits on the possibility that a drone can monitor an individual's day-to-day activities.

In addition to considering the duration and continuation of the surveillance, the court should consider the location of the technology, looking to the aerial surveillance trilogy cases for guidance. For example, in *Riley*, the altitude of the helicopter was of great interest to the Court. Specifically, in her concurring opinion, Justice O'Connor argued that the defining question was "whether the helicopter was in the public airways at an altitude at which members of the public travel with sufficient regularity that Riley's expectation of privacy from aerial observation was not 'one that society is prepared to recognize as reasonable.'"[274] Distinguishing *Riley* from the Court's opinion in *Ciraolo*, Justice O'Connor opined:

> Ciraolo's expectation of privacy was unreasonable not because the airplane was operating where it had a "right to be," but because public air travel at 1,000 feet is a *sufficiently routine part of modern life* that it is unreasonable for persons on the ground to expect that their curtilage will not be observed from the air at that altitude.[275]
>
> . . .
>
> If the public rarely, if ever, travels overhead at such altitudes, the observation cannot be said to be from a vantage point generally used by the public and Riley cannot be said to have "knowingly expose[d]" his greenhouse to public view.[276]

While currently seeing a drone may not be as routine as seeing an airplane or helicopter high above your property, given that approximately *seven million drones*

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[271] *Id.* at 27.

[272] *Maynard* discusses why around the clock video surveillance is different. United States v. Maynard, 615 F.3d 544, 566 (D.C. Cir. 2010); *see also* Brown, *supra* note 20, at 761 (explicating that law enforcement has increasingly engaged in more sophisticated surveillance and "praised video surveillance as an effective tool").

[273] *See*, Ben Coxworth, *HEXO+ Drone Autonomously Follows the Action, for Under $500*, NEW ATLAS (June 16, 2014), https://newatlas.com/hexo-plus-autonomous-drone/32560/ [https://perma.cc/A23Z-98ZQ].

[274] Florida v. Riley, 488 U.S. 445, 454 (1989) (O'Connor, J., concurring) (quoting Katz v. U.S., 389 U.S. 347, 361 (1967)).

[275] *Id.* at 453 (emphasis added).

[276] *Id.* at 455.

are likely to be in the airspace by 2020 they will soon seem as common as seeing a flock of birds.

Thus, under this second factor, the court will move from determining what technologies the drone employed to looking at how the technologies were used in the case before them. This factor is important because a drone simply housing several technologies and flying above may not in itself interfere with one's privacy, but if those technologies are used for extensive periods of time and from improper locations, society will be less likely to deem the use of drones acceptable.

C. How Pervasive Is the Privacy Intrusion?

Finally, the court should look to how pervasive the intrusion is[277] and what information has been collected, considering such things as whether the home is involved, whether intimate details of an individual's life are exposed, and whether access was gained to an item, like a cell phone, that contains a vast amount of information.[278] How personal is the information being collected?[279] Will it be embarrassing or stigmatizing?

Scholar Stephen E. Henderson looked at how personal the information is that is sought after in considering the reasonableness of the surveillance. He posits that where information can routinely be accessed by others, it is typically not considered personal.[280]

> But there may be instances in which the type of information is personal—it is intimate and social norms typically keep such information within one's social network—but nonetheless certain such information is not only accessible to, but is routinely accessed by, persons having no authorization from the person to whom the information relates.[281]

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[277] "Being observed by an insect on the wall is not invasive for privacy; rather, privacy is threatened by being subject to *human* observation, which involves judgments that can affect one's life and reputation." Daniel J. Solove, *Privacy and Power: Computer Databases and Metaphors for Information Privacy*, 53 STAN. L. REV. 1393, 1418 (2001) (emphasis added).

[278] In *Riley v. California*, 134 S. Ct. 2473 (2014), the United States Supreme Court unanimously held that, as a general rule, law enforcement may not, without a warrant, search digital information on a cellphone seized from an individual who has been arrested. Moreover, in evaluating how intrusive the invasion of privacy was, the Court in Riley specifically looked at the element of pervasiveness, noting "there is an element of pervasiveness that characterizes cell phones but not physical records." *Id.* at 2490.

[279] CRIMINAL JUSTICE STANDARDS ON LAW ENFORCEMENT ACCESS TO THIRD PARTY RECORDS § 25-4.1(b) (2012) [hereinafter CJS]. In *Riley*, for example, the Court looked extensively at the data stored on a cell phone, noting that "[d]ata on a cell phone can also reveal where a person has been. Historic location information . . . can reconstruct someone's specific movements down to the minute." *Riley*, 134 S. Ct. at 2490.

