

Notes

DRONES AND THE FOURTH AMENDMENT: REDEFINING EXPECTATIONS OF PRIVACY

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ABSTRACT

Drones have gained notoriety as a weapon against foreign terrorist targets; yet, they have also recently made headlines as an instrument for domestic surveillance. With their sophisticated capabilities and continuously decreasing costs, it is not surprising that drones have attracted numerous consumers—most notably, law enforcement. Courts will likely soon have to decipher the limits on the government's use of drones under the Fourth Amendment. But it is unclear where, or even whether, drones would fall under the current jurisprudence. Because of their diverse and sophisticated designs and capabilities, drones might be able to maneuver through the Fourth Amendment's doctrinal loopholes.

*This Note advocates analyzing drones under an adapted approach to the reasonable-expectation-of-privacy test in *Katz v. United States*. Courts should focus more on the test's oft-neglected first prong—whether a person exhibited a subjective expectation of privacy—and analyze what information falls within the scope of that expectation, excluding information knowingly exposed to the plain view of the public. This analysis also considers instances when, although a subjective expectation exists, it may be impossible or implausible to reasonably exhibit that expectation, a dilemma especially relevant to an analysis of drones.*

Courts that adopt the recommended analysis would have a coherent and comprehensible approach to factually dynamic cases

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challenging the constitutionality of drone surveillance. Until then, the constitutional uncertainties of these cases will likely linger.

INTRODUCTION

Senator Dianne Feinstein, a staunch advocate of governmental surveillance¹ and Chairman of the 113th Congress's Senate Intelligence Committee,² recently found herself, rather ironically, as the target of surveillance.³ One day at her home, Senator Feinstein walked to the window to check on a protest that was taking place outside.⁴ Much to her surprise, a small drone⁵ hovered on the other side of the window, only inches away, spying on her.⁶ The drone immediately flew away.⁷

Senator Feinstein's experience is just one example of drones being used for surveillance within the United States. But her story and others like it⁸ have sparked significant controversy over the use of drones for domestic surveillance, which falls within a broader debate

1. See Spencer Ackerman, *Feinstein Promotes Bill to Strengthen NSA's Hand on Warrantless Searches*, GUARDIAN (Nov. 15, 2013, 10:02 AM), <http://www.theguardian.com/world/2013/nov/15/feinstein-bill-nsa-warrantless-searches-surveillance>.

2. *Members*, U.S. SENATE SELECT COMM. ON INTELLIGENCE, <http://www.intelligence.senate.gov/memberscurrent.html> (last visited Sept. 30, 2014).

3. Kathryn A. Wolfe, *Dianne Feinstein Spots Drone Inches from Face*, POLITICO (Jan. 15, 2014, 4:15 PM), <http://www.politico.com/story/2014/01/senator-dianne-feinstein-encounter-with-drone-technology-privacy-surveillance-102233.html>. This is not the first time that Senator Feinstein has been the subject of surveillance. See Mark Mazzetti & Carl Hulse, *Inquiry by C.I.A. Affirms It Spied on Senate Panel*, N.Y. TIMES, Aug. 1, 2014, at A1 ("An internal investigation by the C.I.A. has found that its officers penetrated a computer network used by the Senate Intelligence Committee [chaired by Feinstein and] . . . read the emails of the Senate [staff] . . .").

4. Wolfe, *supra* note 3. The crowd was supposedly protesting the National Security Agency's spying program. *Id.*

5. The technology often referred to as "drones" is also called Unmanned Aerial Vehicles (UAV), Uninhabited Aerial Systems (UAS), Remotely Piloted Vehicles (RPV), and Remotely Operated Aircrafts (ROA). STEVEN J. ZALOGA, UNMANNED AERIAL VEHICLES: ROBOTIC AIR WARFARE 1917–2007, at 2 (2008). This Note uses "drone" to refer to all of these initialisms and, specifically, for any unmanned, electronic or mechanical instrument that flies and uses sensory technology to acquire information. It uses this term not because of any associated negative connotations but because of public familiarity with the term "drone."

6. Wolfe, *supra* note 3.

7. *Id.*

8. Cf. Jason Koebler, *North Dakota Man Sentenced to Jail in Controversial Drone-Arrest Case*, U.S. NEWS & WORLD REP. (Jan. 15, 2014), <http://www.usnews.com/news/articles/2014/01/15/north-dakota-man-sentenced-to-jail-in-controversial-drone-arrest-case> (reporting on the first person to be arrested and convicted of a crime based on evidence obtained by drone surveillance).

on privacy and governmental surveillance programs.⁹ Advocates of robust federal surveillance policies champion governmental surveillance as the only way to prevent terrorist and cyber attacks against the United States.¹⁰ President Barack Obama defended these surveillance programs as “‘modest encroachments on privacy’” that “‘stri[k]e the ‘right balance’ between national security and civil liberties.”¹¹ In comparison, privacy advocates envision these surveillance programs leading to a dystopian, totalitarian government watching over its citizenry—undetected but omnipresent.¹² References to George Orwell’s *Nineteen Eighty-Four*¹³ abound.¹⁴

9. See Andy Pasztor & Jack Nicas, *Drone Plan Draws Privacy Concerns*, WALL ST. J., Nov. 7, 2013, 7:58 PM, <http://online.wsj.com/news/articles/SB10001424052702303309504579183711382731676> (reporting that a federal plan to integrate drones into the national airspace “riled critics seeking greater attention to privacy protections” at a time of “heightened public and congressional concern about the government’s surveillance capabilities”); see also Peter Finn & Ellen Nakashima, *Obama Defends Sweeping Surveillance Standards*, WASH. POST, June 7, 2013, http://www.washingtonpost.com/politics/obama-defends-sweeping-surveillance-efforts/2013/06/07/2002290a-cf88-11e2-9f1a-1a7cdee20287_story.html (“[President Barack] Obama said it was ‘healthy for our democracy’ to have an open discussion about the balance between privacy and security concerns . . .”).

10. See David E. Sanger & Thom Shanker, *N.S.A. Director Firmly Defends Surveillance Efforts*, N.Y. TIMES, Oct. 13, 2013, at A15 (reporting that the Director of the National Security Agency, General Keith Alexander, defended the agency’s surveillance programs as the only option to prevent terrorist and cyber attacks against the United States and stated that to do so, the United States must expand these surveillance programs).

11. Justin Sink, *Obama Defends NSA Surveillance Programs as ‘Right Balance’*, HILL (June 7, 2013, 6:07 PM), <http://thehill.com/video/administration/304165-obama-defends-nsa-programs-as-striking-right-balance>. President Obama’s statement seems to be the antithesis of Benjamin Franklin’s famous warning on trading liberty for safety: “Those who would give up essential Liberty, to purchase a little temporary Safety, deserve neither Liberty nor Safety.” J.A. LEO LEMAY, 3 THE LIFE OF BENJAMIN FRANKLIN: SOLDIER, SCIENTIST, AND POLITICIAN, 1748–1757, at 474 (2009).

12. See Pasztor & Nicas, *supra* note 9 (discussing a bill introduced by U.S. Senator Ed Markey to establish privacy rules governing the use of drones to protect Americans from “‘spies in the sky,’” and the passage of drone-privacy laws in eight states during 2013).

13. GEORGE ORWELL, NINETEEN EIGHTY-FOUR (1949). *Nineteen Eighty-Four* has frequently been cited as the poster child for a dystopian, totalitarian government that constantly surveils its citizenry. See sources cited *infra* note 14.

14. See, e.g., *Florida v. Riley*, 488 U.S. 445, 466–67 (1989) (Brennan, J., dissenting) (discussing governmental surveillance and referencing *Nineteen Eighty-Four* by George Orwell); M. Ryan Calo, *The Drone as Privacy Catalyst*, 64 STAN. L. REV. ONLINE 29, 32 (2011) (same); Richard G. Wilkins, *Defining the ‘Reasonable Expectation of Privacy’: An Emerging Tripartite Analysis*, 40 VAND. L. REV. 1077, 1078–79 (1987) (same). In *United States v. Jones*, 132 S. Ct. 945 (2012), the Supreme Court considered a question particularly relevant to drones and their ability to track individuals: whether the government may place a Global Positioning System (GPS) on an individual’s vehicle and track her public movements without a warrant. *Id.* at 948. During oral arguments in *Jones*, Orwell’s *Nineteen Eighty-Four* was mentioned six times. See Transcript of Oral Argument at 13, 25, 27, 33, 35, 57, *Jones*, 132 S. Ct. 945 (No. 10-1259).

Apart from the surrounding privacy-concerns debate, drones currently provide many practical benefits and their projected applications seem limitless.¹⁵ Based on their obvious advantage of being unmanned, drones have the capability to conduct missions previously considered too risky, dangerous, or impracticable. These applications are also provided at continuously decreasing costs and with the latest technological sophistication, such as the capability to see through physical obstructions, to detect various chemical and biological agents in the air, to recognize human faces and license plates, and to fly in strategic, coordinated formations.¹⁶

As has frequently been the case, however, the benefits of technological advancement come with the risk of abuse and harassment.¹⁷ These risks are greater when the technology is utilized by government entities.¹⁸ This Note examines the challenges that the United States faces in addressing those risks and harmonizing the conflict between government and technology. Has privacy prospered or foundered through the development of technology? More specifically, how will the burgeoning swarm of drones over American soil affect domestic law enforcement, and how will these effects withstand Fourth Amendment¹⁹ scrutiny?

15. See *infra* notes 143–49 and accompanying text.

16. See *infra* notes 150–54 and accompanying text, and Part II.B.

17. See *Dow Chem. Co. v. United States*, 476 U.S. 227, 240 (1986) (Powell, J., concurring in part and dissenting in part) (describing the Court’s role of “ensur[ing] that Fourth Amendment rights would retain their vitality as technology expanded the Government’s capacity to commit unsuspected intrusions into private areas and activities”); *id.* (concluding that the majority opinion’s approach “will not protect Fourth Amendment rights, but rather will permit their gradual decay as technology advances”); see, e.g., *United States v. Cuevas-Perez*, 640 F.3d 272, 276 (7th Cir. 2011) (describing GPS as “a technology surely capable of abuses fit for a dystopian novel”), *vacated and remanded*, 132 S. Ct. 1534 (2012); see also *Kyllo v. United States*, 533 U.S. 27, 33–34 (2001) (“It would be foolish to contend that the degree of privacy secured to citizens by the Fourth Amendment has been entirely unaffected by the advance of technology.”).

18. See *Jones*, 132 S. Ct. at 956 (Sotomayor, J., concurring) (“[T]he Government’s unrestrained power to assemble data . . . is susceptible to abuse.”); see also *Riley v. California*, 134 S. Ct. 2473, 2497 (2014) (Alito, J., concurring) (“Many forms of modern technology are making it easier and easier for both government and private entities to amass a wealth of information about the lives of ordinary Americans . . .”).

19. The Fourth Amendment states:

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.

U.S. CONST. amend. IV.

Drones, with their current and projected capabilities, present a perfect storm of issues that fall outside of current Fourth Amendment jurisprudence but still appear to implicate the Fourth Amendment.²⁰ Drones can maneuver through each and every loophole of the jurisprudence for warrantless searches.²¹ They travel on public airways at low or high altitudes, undetected and with little or no undue noise, nuisance, or threat to persons or property.²² They can utilize sense-enhancing technologies that are, or will soon be, in general public use.²³ And drones can use these technologies to gather an abundance of intimate details and information, previously impossible or impracticable to acquire.²⁴ Law enforcement is likely to increasingly use drones for domestic surveillance,²⁵ and this will likely propel drones to the forefront of courts' dockets.²⁶

Scholars have written exhaustively on many aspects of the Fourth Amendment, and its intersection with drones has recently

20. See Scott Bomboy, *A Legal Victory for Drones Warrants a Fourth Amendment Discussion*, NAT'L CONST. CTR. (Feb. 7, 2014), <http://blog.constitutioncenter.org/2014/02/a-court-victory-for-drones-warrants-a-fourth-amendment-discussion> (“For now, there doesn’t seem to be a clear-cut answer [on drone surveillance under the Fourth Amendment] . . .”).

21. This Note addresses exclusively *warrantless* surveillance by drones. It does not advocate a blanket prohibition of the use of drones, their technology, or even a prohibition of their use by law enforcement or public entities. Drones provide numerous advantages in both the private and public setting. Their integration and expansion into the airspace under the FAA Modernization and Reform Act of 2012 (FAA Modernization Act) is greatly needed. For law-enforcement purposes, drones may provide the greatest advancement in decades—minimizing risk to police officers, expanding available information, and reducing policing expenses.

These positive aspects, however, do not negate the virtues of requiring warrants in certain situations. See *Riley*, 134 S. Ct. at 2493 (“[T]he warrant requirement is ‘an important working part of our machinery of government,’ not merely ‘an inconvenience to be somehow ‘weighed’ against the claims of police efficiency.’” (citation omitted)). Requiring warrants for certain governmental intrusions protects society’s privacy expectations and the minimum guarantees of the Fourth Amendment. Furthermore, this system promotes the credibility of law-enforcement surveillance because of the *ex ante* review of the intrusion by a judge, requiring probable cause before authorizing a warrant.

22. See *infra* Part III.B.

23. See *infra* notes 204–05 and accompanying text.

24. See *infra* note 96 and accompanying text.

25. See Koebler, *supra* note 8 (reporting on the first person to be arrested and convicted of a crime based on evidence obtained by drone surveillance).

26. Current events will also likely accelerate the use of drones. See *infra* text accompanying notes 153–58. But see Jeff Pegues, *Some Drone Decisions Expected Soon, with Final Rules Likely Years Away*, CBS NEWS (Dec. 29, 2014, 11:26 AM), <http://www.cbsnews.com/news/some-drone-decisions-expected-soon-with-final-rules-likely-years-away> (“[I]t is nearly certain that the FAA will not meet [the September 2015] deadline. Instead, 2017 seems to be a more realistic time frame.”).

received significant attention.²⁷ Much of the literature on drones and the Fourth Amendment recognizes that it is unclear where—and whether—drones fall within current jurisprudence, and recommends a variety of legislative solutions.²⁸ But although scholars identify the legal uncertainties with drones, those recommending legislative action endorse a partial solution that only perpetuates the problem that the courts have maintained with respect to technology and the Fourth Amendment. Specifically, just as current Fourth Amendment jurisprudence has failed to keep pace with advancing technology, a legislative approach will also trail behind.²⁹ This Note addresses these

27. A Westlaw search through law reviews and journals for pieces, published before January 1, 2015, that use the words “drones,” “search,” and “Fourth Amendment” recovered 250 pieces. Of these, eighty-five were published in 2014; seventy-four were published in 2013; thirty-eight were published in 2012; twelve were published in 2011; and forty-one were published before 2011, the earliest in 1991. For example, see generally Timothy T. Takahashi, *Drones and Privacy*, 14 COLUM. SCI. & TECH. L. REV. 72 (2013); John Villasenor, *Observations from Above: Unmanned Aircraft Systems and Privacy*, 36 HARV. J.L. & PUB. POL’Y 457 (2013); Philip J. Hiltner, Comment, *The Drones Are Coming: Use of Unmanned Aerial Vehicles for Police Surveillance and Its Fourth Amendment Implications*, 3 WAKE FOREST J.L. & POL’Y 397 (2013); Troy Roberts, Comment, *On the Radar: Government Unmanned Aerial Vehicles and Their Effect on Public Privacy Interests from Fourth Amendment Jurisprudence and Legislative Policy Perspectives*, 49 JURIMETRICS J. 491 (2009); Andrew B. Talai, Comment, *Drones and Jones: The Fourth Amendment and Police Discretion in the Digital Age*, 102 CALIF. L. REV. 729 (2014).

28. See, e.g., Calo, *supra* note 14, at 29 (arguing that drones may be the “catalyst” to “drag privacy law into the twenty-first century”); Roberts, *supra* note 27, at 516 (arguing that the Fourth Amendment provides few protections against the government’s use of drones for surveillance and that legislative and regulatory action is necessary); Villasenor, *supra* note 27, at 508 (arguing for law-enforcement policies and legislation to govern drone usage); see also Richard M. Thompson II, CONG. RESEARCH SERV., R42701, DRONES IN DOMESTIC SURVEILLANCE OPERATIONS: FOURTH AMENDMENT IMPLICATIONS AND LEGISLATIVE RESPONSES (Apr. 3, 2013), <http://fas.org/sgp/crs/natsec/R42701.pdf>; Bart Elias, CONG. RESEARCH SERV., R42718, PILOTLESS DRONES: BACKGROUND AND CONSIDERATIONS FOR CONGRESS REGARDING UNMANNED AIRCRAFT OPERATIONS IN THE NATIONAL AIRSPACE SYSTEM (Sept. 10, 2012), <http://fas.org/sgp/crs/natsec/R42718.pdf>; cf. *Riley v. California*, 134 S. Ct. 2473, 2497–98 (2014) (Alito, J., concurring) (“Legislatures, elected by the people, are in a better position than we are to assess and respond to the [technological] changes that have already occurred and those that almost certainly will take place in the future.”).

29. A successful legislative approach to drones, or more broadly to governmental surveillance, is also in many ways unrealistic and unlikely based on the current political context and on Congress’s legislative record on Fourth Amendment–like protections. In over 225 years since the Bill of Rights was enacted, many of the significant restrictions on governmental investigations have emerged from the courts, rather than Congress. The Supreme Court has frequently stepped in, or perhaps was forced to step in, to uphold the minimum guarantees against unreasonable searches provided by the Fourth Amendment. See, e.g., *Riley v. California*, 134 S. Ct. 2473, 2493 (2014) (holding that the police may not, without a warrant, search through digital information on an arrestee’s cell phone); *Katz v. United States*, 389 U.S. 347, 353 (1967) (holding that the police may not, without a warrant, wiretap and listen to a

issues and recommends an adaptive approach to Fourth Amendment jurisprudence in the age of the drone.

For these reasons, it is highly probable that courts will soon confront issues regarding the use of drones for domestic surveillance.³⁰ This Note argues that when these issues arise, courts should apply the reasonable-expectation-of-privacy test expounded in *Katz v. United States*,³¹ and, in doing so, expand on the subjective-expectation-of-privacy requirement. This oft-neglected element of the two-pronged test provides critical analysis that is especially relevant to cases involving drones. In further analyzing and clarifying the subjective-expectation requirement, courts should proceed in three steps. First, they should determine whether the surveilled person “exhibited an actual (subjective) expectation of privacy”—the

person’s phone call from a public telephone booth); *Mapp v. Ohio*, 367 U.S. 643, 655 (1961) (holding that evidence obtained from an unconstitutional search may not be admitted at trial as evidence). The Electronic Communications Privacy Act of 1986, 18 U.S.C. §§ 2510–2522 (2012), is one rare example of a legislative approach to Fourth Amendment issues.

A legislative solution is unrealistic also because of the current political context. A politician who attempts to support legislative action that would implement a robust protection against governmental surveillance by drones might be attacked as being “soft on crime.” See BRANDON C. WELSH & DAVID P. FARRINGTON, *THE OXFORD HANDBOOK OF CRIME PREVENTION* 491 (2012) (“It has often been observed that getting tough with [criminal] offenders carries political benefits.”). This political fodder would likely dissuade many politicians, as it has in other contexts in the past, from proposing or voting in favor of a legislative solution similar to those proposed by the sources above. See sources cited *supra* note 28. Therefore, a legislative solution is unlikely.

Nonetheless, there are some jurists who have advocated for legislative solutions to remedy complex Fourth Amendment issues. See, e.g., *Riley*, 134 S. Ct. at 2497 (Alito, J., concurring) (“In light of [technological] developments, it would be very unfortunate if privacy protection in the 21st century were left primarily to the federal courts using the blunt instrument of the Fourth Amendment.”); *Kyllo v. United States*, 533 U.S. 27, 51 (2001) (Stevens, J., dissenting) (“It would be far wiser to give legislators an unimpeded opportunity to grapple with these emerging issues [concerning technology] rather than to shackle them with prematurely devised constitutional constraints.”). Although these jurists might believe that a legislative solution is preferable, they do not acknowledge that it is likely to occur.

In light of this legislative apathy, it is therefore critical to understand where the Fourth Amendment sets the floor of rights for individuals and what restrictions there are on governmental surveillance by drones.

30. Cf. Memorandum Decision and Order Denying Motion to Dismiss at *12, *North Dakota v. Brossart*, Nos. 32-2011-CR-00049, 00071, 32-2011-CR-00074, 32-2011-CR-00050, 00076, 32-2011-CR-00046, 32-2011-CR-00048, 32-2011-CR-00047 (N.D. Dist. Ct. July 31, 2012), available at https://www.nacdl.org/uploadedFiles/files/news_and_the_champion/DDIC/Brossart%20Order.pdf (denying a motion to dismiss or, alternatively, to suppress evidence obtained by a drone because “[t]here was no improper use of a [drone]”); *Bomboy*, *supra* note 20 (reporting on the first case where a person was arrested and convicted of a crime based on evidence obtained by a drone).

31. *Katz v. United States*, 389 U.S. 347 (1967).

threshold issue in order for the Fourth Amendment to apply.³² Second, if the person held a subjective expectation of privacy, courts should evaluate the scope of that privacy expectation. And third, they should determine whether the person “expose[d] [information] to the ‘plain view’ of outsiders” and whether the evidence at issue fell within the scope of that exposure.³³

This Note analyzes drones under current Fourth Amendment jurisprudence and suggests an adapted approach to Fourth Amendment doctrine to help remedy many of the problems presented by drones. Part I discusses Fourth Amendment jurisprudence relevant to an analysis of drone technology. Part II provides an overview of the current market for drones, as well as their current designs and capabilities. Part III analyzes the current doctrinal failings of the relevant Fourth Amendment jurisprudence when applied to drones. Finally, Part IV outlines a more effective analysis of drones under the reasonable-expectation-of-privacy test by analyzing the specific facts that might express a surveilled person’s subjective expectation of privacy, the scope of those expressive factors, and whether the information obtained through surveillance was exposed to the plain view of the public. This reemphasized and expanded analysis would likely solve many of the problems presented by the application of current Fourth Amendment jurisprudence to drones.

I. DRONES AND CURRENT FOURTH AMENDMENT JURISPRUDENCE

Under the Fourth Amendment, “[t]he right of people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated.”³⁴ The Fourth Amendment is the “chief source of privacy protection” in the American justice system.³⁵ It is intended to empower the government to investigate and enforce laws to a “reasonably satisfactory level,” while still restricting these powers.³⁶ In doing so, it acts as a “bulwark

32. *Id.* at 361 (Harlan, J., concurring).

33. *Id.*

34. U.S. CONST. amend. IV.

35. RONALD JAY ALLEN, WILLIAM J. STUNTZ, JOSEPH L. HOFFMAN, DEBRA A. LIVINGSTON & ANDREW D. LEIBOLD, *CRIMINAL PROCEDURE: INVESTIGATION AND RIGHT TO COUNSEL* 337 (2011).

36. Orin S. Kerr, *An Equilibrium-Adjustment Theory of the Fourth Amendment*, 125 HARV. L. REV. 476, 484 (2011).

against police practices that prevail in totalitarian regimes.”³⁷ Fourth Amendment jurisprudence has therefore sought an appropriate balance between the government’s investigative and prosecutorial powers and an individual’s constitutional rights.