[280] CJS, *supra* note 279, at § 25-4.1(d).

[281] Henderson, *supra* note 11, at 817.

Further, the personal nature of the collected information may need to be considered from a subjective standpoint: "the reasonableness of one's expectation of privacy tends to be assessed through the lens of one's own experience."[282] Cultural and ever-evolving societal norms will play a large part in a court's determination in the pervasiveness of the surveillance and whether it will or has resulted in personal information that should afford one an expectation of privacy.

D. The Interplay Between Factors Two and Three

In determining the pervasiveness of the search and whether it results in information that society seeks to protect, the court should consider each case through the lens of the mosaic theory: whether factor two, how the information is collected, results in uncovering personal and private information. The mosaic theory was first introduced in *United States v. Maynard*,[283] the D.C. Circuit opinion that was a precursor to *Jones*. In *Maynard*, Jones argued that the government placing a GPS device on his car and tracking his movements for four weeks was an unreasonable search.[284] In holding that the use of a GPS device was a violation of Jones's Fourth Amendment rights, the court introduced the mosaic theory.[285] This theory is largely based on the idea that "[p]rolonged surveillance reveals types of information not revealed by short-term surveillance, such as what a person does repeatedly, what he does not do, and what he does ensemble. These types of information can each reveal more about a person than does any individual trip viewed in isolation."[286]

That is, it is an approach to the Fourth Amendment whereby actions by the police in isolation do not count as a search but do as they are aggregated. "[U]nder the mosaic theory, searches can be analyzed as a collective sequence of steps rather than as individual steps."[287] Effectively, the longer the duration, the more pervasive the surveillance may become.

In *Jones*, the Supreme Court demonstrated discomfort with applying *Katz*'s reasonable expectation of privacy standard but also failed to adopt the D.C. Circuit Court's mosaic theory argument. While declining to adopt the mosaic theory, however, five justices in concurrences (or at least joining concurrences) acknowledged it. Justices Alito and Sotomayor's concurrences mention it but do not go into extensive detail about it.[288] Justice Alito, however, relies on the reasoning of the D.C. Circuit in *Maynard* to explain why the long-term surveillance in *Jones*

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[282] Jeremy Fogel, *From the Bench: A Reasonable Expectation of Privacy*, 40 A.B.A. LITIG. J. (2014), https://www.americanbar.org/publications/litigation_journal/2013-14/spring/a_reasonable_expectation_privacy.html [https://perma.cc/JM2W-SQXE].

[283] 615 F.3d 544 (D.C. Cir. 2010).

[284] *Id.* at 555; *see supra* Part III.D.2, for a more in-depth factual discussion.

[285] *Maynard*, 615 F.3d at 562.

[286] *Id.*

[287] Orin S. Kerr, *The Mosaic Theory of the Fourth Amendment*, 111 MICH. L. REV. 311, 313 (citing *Maynard*, 615 F.3d at 562).

[288] United States v. Jones, 565 U.S. 400, 412 (2012) (Sotomayor, J., concurring); *id.* at 417 (Alito, J., concurring).

would be a search while the short-term search in *Knotts* was not.[289] Conversely, Justice Sotomayor was less direct in her reference to the mosaic theory in positing that when determining whether police behavior constitutes a search, courts consider "whether people reasonably expect that their movements will be recorded and aggregated" in this way.[290]

Many scholars have been critical of the mosaic theory for reasons focusing on administrability, duration, and pervasiveness. Most notably, Professor Orin Kerr has been critical of the mosaic theory based on what he perceives as its inherent lack of administrability.[291] According to Professor Kerr:

> The mosaic theory requires courts to apply the Fourth Amendment search doctrine to government conduct as a collective whole rather than in isolated steps. Instead of asking if a particular act is a search, the mosaic theory asks whether a series of acts that are not searches in isolation amount to a search when considered as a group.[292]

Marc Jonathan Blitz advocates for not considering a duration of the search or pervasiveness of the search component because doing so "spares the courts the task of seeking some elusive or arbitrary point in the duration or intensity of a search at which such monitoring morphs from being just another means by which police watch over public space into a possible violation of the Constitution."[293] Under Blitz's proposed test, duration is, by design, irrelevant. "After police begin recording events outside of their presence, it does not matter whether they do so for two minutes or two weeks."[294]