In applying the Fourth Amendment to drones, a court must undertake several relevant inquiries to determine if the government’s use of the drone violates the Fourth Amendment. The court must first determine whether a search for Fourth Amendment purposes occurred.³⁸ If no search transpired, then the Fourth Amendment is not implicated.³⁹ Second, if a search occurred for which no warrant was issued, the court must consider whether that search was reasonable.⁴⁰ Therefore, when analyzing the government’s use of drones for domestic surveillance, an issue not yet ruled on by the Supreme Court, the first—and, under current jurisprudence, the most relevant—inquiry is whether this surveillance constitutes a search. This fundamental question plays a significant role in existing Fourth Amendment jurisprudence, and any potentially successful challenge to domestic drone surveillance must first satisfy this inquiry. The issue of whether a search occurred, in addition to whether that search was reasonable, has perplexed courts since the Fourth Amendment’s ratification.⁴¹ Fourth Amendment jurisprudence has been heavily criticized by numerous legal scholars and labeled “a mess,”⁴² “a theoretical embarrassment,”⁴³ and “a vast jumble of judicial pronouncements that is not merely complex and contradictory, but often perverse.”⁴⁴

37. *California v. Acevedo*, 500 U.S. 565, 586 (1991) (Stevens, J., dissenting).

38. JOSHUA DRESSLER & GEORGE C. THOMAS III, *CRIMINAL PROCEDURE: PRINCIPLES, POLICIES AND PERSPECTIVES* 82 (1999).

39. ALLEN ET AL., *supra* note 35, at 418.

40. DRESSLER & THOMAS, *supra* note 38, at 62, 334.

41. *See* Kerr, *supra* note 36, at 480 (“Fourth Amendment rules can appear to be selected almost at random. The patchwork of results has made search and seizure law a theoretical embarrassment to scholars and judges alike. According to scholars, the law lacks any theoretical grounding. It is cobbled together from ‘a series of inconsistent and bizarre results that [the Court] has left entirely undefended.’” (alteration in original) (citation omitted)); *see also* *Kyllo v. United States*, 533 U.S. 27, 31 (2001) (“[T]he antecedent question whether or not a Fourth Amendment ‘search’ has occurred is not so simple under our precedent.”).

42. Ronald J. Allen & Ross M. Rosenberg, *The Fourth Amendment and the Limits of Theory: Local Versus General Theoretical Knowledge*, 72 ST. JOHN’S L. REV. 1149, 1149 (1998).

43. Kerr, *supra* note 36, at 480.

44. Akhil Reed Amar, *Fourth Amendment First Principles*, 107 HARV. L. REV. 757, 758 (1994).

Through the doctrine's "patchwork of [Fourth Amendment] protections,"⁴⁵ two frameworks have arisen for identifying a search: a property-rights paradigm and a privacy-rights paradigm.⁴⁶ The traditional property-rights paradigm focuses on common-law property rights and examines the government's conduct under the "trespass," "curtilage," and "open-fields" doctrines. Beginning in the twentieth century, courts also adopted a paradigm that focuses on a person's expectations of privacy and analyzes whether these expectations are both subjectively held and objectively reasonable. These two paradigms recognize the intertwined property and privacy principles inherent in the Fourth Amendment's guarantees from unreasonable searches and seizures.⁴⁷

A. *The Property-Rights Paradigm*

The property-rights framework uses common-law property rights as the parameters for identifying a search within the meaning of the Fourth Amendment. This approach arose from historical roots in the common law and society's reverence for individual property rights.⁴⁸ This paradigm also reflects a simple and transparent doctrinal solution to unreasonable governmental intrusions limited by pre-twentieth century investigatory mechanisms that relied on the natural senses.⁴⁹ Such searches typically required a physical trespass to acquire the information sought by the government.⁵⁰

*United States v. Jones*⁵¹ provides a modern example of the property-rights paradigm under the trespass doctrine. In *Jones*, the Supreme Court considered whether attaching a Global Positioning

45. Kerr, *supra* note 36, at 479.

46. See *United States v. Jones*, 132 S. Ct. 945, 952 (2012) ("[T]he *Katz* reasonable-expectation-of-privacy test has been *added to*, not *substituted for*, the common-law trespassory test.").

47. See *Florida v. Jardines*, 133 S. Ct. 1409, 1419 (2013) (Kagan, J., concurring) (describing the connection between property and privacy within the Fourth Amendment).

48. *Entick v. Carrington*, [1765] 95 Eng. Rep. (K.B.) [817] ("Our law holds the property of every man so sacred that no man can set his foot upon his neighbour's close without his leave. If he does he is a trespasser, though he does no damage at all."). Courts and legal scholars have long considered *Carrington* as "'the true and ultimate expression of constitutional law' with regard to search and seizure" and "'undoubtedly familiar' to 'every American statesman' at the time the Constitution was adopted." *Jones*, 132 S. Ct. at 949 (quoting *Brower v. Cnty. of Inyo*, 489 U.S. 593, 596 (1989)).

49. See *Jardines*, 133 S. Ct. at 1417 ("One virtue of the Fourth Amendment's property-rights baseline is that it keeps easy cases easy.").

50. *Jones*, 132 S. Ct. at 950.

51. *United States v. Jones*, 132 S. Ct. 945 (2012).

System (GPS) to Antoine Jones’s vehicle and monitoring his movements on public roads for twenty-eight days without a warrant constituted an unreasonable search.⁵² The Court unanimously found that the government’s conduct violated the Fourth Amendment, but the justices split over their reasoning for that holding.⁵³ The majority opinion, written by Justice Antonin Scalia, held that the government’s actions violated Jones’s Fourth Amendment rights based upon the trespass doctrine.⁵⁴ By physically attaching a GPS to Jones’s vehicle, the government committed a trespass upon chattel and “encroached on a [constitutionally] protected area,” notwithstanding the government’s monitoring of the vehicle’s movements on public roads.⁵⁵ The government’s actions therefore constituted an unreasonable search.⁵⁶

Fourth Amendment jurisprudence has extended this property-rights paradigm to the curtilage doctrine. The curtilage of the home is considered as “part of the home itself for Fourth Amendment purposes” and, thus, afforded the same protections.⁵⁷ The curtilage consists of the area immediately surrounding a home where the private details of the home naturally extend,⁵⁸ and it is “intimately linked to the home, both physically and psychologically.”⁵⁹ In determining whether an area forms the curtilage, courts have considered a variety of factors, including “the proximity of the area . . . to the home, whether the area is included within an enclosure surrounding the home, the nature of the uses to which the area is put,

52. *Id.* at 948.

53. *Id.* at 947. Chief Justice Roberts and Justices Kennedy, Thomas, and Sotomayor joined Justice Scalia’s opinion holding that the government’s conduct constituted a search under the property-rights paradigm. *Id.* at 947, 949. Justice Sotomayor entered a concurring opinion arguing that the government’s conduct constituted a search under both the property- and privacy-rights paradigms. *Id.* at 954–55 (Sotomayor, J., concurring). And Justices Ginsburg, Breyer, and Kagan joined Justice Alito’s concurring opinion arguing that the government’s conduct constituted a search under the privacy-rights paradigm. *Id.* at 964 (Alito, J., concurring).

54. *Id.* at 949.

55. *Id.* at 952.

56. *Id.* at 949.

57. *Oliver v. United States*, 466 U.S. 170, 180 (1984).

58. *See, e.g., Florida v. Jardines*, 133 S. Ct. 1409, 1414–15 (2013) (finding that the front porch of a home fell within the curtilage); *California v. Ciraolo*, 476 U.S. 207, 209 (1986) (finding that a “fenced-in backyard” fell within the curtilage). *But see Dow Chem. Co. v. United States*, 476 U.S. 227, 239 (1986) (finding that “the open areas of an industrial plant complex . . . spread over an area of 2,000 acres” did not fall within the curtilage).

59. *Ciraolo*, 476 U.S. at 213.

and the steps taken by the resident to protect the area from observation by people passing by.”⁶⁰ The curtilage is generally easily identifiable and understandable from our common experiences and knowledge.⁶¹ The Supreme Court has found the curtilage to include, among other areas, a front porch to a home⁶² and a “fenced-in backyard.”⁶³ The curtilage does not include, however, “the open areas of an industrial plant complex . . . spread over an area of 2,000 acres.”⁶⁴

In *Florida v. Jardines*,⁶⁵ a 2013 property-rights case, the Supreme Court discussed the Fourth Amendment protections guaranteed to the curtilage as well as the scope of an implicit license to enter the curtilage for certain purposes. Here, the Court considered whether the government’s brief physical presence on Joelis Jardines’s front porch with a drug-sniffing dog, to investigate if illicit drugs were inside the home, constituted an unreasonable search.⁶⁶ The majority held that by entering the curtilage (here, the front porch) and acting beyond an implicit license to approach a home and solicit its occupants (here, using the drug-sniffing dog), the government physically trespassed on a constitutionally protected area and, thus, violated Jardines’s Fourth Amendment rights.⁶⁷ According to the Court, the type of investigative instrument utilized,⁶⁸ the duration of the trespass,⁶⁹ and the fact that any law-enforcement officer or citizen could enter the same area to knock on the door and attempt to contact the home’s occupants,⁷⁰ were all irrelevant.

By contrast, courts have not extended the same guarantees afforded to the home and its curtilage to areas deemed analogous to an open field.⁷¹ Open fields are not required to be either open or fields in the literal sense, but they typically fall outside of the home’s

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

61. *Oliver*, 466 U.S. at 182 n.12.

62. *Jardines*, 133 S. Ct. at 1414.

63. *Ciraolo*, 476 U.S. at 209.

64. *Dow Chem. Co. v. United States*, 476 U.S. 227, 239 (1986).

65. *Florida v. Jardines*, 133 S. Ct. 1409 (2013).

66. *Id.* at 1413.

67. *Id.* at 1417–18.

68. *Id.* at 1417.

69. *See id.* at 1421 (Alito, J., dissenting) (criticizing the majority opinion for ignoring the short period of time, approximately one or two minutes, during which the events transpired).

70. *Id.* at 1416 (majority opinion).

71. *Dow Chem. Co. v. United States*, 476 U.S. 227, 235–36 (1986); *Oliver v. United States*, 466 U.S. 170, 176 (1984).

curtilage.⁷² Accordingly, an absence or insufficiency of the enumerated factors establishing the curtilage of a home would denote an open field.⁷³ The Court has found, for example, that a barn was located in an open field, rather than the curtilage, because the barn was fifty yards from a fence surrounding the home and sixty yards from the home, the barn was not surrounded by a fence, the barn “was not being used for intimate activities of the home,” and the resident of the home “did little to protect the barn area from observation by those standing in open fields.”⁷⁴ Open fields do not share the same setting for private activities and information that the Fourth Amendment protects from governmental intrusions.⁷⁵ Thus, a person may not expect privacy in an open field, and the government’s conduct generally would not constitute a search.⁷⁶

In *Dow Chemical Co. v. United States*,⁷⁷ the Supreme Court considered whether the curtilage or open-fields doctrine applied to the open areas between buildings on a large industrial property.⁷⁸ The U.S. Environmental Protection Agency (EPA) conducted warrantless, aerial surveillance of a two-thousand-acre facility owned by Dow Chemical.⁷⁹ Finding that the extensive, scattered outdoor areas of the complex were neither precisely the curtilage nor an open field,⁸⁰ the Court concluded that the complex was more similar to an open field.⁸¹ Therefore, the Fourth Amendment’s guarantees did not extend to these areas, and the government’s actions did not constitute a search.⁸²

The Supreme Court has recently adapted this property-rights paradigm to investigations of the home that would traditionally fall

72. *Dow*, 476 U.S. at 236, 239 (quoting *Oliver*, 466 U.S. at 180 n.11); see also, e.g., *United States v. Dunn*, 480 U.S. 294, 304 (1987).

73. See *California v. Ciraolo*, 476 U.S. 207, 221 (1986) (Powell, J., dissenting) (listing the factors relevant to determining whether an area constitutes the curtilage); *Oliver*, 466 U.S. at 171 (“[T]he common law, by implying that only the land immediately surrounding and associated with the home warrants the Fourth Amendment protections that attach to the home, conversely implies that no expectation of privacy legitimately attaches to open fields.”).

74. *Dunn*, 480 U.S. at 302–03.

75. *Oliver*, 466 U.S. at 179.

76. *Id.* at 178.

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

78. *Id.* at 235.

79. *Id.* at 229.

80. *Id.* at 236.

81. *Id.* at 239.

82. *Id.*

outside the trespass doctrine because they do not complete a traditional, physical trespass. This adaptation, expounded in *Kyllo v. United States*,⁸³ has extended the property-rights paradigm to certain invasive technologies in order to shelter the Fourth Amendment's guarantees from modern technology.⁸⁴ This paradigm will likely play a critical role in evaluating the constitutionality of many sophisticated technologies employed by drones. In *Kyllo*, a federal agent, investigating whether Danny Kyllo was growing marijuana plants using heat lamps inside his home, used a thermal-imaging device from a public roadway to determine if there was an elevated amount of heat emanating from the walls of the home.⁸⁵ The Supreme Court considered whether the government's use of the thermal imager constituted an unreasonable search and, more generally, "what limits there are upon [the] power of technology to shrink the realm of guaranteed privacy."⁸⁶ The majority held that when the government uses sense-enhancing technology to acquire details from within "the home that could not otherwise have been obtained without physical 'intrusion into a constitutionally protected area,'" then this conduct constitutes an unreasonable search when the technology "is not in general public use."⁸⁷

Although the Court failed to clarify the parameters of general public use, several earlier cases introducing this requirement seemed to require only marginal use or prevalence.⁸⁸ For example, in *Florida v. Riley*,⁸⁹ the Supreme Court found that helicopter travel was not "unheard of" in the area and that it was not "sufficiently rare" to raise a Fourth Amendment issue.⁹⁰ In *Dow*, the Court found a twenty-two-thousand-dollar mapmaking camera to be "conventional."⁹¹ The scope of this general-use element is especially relevant to the impending boom in drone usage and the forthcoming Federal

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

84. *Id.* at 34 (stating that the rule in *Kyllo* "assures preservation of that degree of privacy against government that existed when the Fourth Amendment was adopted"); *id.* at 36 ("[T]he rule we adopt must take account of more sophisticated systems that are already in use or in development.").

85. *Id.* at 29.

86. *Id.* at 34.

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

88. The Court did note, however, that the thermal imager was "relatively crude" and not in general public use. *Id.* at 34, 36.

89. *Florida v. Riley*, 488 U.S. 445 (1989) (plurality opinion).

90. *Id.* at 450-51.

91. *Dow Chem. Co. v. United States*, 476 U.S. 227, 238 (1986).

Aviation Administration (FAA) regulations under the FAA Modernization and Reform Act of 2012 (FAA Modernization Act),⁹² which will integrate drones into the national airspace.⁹³

B. The Privacy-Rights Paradigm

Beginning in the twentieth century, the Supreme Court adopted a new Fourth Amendment doctrine analyzing certain nontrespassory issues under privacy-rights rationales. In recognizing that “the Fourth Amendment protects people, not places,” the Court attempted to guide the doctrine’s analytical criterion to maintain the Fourth Amendment’s guarantees in the face of modern technology.⁹⁴ This privacy-rights approach resulted from the Court’s recognition of various technological advancements that no longer fell neatly within the property-rights jurisprudence.⁹⁵ These new technologies have enabled the government to acquire the same type of information—as well as entirely new types of information—that traditionally could only have been lawfully collected by the government pursuant to a warrant.⁹⁶

The Court first announced the privacy-rights paradigm in *Katz v. United States*. In *Katz*, the government attached a microphone to a public phone booth to listen to and record Charles Katz’s telephone conversations.⁹⁷ The Court rejected the argument that a Fourth Amendment violation turned on whether a physical trespass had occurred.⁹⁸ Instead, it held that the government had violated Katz’s reasonable expectation of privacy by listening to his conversation,

92. FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 332(a)(3), 126 Stat. 11, 73 (2012).

93. *Id.*

94. *Katz v. United States*, 389 U.S. 347, 351 (1967).

95. *See id.* at 353 (holding that the government’s conduct violated Katz’s privacy rights under the Fourth Amendment and reasoning that “[t]he fact that the electronic device . . . did not happen to penetrate the wall of the booth can have no constitutional significance”).

96. *See, e.g., Riley v. California*, 132 S. Ct. 2473, 2491 (2014) (“Indeed, a cell phone search would typically expose to the government far *more* than the most exhaustive search of a house: A phone not only contains in digital form many sensitive records previously found in the home; it also contains a broad array of private information never found in a home in any form”); *id.* at 2494–95 (“Modern cell phones are not just another technological convenience. With all they contain and all they may reveal, they hold for many Americans ‘the privacies of life.’” (citation omitted)); *id.* at 2496 (Alito, J., concurring) (“Many cell phones now in use are capable of storing and accessing a quantity of information, some highly personal, that no person would ever have had on his person in hard-copy form.”).

97. *Katz*, 389 U.S. at 348.

98. *Id.* at 353.

which was intended to be private once he closed the phone-booth door.⁹⁹ The government's actions therefore constituted an unreasonable search.¹⁰⁰ In so holding, the Court reasoned that “[w]hat a person knowingly exposes to the public . . . 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.”¹⁰¹

Although the majority opinion diverged from the traditional inquiry regarding property rights as the sole relevant criterion in identifying a Fourth Amendment search,¹⁰² *Katz*'s prominence in Fourth Amendment jurisprudence comes from Justice John Harlan's concurring opinion.¹⁰³ Justice Harlan interpreted the majority opinion as holding, in part, that “electronic as well as physical intrusion” into areas where “a person has a constitutionally protected *reasonable expectation of privacy*” can violate the Fourth Amendment, and that “the invasion of a constitutionally protected area by [the government] is . . . presumptively unreasonable in the absence of a search warrant.”¹⁰⁴ In finding an invasion of *Katz*'s reasonable expectation of privacy, Justice Harlan established a two-part test for determining whether such an expectation existed.¹⁰⁵ First, a person must “have exhibited an actual (subjective) expectation of privacy.”¹⁰⁶ Second, that subjective expectation must “be one that society is prepared to recognize as [objectively] ‘reasonable.’”¹⁰⁷

In the decades following *Katz* and the reasonable-expectation-of-privacy test, the Court confronted the issue of warrantless, aerial surveillance in three key cases.¹⁰⁸ Although each of the cases considered aerial surveillance in some respect, they all added a different dynamic to Fourth Amendment jurisprudence and the

99. *Id.* at 352.

100. *Id.* at 353.

101. *Id.* at 351–52 (citations omitted).

102. *Id.* at 353.

103. The Court subsequently adopted the reasonable-expectation-of-privacy test in *Smith v. Maryland*, 442 U.S. 735, 740 (1979).

104. *Katz*, 389 U.S. at 360–61 (Harlan, J., concurring) (emphasis added).

105. *Id.*

106. *Id.* at 361.

107. *Id.*

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

reasonable-expectation-of-privacy test. And each case informs the approach to drones.

California v. Ciraolo,¹⁰⁹ the first of the aerial-surveillance triad, addressed the constitutionality of warrantless, “naked-eye observation” of the curtilage of a home from above.¹¹⁰ To investigate an anonymous tip that Ciraolo was growing marijuana in his backyard, police officers flew an airplane over his property, photographing marijuana plants discovered on the property from one-thousand feet above.¹¹¹ The Court held that although Ciraolo “manifest[ed] his own subjective intent and desire to maintain privacy” by putting up a fence,¹¹² his expectation was not one that society was prepared to recognize as reasonable.¹¹³ The majority reasoned that because of the proliferation of air travel, anyone could look down and observe the curtilage of Ciraolo’s home with naked-eye observation.¹¹⁴ The Fourth Amendment does not hold the police to a higher standard and require them “to shield their eyes when passing by a home on public thoroughfares . . . where [they have] a right to be.”¹¹⁵

Dow, discussed above, also considered the “narrow issue” of whether nontrespassory, aerial surveillance of a large commercial property constituted a Fourth Amendment violation.¹¹⁶ In *Dow*, the EPA surveilled a two-thousand-acre commercial complex from altitudes of twelve-hundred feet and above.¹¹⁷ The aircraft used “a conventional, albeit precise, commercial camera commonly used in mapmaking”¹¹⁸ that cost over twenty-two-thousand dollars in the 1980s and was able to enlarge photographs taken at twelve-hundred feet to identify something as small as a power line about one-half of an inch in diameter.¹¹⁹ Although the majority opinion focused most of

109. *California v. Ciraolo*, 476 U.S. 207 (1986).

110. *Id.* at 213.

111. *Id.* at 209.

112. *Id.* at 211. Although it referenced Ciraolo’s subjective expectation of privacy, the Court neglected to determine the subjective requirement because the state had waived this issue on appeal. *Id.*

113. *Id.* at 214.

114. *Id.* at 215.

115. *Id.* at 213.

116. *Dow Chem. Co. v. United States*, 476 U.S. 227, 237 (1986).

117. *Id.* at 229.

118. *Id.* at 238.

119. *Id.* at 242 n.4, 243 (Powell, J., concurring in part and dissenting in part).

its analysis on the open-fields doctrine¹²⁰ and the facts of *Ciraolo*, which had been decided on the same day as *Dow*,¹²¹ it also cited the reduced expectations of privacy in commercial properties and the type of technology utilized by the government as relevant to its inquiry.¹²² The Court reasoned that because expectations of privacy in commercial properties are lesser than those in a home, the Fourth Amendment does not extend to commercial properties as it does to the home.¹²³ The majority opinion also suggested that the use of “highly sophisticated surveillance equipment not generally available to the public” might constitute an unreasonable search.¹²⁴ The technology used by the EPA, however, was not so sophisticated and revealing as to constitute an unreasonable search.¹²⁵

The third and final case, *Florida v. Riley*,¹²⁶ was decided three years after *Ciraolo* and *Dow* and garnered only a plurality vote of the Court.¹²⁷ In *Florida v. Riley*, the Supreme Court considered whether warrantless, naked-eye aerial observation of the interior of a partially enclosed greenhouse violated the Fourth Amendment.¹²⁸ Police officers, investigating an anonymous tip, flew a helicopter four-hundred feet over Riley’s greenhouse, which was located ten to twenty feet from his home.¹²⁹ Because sections of the greenhouse roof were missing, the officers were able to see inside the greenhouse and identify marijuana plants through naked-eye observation.¹³⁰

Although finding that the greenhouse was within the curtilage, the Court held that the government’s conduct did not constitute a search for Fourth Amendment purposes.¹³¹ The plurality opinion reasoned that because the interior of the greenhouse was visible from above through the missing roof panels, Riley could not reasonably expect this area to be free from lawful observations from the public

120. *Id.* at 234–39 (majority opinion).

121. Both cases were decided on May 19, 1986, and Chief Justice Warren Burger authored both majority opinions. *California v. Ciraolo*, 476 U.S. 207, 207 (1986); *Dow*, 476 U.S. at 227.

122. *Dow*, 476 U.S. at 237–39.

123. *Id.* at 237–38 (quoting *Donovan v. Dewey*, 452 U.S. 594, 598–99 (1981)).

124. *Id.* at 238.

125. *Id.*

126. *Florida v. Riley*, 488 U.S. 445 (1989) (plurality opinion).

127. *Id.* at 445–47.

128. *Id.* at 447–48.

129. *Id.* at 448.