And yet, ignoring both the duration and pervasiveness of the search tips the scale too far toward administrability in terms of the balance between court administrability and privacy. Yes, it spares the court the task of determining where to draw the line, but, at the expense of not taking into consideration that the invasion of privacy is undoubtedly considerably higher when the surveillance is longer and more pervasive. Blitz also advocates for avoiding duration and persistence as part of the test because doing so "parallels the way that courts typically define Fourth Amendment searches in private spaces."[295] That is, outside of exigent circumstances.[296]

According to Stephen Henderson, the state took an "egregious position" when it argued that law enforcement could use GPS to track the movements of anyone for

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[289] *Id.* at 424–29 (Alito, J., concurring).
[290] *Id.* at 416.
[291] Kerr, *supra* note 287, at 313, 325.
[292] *Id.* at 320.
[293] Blitz, *supra* note 10, at 28.
[294] *Id.* at 28–29.
[295] *Id.* at 29.
[296] *See, e.g.*, Payton v. New York, 445 U.S. 573, 590 (1980) (With the exception of "exigent circumstances," under the Fourth Amendment, the police must acquire a search warrant whenever they cross "the line at the entrance to the house").

nearly a month without a warrant.[297] On the one hand, given the state of Fourth Amendment law at the time, *Jones* could have (and, as some would argue, should have) been seen as merely an extension of *Knotts*.

That said, in *Riley v. California*, the Supreme Court unanimously held that generally the police may not, "without a warrant, search digital information on a cell phone seized from an individual who has been arrested."[298] Although Fourth Amendment jurisprudence undoubtedly differs in the context of a search incident to arrest, it was the Court's willingness in *Riley* to view cell phone technology differently from other objects, given a cell phone's immense storage capacity and the pervasiveness of the data that is accumulated[299] that may signal a willingness on the part of the Court to consider the pervasiveness of drone technology.

Because of the multiple technologies that may be utilized at the same time on a single drone, courts should consider each action taken by the government in the surveillance and the combined effect of the surveillance to determine whether there has been a search and an individual's right to privacy has been usurped. Using this three-factor test, the court will consider the drone itself—the size, capabilities, and appearance—the technologies attached to it, the extent of the surveillance, and its accompanied pervasiveness.

CONCLUSION

The advances in technology that have resulted in the increase in the prediction as to the number of drones that may soon be in our skies—as many as seven million in 2020 alone—serve as a call to action. It serves as a call to action for those concerned with protecting individuals' privacy without imprudently inhibiting the ability of law enforcement. It also serves as a call to action for those concerned with the Supreme Court's Fourth Amendment jurisprudence focusing on the "reasonable expectation of privacy" standard. If the Federal Aviation Administration itself predicted six years ago that there would be 15,000 drones sold annually and today places that number at seven million, how can law enforcement and the courts determine what the public's reasonable expectation of privacy should be regarding drones? If the technology advances allow for nearly constant increases in surveillance capabilities of drones from an amalgamation of technologies, it is time for the Court to deconstruct its broad "reasonable expectation of privacy" doctrine.

This Article has proposed three factors that the Court should take into account to determine whether police are required to obtain a warrant based on probable cause. Essentially, courts should first apply a presumption that a warrant is necessary absent exigent circumstances[300] in instances where the police are surveying homes

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[297] Henderson, *supra* note 11, at 808.

[298] Riley v. California, 134 S. Ct. 2473, 2480 (2014).

[299] *Id.* at 2489–90.

[300] United States v. Martinez, 406 F.3d 1160, 1164 (9th Cir. 2005) (quoting United States v. McConney, 728 F.2d 1195, 1199 (9th Cir. 1984) (en banc)) ("As a general rule, 'we define exigent circumstances as those circumstances that would cause a reasonable person to believe that entry . . . was necessary to prevent physical harm to the officers or other

or its curtilage when using drones. Given the myriad surveillance technologies potentially contained within a single drone, they are simply not like any other singular technology. The potential for a literal "invasion of privacy" is too great. Therefore, a presumption that a warrant is required will combat the increased potential of Fourth Amendment infringement. The burden would then be on law enforcement to demonstrate why it should not have been required to obtain a warrant given the multifactor test of viewing the surveillance technology in use, the extent of the surveillance, and the pervasiveness of the privacy intrusion.

persons, the destruction of relevant evidence, the escape of the suspect, or some other consequence improperly frustrating legitimate law enforcement efforts.'").