130. *Id.*

131. *Id.* at 450, 452.

airspace.¹³² Moreover, the Court emphasized that the government's actions did not violate any laws or regulations and that there was no indication that similar helicopter flights were sufficiently rare in the United States to support a reasonable expectation of privacy from this type of observation.¹³³

II. THE CURRENT STATE OF DRONE TECHNOLOGY

Although drones have received more public attention recently, they have already played a significant role in both U.S. and world history. Recent events—and federal legislation—indicate that this trend is likely to continue. The current market for drones is at an all-time high, and public and private demand for drones continues to grow.¹³⁴ Continuing development of sophisticated drone technology, in addition to decreasing costs, will further increase this demand.¹³⁵

A. *The Current Market for Drone Technology*

Earlier prototypes of drones were much different than those in the news today, and the use of drones has expanded since their creation.¹³⁶ A predecessor to the drone first appeared in American military history during the American Civil War, when both Union and Rebel forces deployed balloons filled with explosive devices against each other.¹³⁷ During World War I, the U.S. Navy tested and developed “aerial torpedoes,” a form of remote-controlled, explosive drones that would be flown into targets, including “German U-boats, their bases, and munitions factories[,] from distances of up to 100 miles.”¹³⁸ Although these aerial torpedoes were not sufficiently accurate to be used during World War I,¹³⁹ they were eventually flown in World War II.¹⁴⁰ And during the Vietnam War, the U.S. military used drones for surveillance, intelligence gathering, “leaflet

132. *Id.* at 450.

133. *Id.* at 451–52.

134. *See infra* notes 154–55 and accompanying text.

135. *See infra* Part II.B; notes 150–53 and accompanying text.

136. *See generally* LAURENCE R. NEWCOME, UNMANNED AVIATION: A BRIEF HISTORY OF UNMANNED AERIAL VEHICLES (2004); ZALOGA, *supra* note 5.

137. Jim Garamone, *From U.S. Civil War to Afghanistan: A Short History of UAVs*, U.S. DEP'T OF DEFENSE (Apr. 16, 2002), <http://www.defense.gov/news/newsarticle.aspx?id=44164>. These exploding balloons were supposedly not “terribly effective.” *Id.*

138. NEWCOME, *supra* note 136, at 18.

139. ZALOGA, *supra* note 5, at 6.

140. Garamone, *supra* note 137.

dropping,” and “radar detection, location[,] and identification” of surface-to-air missiles.¹⁴¹ Drones are now frequently used to surveil and to conduct air strikes on terrorists and terrorist organizations.¹⁴²

Today, drones have evolved from their militaristic roots and are used for a variety of purposes.¹⁴³ As of 2014, drones have been used to monitor weather patterns,¹⁴⁴ to assist in farming and ranching,¹⁴⁵ to patrol international borders,¹⁴⁶ to map and photograph remote locations,¹⁴⁷ to conduct search and rescue missions after the 2010 earthquake in Haiti, and to survey damage after the 2011 Fukushima nuclear disaster.¹⁴⁸ And the predicted applications for drones seem limitless. Some drone advocates have projected their use for engineering, firefighting, journalism, preventing animal poaching, and even delivering packages and pizza.¹⁴⁹

In addition to their sophisticated capabilities and expanding applications, the ever-decreasing cost of drones is further propelling their popularity. Although some drones like the Air Force’s RQ-4A/B Global Hawk cost as much as \$222.7 million,¹⁵⁰ companies are developing far-less-expensive models—like Apple’s Parrot AR.Drone 2.0—that cost as little as a few hundred dollars.¹⁵¹ In the law-enforcement setting, the retail price for a police helicopter commonly used for ground support or search-and-rescue missions (not including expenses for fuel, maintenance, and manpower) generally exceeds

141. *Id.*

142. *See, e.g.,* ZALOGA, *supra* note 5, at 4 (describing a Central Intelligence Agency drone attack on a senior Al Qaeda leader).

143. Daisy Carrington & Jenny Soffel, *15 Ways Drones Will Change Your Life*, CNN (Nov. 18, 2013, 5:23 AM), <http://edition.cnn.com/2013/11/03/business/meet-your-friendly-neighborhood-drones>.

144. Jason Koebler, *NASA to Use Second Drone to Monitor Hurricanes*, U.S. NEWS & WORLD REP. (May 30, 2013), <http://www.usnews.com/news/articles/2013/05/30/nasa-to-use-second-drone-to-monitor-hurricanes>.

145. Carrington & Soffel, *supra* note 143.

146. William Booth, *More Predator Drones Fly U.S.-Mexico Border*, WASH. POST, Dec. 21, 2011, http://www.washingtonpost.com/world/more-predator-drones-fly-us-mexico-border/2011/12/01/gIQANSZz8O_story.html.

147. Jason Koebler, *Drones Could be Coming to American Skies Sooner Than You Think*, POLITICO MAG. (Jan. 28, 2014), http://www.politico.com/magazine/story/2014/01/drones-faa-lawsuit-coming-to-american-skies-102754.html#.UvbYJXk2_wI.

148. Jonathan Beale, *Drones: A Rare Glimpse at Sophisticated US Spy Plane*, BBC NEWS (Oct. 30, 2013, 8:37 PM), <http://www.bbc.co.uk/news/world-us-canada-24729998>.

149. Koebler, *supra* note 147.

150. U.S. GOV’T ACCOUNTABILITY OFFICE, GAO-13-294SP, DEFENSE ACQUISITIONS: ASSESSMENTS OF SELECTED WEAPON PROGRAMS 113 (2013).

151. Thompson, CONG. RESEARCH SERV., *supra* note 28, at 16.

one-million dollars.¹⁵² These high costs have prevented many law-enforcement departments from purchasing helicopters.¹⁵³ Drones provide an inexpensive alternative with many of the same—and often greater—capabilities.

In light of these diverse applications, American venture capitalists invested over forty-million dollars in drones during the first nine months of 2013, over twice the total amount in all of 2012,¹⁵⁴ and the total global market for drones was estimated to have hit eighty-nine billion dollars by 2013.¹⁵⁵ Although FAA regulations have somewhat hindered the proliferation of drone usage,¹⁵⁶ this bulwark will soon be removed by pending FAA regulations that will govern federal aviation law. The FAA Modernization Act directs the FAA to develop a plan to safely integrate drones into the national airspace no later than September 30, 2015.¹⁵⁷ The inevitable result of these measures will be a rapid and heavy influx of drone usage in the United States.¹⁵⁸ In fact, the FAA has forecast that nonmilitary persons will operate approximately fifteen-thousand drones by 2020 and thirty-thousand drones by 2030.¹⁵⁹

These advanced and affordable technologies have attracted many public entities at both the federal and local level. As of November 2013, the FAA had granted 1387 licenses to fly drones, only one of which was issued to a private entity.¹⁶⁰ The U.S. Customs

152. Peter Finn, *Privacy Issues Hover Over Police Drone Use*, WASH. POST, Jan. 23, 2011, http://www.washingtonpost.com/national/privacy-issues-hover-over-police-drone-use/2011/01/22/ABEw0uD_story.html.

153. *Id.*

154. Olga Kharif, *As Drones Evolve from Military to Civilian Uses, Venture Capitalists Move In*, WASH. POST, Nov. 1, 2013, http://www.washingtonpost.com/business/as-drones-evolve-from-military-to-civilian-uses-venture-capitalists-move-in/2013/10/31/592ca862-419e-11e3-8b74-d89d714ca4dd_story.html.

155. Carrington & Soffel, *supra* note 143.

156. Kharif, *supra* note 154.

157. FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 332(a)(3), 126 Stat. 11, 73 (2012). *But see* Pegues, *supra* note 26 (“[I]t is nearly certain that the FAA will not meet [the September 2015] deadline. Instead, 2017 seems to be a more realistic time frame.”).

158. *See* Koebler, *supra* note 147 (describing the legal limitations on companies selling drones in the United States, and American companies who resort to selling drones abroad in response).

159. FEDERAL AVIATION ADMINISTRATION, FAA AEROSPACE FORECAST: FISCAL YEARS 2010-2030, at 48 (2010), *available at* http://www.faa.gov/data_research/aviation/aerospace_forecasts/2010-2030/media/2010%20Forecast%20Doc.pdf.

160. Koebler, *supra* note 147. The sole private entity was the oil company ConocoPhillips. *Id.* The FAA has also granted six aerial-photography and video-production companies regulatory exemptions, allowing them to fly drones without a license. Press Release, Fed.

and Border Protection (CBP) has flown drones along the U.S.–Mexico border since 2004 to assist its agents.¹⁶¹ Drones have made their way into the ranks of local law enforcement as well. Several noteworthy law-enforcement departments that have used drone technology include the Houston Police Department, the Miami-Dade Police Department, the Seattle Police Department, and the Federal Bureau of Investigations.¹⁶² According to law-enforcement officials, drones are a “tactical game-changer,” and “[n]ot since the Taser has a technology promised so much for law enforcement.”¹⁶³ One law-enforcement agency, the Georgia Tech Police Department (GTPD), even applied for FAA authorization to fly drones for “special events” and “day-to-day law enforcement operations.”¹⁶⁴ Although GTPD’s application was ultimately denied, the department planned to deploy drones to the locations of reported situations and emergencies, and the project was “intended . . . [to] provide valuable lessons learned for the use of [drones] for law enforcement nationwide.”¹⁶⁵

B. Current Drone Capabilities

Most of the successes of drones are attributable to their sophisticated technologies and capabilities. Drones are equipped with various technologies for visual surveillance, audio enhancement, and sense-enhancing capabilities, and with sophisticated programming. Drones are manufactured in a variety of sizes, weights, and designs, and with various methods of flight and propulsion. Current models range in size from a wingspan of just three centimeters¹⁶⁶ to over forty meters.¹⁶⁷ Drones range in weight from eighty milligrams¹⁶⁸ to nearly

Aviation Admin., U.S. Transportation Secretary Foxx Announces FAA Exemptions for Commercial UAS Movie and TV Production (Sept. 25, 2014).

161. *Unmanned Aerial Vehicles Support Border Security*, CUSTOMS & BORDER PROT. TODAY (U.S. Customs & Border Prot., Washington, D.C.), July–Aug. 2004, available at http://www.cbp.gov/xp/CustomsToday/2004/Aug/other/aerial_vehicles.xml.

162. *2011–2012 FAA List of Drone License Applicants*, ELEC. FRONTIER FOUND., <https://www.eff.org/document/2012-faa-list-drone-applicants> (last visited Feb. 8, 2015).

163. Finn, *supra* note 152.

164. *Georgia Tech Police Department Drone Records, Certificate of Authorization*, ELEC. FRONTIER FOUND., <https://www.eff.org/document/georgia-tech-police-dept> (last visited Feb. 8, 2015).

165. *Id.*

166. Amina Khan, *Meet RoboBee, a Bug-sized, Bio-inspired Flying Robot*, L.A. TIMES (May 2, 2013, 5:11 PM), <http://articles.latimes.com/2013/may/02/science/la-sci-sn-flying-robot-robobee-smallest-ever-20130502>.

167. *Global Hawk*, NORTHROP GRUMMAN, <http://www.northropgrumman.com/capabilities/globalhawk/Pages/default.aspx> (last visited Feb. 8, 2015).

seven tons.¹⁶⁹ Although many drones have been designed as traditional fixed- and rotary-wing aircraft, there have been significant developments to the aeronautical design and propulsion of drones enabling them to fly by “flap[ping their] wings,” similar to birds and insects.¹⁷⁰

The SolarEagle and the RoboBee are perhaps two of the best examples that demonstrate the spectrum of advanced drone designs that could be used by law enforcement. The SolarEagle, currently in development by Boeing and the U.S. Defense Advanced Research Projects Agency (DARPA), is projected to have a wingspan of approximately 120 meters and will utilize solar energy as its power source.¹⁷¹ In comparison, the RoboBee has a wingspan of approximately three centimeters, weighs eighty milligrams, and was inspired by the bee, contributing to its design and propulsion by two insect-like wings that flap 120 times per second.¹⁷² Drones also have reached significant milestones with regard to velocity, altitude, and flight time. Current models are capable of reaching speeds of over 310 knots true airspeed and altitudes of over 60,000 feet.¹⁷³ The SolarEagle’s use of solar energy is projected to enable it to remain in continuous flight, without recharging or refueling, for over five years.¹⁷⁴

Drones also employ the most advanced technology available for visual surveillance. One such example is DARPA’s Autonomous Real-Time Ground Ubiquitous Surveillance Imaging System (ARGUS).¹⁷⁵ Alleged to be the most sophisticated surveillance technology ever created—and still partially classified—ARGUS can record video footage with 1.8-gigapixel resolution of an area covering fifteen square miles from a drone flying at twenty-thousand feet.¹⁷⁶ The recording automatically tracks all moving objects within the area

168. Khan, *supra* note 166.

169. *Global Hawk*, *supra* note 167.

170. Khan, *supra* note 166.

171. *Boeing Wins DARPA Vulture II Program*, BOEING (Sept. 16, 2010), <http://boeing.mediaroom.com/index.php?s=20295&item=1425>.

172. Khan, *supra* note 166.

173. *Global Hawk*, *supra* note 167.

174. *Boeing Wins DARPA Vulture II Program*, *supra* note 171.

175. Craig Lloyd, *DARPA Unveils 1.8-Gigapixel Drone Camera, Can Target Hostiles at 20,000 Feet*, SLASHGEAR (Jan. 29, 2013), <http://www.slashgear.com/darpa-unveils-1-8-gigapixel-drone-camera-can-target-hostiles-at-20000-feet-29267138>.

176. *Id.*

and can magnify objects on the ground as small as six inches.¹⁷⁷ ARGUS can monitor a medium-sized city and record over five-thousand hours of footage per day.¹⁷⁸ Existing drone technology can also recognize and record license plates¹⁷⁹ and faces.¹⁸⁰ Other forms of visual-surveillance technology include the ability to see through obstructions such as clouds, fog, and walls; to identify objects at night;¹⁸¹ and, possibly, to recognize psychological signals that detect impending violent behaviors.¹⁸²

Drones are able to employ different types of sense-enhancing technology, including audio recorders and “sniffers” that detect biological, chemical, radioactive, and explosive agents in the air.¹⁸³ For example, Makel Engineering, Inc. and Pennsylvania State University are currently developing a drone for the U.S. Navy and U.S. Coast Guard that weighs less than one pound and that could be deployed to suspicious vessels to sniff for explosives, chemical and biological weapons, and illicit drugs.¹⁸⁴

Future drone technology may be even less restricted by the need for human pilots at the controls. Drones can already fly autonomously, or without any human control.¹⁸⁵ Some have expanded on this technology by programming drones to fly in coordinated,

177. *Id.*

178. *Id.*

179. Cf. Eric Roper, *City Cameras Track Anyone, Even Minneapolis Mayor Rybak*, STAR TRIB. (Aug. 17, 2012, 1:13 PM), <http://www.startribune.com/local/minneapolis/166494646.html> (describing a Minneapolis municipal database that stores data regarding the recent location of personal vehicles based on license-plate photographs taken by high-definition cameras throughout the city).

180. Brian Naylor, *Look, Up in the Sky! It's a Drone, Looking at You*, NPR (Dec. 5, 2011, 12:34 PM), <http://www.npr.org/2011/12/05/143144146/drone-technology-finding-its-way-to-american-skies>.

181. UNIV. OF WASH. TECH. & PUB. POL'Y CLINIC, DOMESTIC DRONES: TECH. AND POL'Y ISSUES, at 6 (2013), available at <http://www.law.washington.edu/Clinics/Technology/Reports/DronesLawandPolicy.pdf> (last visited Feb. 8, 2015).

182. *Detection and Computational Analysis of Psychological Signals (DCAPS)*, DARPA, [http://www.darpa.mil/Our_Work/I2O/Programs/Detection_and_Computational_Analysis_of_Psychological_Signals_\(DCAPS\).aspx](http://www.darpa.mil/Our_Work/I2O/Programs/Detection_and_Computational_Analysis_of_Psychological_Signals_(DCAPS).aspx) (last visited Feb. 8, 2015).

183. MAKEL ENG'G, INC., COMPACT ELEC. SNIFFER FOR SHIPBOARD LAUNCHED UAV CBRNE DETECTION MISSIONS, at 1, available at <http://files.meetup.com/1275333/Narcotic%20sniffing%20drone.pdf> (last visited Feb. 8, 2015).

184. *Id.*

185. ZALOGA, *supra* note 5; see also Audwin Short, *Nano Quadcopter Robots Swarm Video Flying Drones*, YOUTUBE (Feb. 3, 2012), <http://www.youtube.com/watch?v=AiCfTmdrvHM> (showing multiple drones flying in formation autonomously).

strategic formations with other drones.¹⁸⁶ These coordinated drones can fly in organized columns and rows, in intersecting figure-eight patterns, and through physical obstructions such as windows and doors, along both horizontal and vertical axes.¹⁸⁷

A critical feature of these designs and capabilities is that these drones may be undetectable to the person or persons observed. Whether it is from thousands of feet away using precise, sense-enhancing technology or mere inches away in an insect-like form, these drones have the capability to conduct surveillance without detection.

Although these current features and prototypes provide tangible—and intriguing—examples of drone technology, they are intended to serve solely as models to analyze under the Fourth Amendment. Importantly, these are only the *current* designs and capabilities of drones, and these models will likely be outdated, possibly even irrelevant, by the time the courts address drone surveillance under the Fourth Amendment.

III. THE DOCTRINAL FAILINGS OF CURRENT FOURTH AMENDMENT JURISPRUDENCE WHEN APPLIED TO DRONES

There are several problems with applying current Fourth Amendment jurisprudence to drones. The factual dynamics of Fourth Amendment cases contribute to the mishmash of Fourth Amendment jurisprudence, and the increased complexity of drone technology will only contribute to the problems with applying either Fourth Amendment search paradigm to drones. First, drones could generally avoid all Fourth Amendment violations under the property-rights paradigm because they can fly on public thoroughfares, thereby avoiding a trespass. Second, although the reasonable-expectation-of-privacy test would provide the most workable test for an analysis of drones, a person would often be unable to satisfy the test's subjective element, and courts have not yet expounded an understandable theory for the objective element. Drones therefore face considerable challenges under the current jurisprudence.

186. Short, *supra* note 185.

187. *Id.*

A. *Factual Dynamics of Fourth Amendment Cases*

Given its highly context-specific application, a significant feature of the Fourth Amendment is the dynamic factual scenarios that are presented for court review.¹⁸⁸ The government often employs new instruments to investigate and prosecute criminals.¹⁸⁹ Likewise, criminals often employ new instruments to commit crimes and to evade police detection or capture.¹⁹⁰ Ordinary citizens, however, may employ many of these same instruments to accommodate their everyday conveniences and necessities. According to Professor Orin Kerr, this complex dynamic has contributed to the numerous exceptions and seemingly divergent holdings of Fourth Amendment precedent.¹⁹¹ This dynamic is exacerbated by the diverse designs and capabilities of sophisticated technology—a dynamic that is not alleviated by drone technology.

Law enforcement can strategically use drone technology to avoid current Fourth Amendment prohibitions. The government can navigate the various doctrinal loopholes by altering the designs and capabilities of drones, the location and flight paths of drones, the means of acquiring information, and the types of information acquired. In effect, drones implicate the most factually diverse aspects of an already diverse and unpredictable jurisprudence. Analyzing drones under both the property-rights and privacy-rights paradigms thus presents significant problems for determining when the use of drones constitutes an unreasonable search.

B. *Property-Rights Analysis of Drones*

Although some narrow instances might raise a Fourth Amendment issue, drones generally would not be hampered under the property-rights paradigm. It is long established that an aircraft traveling over an individual's land does not constitute a trespass.¹⁹² The Supreme Court rejected the common-law concept of *cuius est solum, eius est usque ad coelum*—extending a property owner's rights

188. Kerr, *supra* note 36, at 485.

189. *Id.* at 486.

190. *Id.*

191. *See id.* at 487–90 (arguing that judges recognize the factual dynamics and power imbalances resulting from these technologies and attempt to reconcile these dynamics by applying the law in ways to restore the balance of power between the police and society—what Kerr calls the “Equilibrium-Adjustment Theory”).

192. *United States v. Causby*, 328 U.S. 256, 260–61 (1946).

to the center of the earth and the infinite limits of the universe—as a doctrine with “no place in the modern world.”¹⁹³ In discarding this doctrine, the Court recognized that the “immediate reaches” around property still belong to the owner.¹⁹⁴ These “immediate reaches,” however, seem to comprise the literal interpretation of the phrase, as the Supreme Court has concluded that even low-flying aircraft do not enter these reaches. In *Florida v. Riley*, for example, the plurality opinion held that a helicopter flying four-hundred feet over Riley’s property did not constitute a trespass in violation of the Fourth Amendment.¹⁹⁵ The plurality opinion did acknowledge, however, that these limits still exist and that not every aerial inspection of a home would survive an inquiry under the Fourth Amendment “simply because the [aircraft] is within the navigable airspace specified by law.”¹⁹⁶

Much of the current use of drones would not constitute a Fourth Amendment violation under the trespass doctrine. Drones are analogous to manned aircraft in many respects because they can fly on the same public thoroughfares abutting private property. The same precedent regarding air travel would therefore control. If that were the case, drones’ flight paths—at or above the four-hundred feet in *Florida v. Riley*—would not constitute a trespass for Fourth Amendment purposes. As discussed above, drones have the ability to fly a few inches off the ground and at altitudes of up to sixty-five-thousand feet.¹⁹⁷ Drones flying at lower altitudes could risk a Fourth Amendment violation under the trespass doctrine for being within the immediate reaches of the property. Assuming that they do not fly within these immediate reaches at ground-level altitudes or near taller buildings (for example, outside the window of a high-rise apartment), however, drones would evade trespass violations as other aircraft do. If the government wanted to conduct surveillance, it could also utilize conventional and future methods of surveillance from public areas or from lower levels that would not implicate the trespass doctrine.

The curtilage doctrine also does not provide a significant Fourth Amendment impediment to law enforcement’s use of drones. If

193. *Id.*

194. *Id.* at 264.

195. *Florida v. Riley*, 488 U.S. 445, 451 (1989) (plurality opinion).

196. *Id.*

197. *See supra* text accompanying note 173.

drones fly outside the immediate reaches of property, then they are likely to avoid a trespass within the curtilage. Furthermore, observing details within the curtilage of the home from a lawful location would not constitute an unreasonable search, as government actors are not required “to shield their eyes” from observing the home or its curtilage.¹⁹⁸ A *Jardines*-like scenario might be the exception, but it sets some precedent for the proposition that certain uses of drones to observe the inside of a home constitute a search within the meaning of the Fourth Amendment. If the government entered the curtilage with a drone to obtain information, similar to *Jardines*,¹⁹⁹ then the trespass doctrine would prohibit conduct outside of an express or implied license to enter the curtilage. It is highly improbable, however, that drones would have an express or implied license to enter the curtilage to investigate.

Lastly, the open-fields doctrine provides no greater protection from drones. The Supreme Court has already rejected the idea that the Fourth Amendment applies to open fields.²⁰⁰ Therefore, the government’s use of a drone to obtain information in open fields would not constitute a search for purposes of the Fourth Amendment.

Despite the advanced capabilities and high costs of some drone models, many would fall outside of the Fourth Amendment analysis stated in *Kyllo v. United States*. Most drone usage would not constitute a search under *Kyllo* unless the information is from the *interior* of the home—*Kyllo* did not consider drone surveillance of the home’s non-interior areas. This drone surveillance would collect information existing *outside* the home. Therefore, because this information does not exist within the “interior of the home” and presumably would not “otherwise have [required] a physical ‘intrusion, into a constitutionally protected area,’”²⁰¹ *Kyllo* would not apply to these types of drone surveillance. *Kyllo* would apply, however, to scenarios where a drone uses sense-enhancing technology to obtain information from within the home. In these circumstances, the use of the drone, similar to the thermal imager in *Kyllo*,²⁰² would

198. *California v. Ciraolo*, 476 U.S. 207, 213 (1986).

199. *See Florida v. Jardines*, 133 S. Ct. 1409, 1417–18 (2013) (holding that the presence of a police officer and drug-sniffing dog within the curtilage to investigate for illicit drugs constituted an unreasonable search).

200. *Dow Chem. Co. v. United States*, 476 U.S. 227, 235–36 (1986).

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

202. *See id.* at 29–31 (describing the thermal imager used on *Kyllo*’s home).

constitute an unreasonable search by using sophisticated technology not in general public use to obtain information from the home that would have typically required a physical intrusion. For example, using X-ray or infrared technology that is not in general public use to locate persons within a home would violate the *Kyllo* rule and constitute an unreasonable search within the meaning of the Fourth Amendment.

Nonetheless, a dilemma arises when the information is obtained by using an instrument to enhance details available from public areas. For example, consider whether the use of vision-enhancement technology to peer through an open window of a home on a secluded, one-hundred-acre property would fall under *Kyllo*. Here, the information is available from outside the home, but its availability by naked-eye observation is restricted by the vast size of the private property.²⁰³ Acquiring the information is possible, however, from lawful areas (for example, a distant public road) with the vision-enhancement technology. Because the sense-enhancing instrument is necessary to acquire information from within the home and because a physical trespass on the property or inside the home would be necessary without the instrument, a court would confront conduct falling somewhere between the *Kyllo* and *Ciraolo* scenarios.

Furthermore, the Court has not clarified when technology is sufficiently within general public use to avoid a Fourth Amendment violation. The Court's earlier plurality opinion in *Florida v. Riley* that helicopter travel was not sufficiently rare to raise a Fourth Amendment violation²⁰⁴ indicated that only a marginal level of prevalence might be necessary (given that not many people enjoy the luxuries of helicopter travel). In light of *Florida v. Riley* and *Kyllo*, drones would not yet be in general public use because of the FAA regulations limiting their use almost exclusively to public entities in limited circumstances. With the FAA Modernization Act and the projected expansion of their use,²⁰⁵ however, drones will likely surpass

203. This scenario is similar to—but distinguishable from—*United States v. Dunn*, 480 U.S. 294 (1987). In *Dunn*, police officers trespassed onto Ronald Dunn's property, passing several fences and gates, and then looked into Dunn's barn from an open field next to it, identifying a laboratory for illicit drugs. *Id.* at 296–99. In the above scenario, if the government were to stand in an open field on the property without a warrant and look through the window, the government's actions would constitute a trespass—but not a search—under *Dunn* and the open-fields doctrine. This scenario, however, presumes that the government does not trespass onto the property and conducts its surveillance from an area where it may lawfully do so.

204. *Florida v. Riley*, 488 U.S. 445, 451 (1989) (plurality opinion).

205. FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 332(a)(3), 126 Stat. 11, 73 (2012).

the prevalence of helicopters in both the private and public sectors. And many of the technologies employed by drones, such as cameras and audio recorders, are already commonplace. Therefore, drones will likely soon be within general public use under *Kyllo*, and many forms of drone technology would already satisfy the general-use standard.

C. *Privacy-Rights Analysis of Drones*

With its holding in *Katz*, the Supreme Court adopted a privacy-rights framework for determining whether a search had occurred for Fourth Amendment purposes. In *Katz*, Justice Harlan interpreted the Court's Fourth Amendment jurisprudence as recognizing two key elements for identifying a search.²⁰⁶ Under this inquiry, a search generally occurs when persons "have exhibited an actual (subjective) expectation of privacy" and when that expectation is "one that society is prepared to recognize as 'reasonable.'"²⁰⁷

The Court in *Jones* alluded to the possible Fourth Amendment inquiries that might be implicated in a case involving drone technology. In *Jones*, the Supreme Court suggested that warrantless, nontrespassory surveillance accomplished by traditional means typically would not qualify as an unreasonable search under current Fourth Amendment jurisprudence.²⁰⁸ The Court conceded, however, that the same surveillance conducted "through electronic means" might constitute "an unconstitutional invasion of privacy."²⁰⁹ It recognized that courts might have to confront these problems in a "future case where a classic trespassory search is not involved," but declined to address that scenario.²¹⁰

Although the reasonable-expectation-of-privacy test presents the most viable Fourth Amendment doctrine to analyze drones, it has been highly criticized since its inception. The test has been said to "disappoint[] scholars and frustrate[] students for . . . decades."²¹¹ It has frequently been "criti[cized] as circular, . . . subjective and

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

207. *Id.*

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

209. *Id.* at 954.

210. *Id.*

211. Orin S. Kerr, *Four Models of Fourth Amendment Protection*, 60 STAN. L. REV. 503, 503 (2007).

unpredictable.”²¹² Many legal texts forgo explaining the test, instead simply listing the relevant cases and outcomes.²¹³ With numerous contrary holdings and no clear framework to analyze cases, a reasonable expectation of privacy “has largely come to mean what a majority of the Supreme Court Justices” says it means.²¹⁴ Courts might, and evidence suggests they do, misidentify what society recognizes as a reasonable expectation of privacy.²¹⁵ It has also been criticized as a standard that erodes over time²¹⁶ because the development of technology slowly erodes the public’s privacy expectations and with it, the reasonable expectation of privacy.²¹⁷

The test’s current interpretation and application do not cover many of the different types of surveillance conducted by drones. There are two key problems with applying the reasonable-expectation-of-privacy test to drone surveillance. First, there might not be a practical or reasonable way for persons unaware of their exposure to drones to satisfy the subjective requirement of the test. Second, as described above, the objectively reasonable requirement is highly unpredictable and has resulted in an unclear and unworkable standard.

1. *The Subjective-Expectation-of-Privacy Requirement.* A significant problem with applying the reasonable-expectation-of-privacy test to drones is the subjective requirement of “exhibit[ing] an actual (subjective) expectation of privacy.”²¹⁸ When the Supreme Court has addressed the subjective requirement, albeit infrequently, it has looked to the presence of various expressive factors. In his concurrence in *Katz*, Justice Harlan stated that the “objects, activities,

212. *Kyllo v. United States*, 533 U.S. 27, 34 (2001) (citations omitted).

213. Kerr, *supra* note 211, at 505.

214. ROBERT M. BLOOM, SEARCHES, SEIZURES, AND WARRANTS 46 (2003).

215. See Christopher Slobogin & Joseph E. Schumacher, *Reasonable Expectations of Privacy and Autonomy in Fourth Amendment Cases: An Empirical Look at “Understandings Recognized and Permitted by Society”*, 42 DUKE L.J. 727, 774 (1993) (conducting a survey of 217 participants and comparing the participants’ perceptions of whether different law-enforcement investigations are unreasonable with analogous Supreme Court precedent, and concluding that “the Supreme Court’s conclusions about the scope of the Fourth Amendment [that is, whether certain governmental conduct is objectively reasonable and therefore does not implicate the Fourth Amendment] are often not in tune with commonly held attitudes about police investigative techniques”).

216. Sherry F. Colb, *What Is a Search? Two Conceptual Flaws in Fourth Amendment Doctrine and Some Hints of a Remedy*, 55 STAN. L. REV. 119, 121 (2002).

217. *Id.* at 139.

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

or statements that [a person] exposes to the ‘plain view’ of outsiders” fail the subjective requirement because the person exhibits no intention of keeping these items private.²¹⁹ *Dow* discussed the subjective requirement at length,²²⁰ even though the case was decided primarily under the curtilage and open-fields doctrines.²²¹ Although the Court disagreed on the probative value of the precautions taken by Dow to protect the privacy of its property, both the majority and the dissent mentioned several measures that might indicate a party’s subjective expectation of privacy, including a perimeter fence, security personnel, and other precautions against intrusion.²²² The Court in *Ciraolo* also considered a fence around Ciraolo’s property as relevant to the subjective inquiry but concluded that the fence did not establish whether he manifested a subjective expectation of privacy from *all* types of observation.²²³

Now consider drones with the capability to conduct surveillance of entire cities, to collect aggregated data on persons that, when taken together, may reveal intimate details, or to collect information believed to be free from unwelcome eyes, ears, and other sensory methods of detection.²²⁴ Each of these methods of surveillance can reveal entirely new types of information, information that is otherwise unattainable without detection, or information that is otherwise prohibitively expensive or difficult to acquire when obtained by traditional surveillance methods. Each makes it impossible or implausible to “*exhibit*[] an actual (subjective) expectation” and intention to keep these details private.²²⁵ And even when it is possible and reasonable to exhibit an expectation of privacy in these scenarios, the Court has failed to expound on what specific

219. *Id.*

220. *See* Dow Chem. Co. v. United States, 476 U.S. 227, 237–38 & n.4 (1986) (discussing the lack of precautions taken by Dow to protect the privacy of its property). *But see id.* at 241–43 & nn.1–3, 244 n.7, 247, 249 (Powell, J., dissenting) (discussing the *surplus* of precautions taken by Dow to protect the privacy of its property).

221. *See id.* at 239 (finding that the industrial complex was more similar to an open field than the curtilage).

222. *See id.* at 237 n.4 (discussing precautions taken to protect the privacy of a constitutionally protected area); *id.* at 241–42 (Powell, J., dissenting) (same).

223. California v. Ciraolo, 476 U.S. 207, 211–12 (1986).

224. *See, e.g.,* Finn, *supra* note 152 (discussing the planned deployment of drones to monitor a small town in Afghanistan); Lloyd, *supra* note 175 (discussing ARGUS technology, which can monitor and videotape fifteen square miles and track all moving objects within that area).

225. Katz v. United States, 389 U.S. 347, 361 (1967) (Harlan, J., concurring) (emphasis added).

actions or measures are necessary or sufficient to express a subjective expectation of privacy besides basic precautions, such as perimeter fences and closed phone booths.

There are significant difficulties associated with exhibiting an actual subjective expectation of privacy from several types of drone surveillance. Drones can utilize numerous surveillance methods and can obtain countless types of information. Many people do not expect certain information or details to be at risk of being exposed to others. Consequently, many people will not take typical—or any—precautions to protect the privacy of that information. Although hardly anyone *expects* the government to monitor them and uncover their personal information, this subjective expectation of privacy goes beyond that bare belief that one is not under investigation and extends to the expectation of privacy that people manifest by taking ordinary precautions to protect information from exposure to third parties. This idea extends both to information that people do not expect to be exposed to others by *any* method as well as to information that people do not expect to be exposed because of the precautions they have taken.

Consider, for example, a drone with ARGUS technology, constantly monitoring the location of an individual for a month or longer.²²⁶ Or imagine the insect-like RoboBee conducting dragnet monitoring of a city block and using sniffers to test the air around individuals for specific biochemical agents undetectable by human senses.²²⁷ Current Fourth Amendment jurisprudence regarding the subjective requirement does not inhibit the government from conducting such investigations. A person moving in public “has no reasonable expectation of privacy in his movements from one place to another.”²²⁸ Furthermore, a party claiming a violation of his Fourth Amendment rights by these governmental actions would fail the subjective requirement because he has not exhibited his expectation of privacy with respect to this information. Based on the Court’s precedent of considering the specific privacy precautions taken, an affected individual would likely fail to take a sufficient precaution,

226. See, e.g., Lloyd, *supra* note 175 (describing ARGUS technology and its surveillance capabilities).

227. See, e.g., Khan, *supra* note 166 (describing the RoboBee); MAKEL ENG’G, INC., *supra* note 183 (describing a drone that sniffs the air for chemical, biological, and narcotic agents).

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

such as concealing his public movements or wearing specific garments to conceal any smells or agents.²²⁹

Additional problems arise when these measures are impossible or implausible. In *Dow*, the vast property and safety concerns prevented Dow from installing an overhead canopy.²³⁰ Had the Court found the area to constitute the curtilage and not an open field,²³¹ the lack of a canopy—or a comparable precaution—would have likely negated Dow’s expression of a subjective expectation of privacy for the curtilage.²³² It therefore seems that only a dome or structure covering the entire two-thousand-acre property would have been sufficient for the Court to find that Dow exhibited a subjective expectation of privacy in activities occurring within the curtilage of the property.

2. *The Objective-Expectation-of-Privacy Requirement.* There are also significant problems with the reasonable-expectation-of-privacy test’s objective requirement that “the [subjective] expectation be one that society is prepared to recognize as ‘reasonable.’”²³³ Determining whether an expectation of privacy is reasonable turns on “whether the government’s intrusion infringes upon the personal and societal values protected by the Fourth Amendment.”²³⁴

Analyzing whether an expectation of privacy from drone surveillance is objectively reasonable, however, seems to be an informed guess, at best. The Supreme Court has neglected to adopt a single test or approach to determine whether an expectation of privacy is reasonable.²³⁵ The Court has considered many factors in applying the test and has returned a series of “divergent and conflicting” opinions and holdings.²³⁶ This approach has allowed the

229. These scenarios are more likely to turn on the facts of the case, specifically those indicating the extent of the precautions taken and the risk of exposure of the information.

230. *Dow Chem. Co. v. United States*, 476 U.S. 227, 240 n.1 (1986) (Powell, J., dissenting) (“The record establishes that Dow used the open-air design primarily for reasons of safety Moreover, . . . Dow found that the cost of enclosing the facility would be prohibitive.”).

231. *See id.* at 239 (holding that the area was more analogous to an open field than to the curtilage).

232. *See id.* at 236 (“The intimate activities associated with family privacy and the home and its curtilage simply do not reach the outdoor areas or spaces between structures and buildings of a manufacturing plant.”).

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

234. *Oliver v. United States*, 466 U.S. 170, 182–83 (1984).

235. *Kerr*, *supra* note 211, at 525.

236. *Wilkins*, *supra* note 14, at 1080.

lower federal courts to justify almost any result.²³⁷ Consequently, an analysis of the reasonableness of drones will depend on their specific use and various intangible factors. Thus, in nearly all Fourth Amendment cases considering governmental surveillance by drones, the objective reasonableness of a subjective expectation of privacy seems up for grabs.

IV. REDEFINING THE REASONABLE-EXPECTATION-OF-PRIVACY TEST

The reasonable-expectation-of-privacy test provides the most viable approach for future cases considering whether the government's use of a drone constitutes an unreasonable search. In applying this test, courts should focus more analysis on the subjective-expectation requirement and expand upon its existing interpretation because this oft-neglected element of the two-pronged test²³⁸ is especially relevant to drones.

In further addressing and clarifying the subjective requirement, the analysis should proceed in three parts. First, a court should determine whether the surveilled person "exhibited an actual (subjective) expectation of privacy"²³⁹ so as to fall within the Fourth Amendment's protections. Second, if the person has exhibited a subjective expectation of privacy, the court should then analyze the scope of that privacy expectation and the information it covers. Finally, the court should determine whether the person has exposed that information to the "'plain view' of outsiders."²⁴⁰

A. *The Reasonable-Expectation-of-Privacy Test*

Adopting a versatile standard focused on the subjective-expectation-of-privacy test may provide the most effective approach to reviewing drone surveillance. This flexible approach accounts for both the diverse factual dynamics of Fourth Amendment cases and

237. See Kerr, *supra* note 211, at 525–26 (noting that categorization choices under a policy model can be "completely arbitrary").

238. See Orin S. Kerr, *Katz Has Only One Step: The Irrelevance of Subjective Expectations*, 81 U. CHI. L. REV. (forthcoming 2015) (manuscript at 2), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2448617. ("A majority of courts that apply *Katz* do not even mention the subjective test; when the test is mentioned, it is usually not applied; and when it is applied, it makes no apparent difference to case outcomes.")

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

240. *Id.*

the nebulous nature of nontrespassory Fourth Amendment issues.²⁴¹ It also provides a workable standard for drones and technology in the modern age when the need for Fourth Amendment and privacy protections extends beyond the home and the other traditionally protected areas.²⁴²

A significant problem with the current interpretation of the reasonable-expectation-of-privacy test is the manner in which the courts have applied the test. Courts have more “flex[ed] than analy[zed]” the test.²⁴³ Moreover, courts have focused almost exclusively on the objective requirement and neglected nearly any analysis of the subjective-expectation requirement.²⁴⁴ Even when the Supreme Court has addressed the subjective-expectation requirement, it has often failed to clarify what measures are necessary or sufficient to express a subjective expectation of privacy.²⁴⁵

Realigning the scope of analysis from the objective requirement to the subjective requirement would solve many of the problems with applying the current interpretation of the reasonable-expectation-of-privacy test to drones. Instead of attempting to analyze and ascertain what expectations of privacy society as a whole would recognize as reasonable, the subjective requirement looks to the specific factual circumstances in determining whether an expectation exists. This realignment would provide a clearer, more consistent analysis for trial courts than the nebulous determinations of the objective requirement.

241. See Kerr, *supra* note 211 (arguing against a single test or approach for determining the reasonableness of an expectation of privacy because no single test or approach could properly apply to the numerous issues presented by Fourth Amendment cases); *supra* Part I.A. (discussing the factual dynamics of Fourth Amendment cases). *But see* Oliver v. United States, 466 U.S. 170, 181–82 (1984) (“Th[e Supreme] Court repeatedly has acknowledged the difficulties created for courts, police, and citizens by an ad hoc, case-by-case definition of Fourth Amendment standards to be applied in differing factual circumstances. The ad hoc approach not only makes it difficult for the policeman to discern the scope of his authority, it also creates a danger that constitutional rights will be arbitrarily and inequitably enforced.” (citations omitted)).

242. Wilkins, *supra* note 14, at 1079.

243. *Id.* (quotation marks omitted).

244. Kerr, *supra* note 238 (manuscript at 2) (“A majority of courts that apply *Katz* do not even mention the subjective test; when the test is mentioned, it is usually not applied; and when it is applied, it makes no apparent difference to case outcomes.”).

245. See *supra* text accompanying notes 222–23.

B. The Subjective-Expectation-of-Privacy Requirement

1. *Determining Whether a Subjective Expectation of Privacy Exists.* In determining whether a person holds a subjective expectation of privacy in certain information, various factors might indicate her intention to keep information private. The Supreme Court has detailed some of these factors,²⁴⁶ but further attention and clarification is needed. Moreover, these expressive factors are not always needed to support a subjective expectation. Fourth Amendment jurisprudence should come to recognize that in certain situations, the lack of evidence exhibiting an expectation of privacy results from the person's belief that the information is at little or no risk of being revealed to others. The lack of expressive factors, therefore, may evidence a robust subjective expectation of privacy that is still entitled to Fourth Amendment protection.

A person can express a subjective expectation of privacy through different expressive factors. These factors “exhibit [an] . . . intention to keep” certain information private.²⁴⁷ The location of the private information is not determinative or necessary to negate this expectation of privacy. *Katz* described this relationship as follows: “What a person knowingly exposes to the public . . . 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.”²⁴⁸

Although expressive factors provide concrete evidence to ascertain whether a subjective expectation of privacy exists, they may be lacking in cases where the person believes there is little or no risk of having her information revealed to others. In these cases, in which the expectation of privacy is arguably strongest, few people would take measures that would objectively evidence an expectation of privacy. Courts should consider the probability of public exposure and the practicality or reasonableness of taking different information-protecting precautions when determining whether a subjective expectation of privacy exists, even absent previously recognized expressive factors.

For example, consider a RoboBee flying outside the curtilage and immediate reaches of a property and recording a conversation

246. *Id.*

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

248. *Id.* at 351–52 (majority opinion) (emphasis added) (citations omitted).

occurring within the curtilage—audible from the public airways overhead but not from the perimeter of the property. Here, most people would not expect the conversation to be exposed to listeners from above. A reasonable individual would believe that a sufficient distance from the perimeter of the property, a normal speaking volume, and an absence of any parties unwelcome to the conversation would be sufficient to indicate that the conversation was intended to be private. The speaker's estimate of a marginal or zero probability of this information being exposed to others demonstrates a subjective expectation of privacy with respect to the information. The lack of expressive factors alone does not fail to create a subjective expectation. Instead, the expectation may be *exhibited* through expressive actions or measures. A subjective expectation of privacy must already exist before it may be exhibited. Expressive factors do not create a subjective expectation; they exhibit it.

Under other circumstances, the impossibility or unreasonableness of taking certain measures to exhibit a subjective expectation of privacy in information also may justify the failure to exhibit any such factors. For example, consider again the hypothetical of a RoboBee using sniffers to test the air around individuals for biological and chemical agents emanating from their persons or effects. If it were known that these investigations actually occurred, people would have little or no opportunity to protect this information and exhibit an expectation of privacy in it. Furthermore, even if some precautions could be taken (for example, wearing a full-body hazmat suit), these precautions would be unreasonable and would impose costly and impractical burdens preventing many individuals from taking such measures. Consequently, people would be subject to these investigations without a feasible way to exhibit their subjective expectation to keep this information private. Imagine if the SolarEagle were used to monitor individuals' locations over an extensive span of time.²⁴⁹ If a person expects to keep his long-term record of visits to his attorney or psychotherapist private, he would not take burdensome precautions to conceal this information—analogueous to a fence around a yard or a closed door of a phone booth—such as repetitively altering the route traveled, the office visited, or his physical and vocal attributes at such meetings.

249. See, e.g., Roper, *supra* note 179 (reporting on a “license-plate reader” that digitally recognized and recorded the exact location of the Minneapolis mayor’s vehicle at least forty-one times over the course of a year).

These two examples illustrate that the lack of measures exhibiting an expectation of privacy does not negate a subjective expectation of privacy in all circumstances. If it is found that no measures were exhibited, courts determining whether the subjective-expectation requirement was satisfied should first consider the assumed probability of exposure of the information. In addition, they should consider the plausibility and reasonableness of exhibiting a subjective expectation of privacy in that information. Surveilled individuals might still satisfy the subjective requirement by showing either that there was an assumed marginal risk that the information would be exposed or that the only measures available to exhibit a subjective expectation of privacy would have been implausible or impracticable. If a court holds that the person did maintain a subjective expectation of privacy despite the lack of expressive factors, then the scope of that expectation, whether he exposed the information to the plain view of others, and the objective reasonableness of that expectation would still be relevant in determining whether a reasonable expectation of privacy exists to establish a search within the meaning of the Fourth Amendment.

2. Determining the Scope of the Subjective Expectation of Privacy.

The scope of a person's subjective expectation of privacy is also relevant in determining whether a Fourth Amendment search occurred. Under this inquiry, the scope of the expectation is critical to understanding the extent of the information protected from governmental intrusions. If an expectation of privacy to remain free from intrusion by certain categories of sensory detection extends to only some, but not other, types of information, then any information falling outside of that scope would not be protected. Therefore, the government's acquisition of this unsheltered information would not constitute a search under the Fourth Amendment.

Consider the *Katz* decision itself, in which the Court held that the government's recording of Katz's telephone conversations in an enclosed telephone booth constituted an unreasonable search.²⁵⁰ By closing the door to the phone booth, Katz exhibited an expectation of privacy for the *oral* content of his phone conversation.²⁵¹ The closed door, assuming it was transparent, would not exhibit Katz's expectation of privacy from *visual* observations, including his

250. *Katz*, 389 U.S. at 353.

251. *Id.* at 352.

presence in the phone booth, his use of the telephone, and, possibly, the telephone number he dialed or the contents of the conversation if they were recorded by a lip reader observing the phone booth.²⁵² Therefore, the scope of Katz's subjective expectation of privacy extended to his oral conversation, but not to these physical characteristics.

3. *Determining Whether a Person Exposed Information to the Plain View of Outsiders.* Justice Harlan expanded on his reasonable-expectation-of-privacy test by clarifying that information "expose[d] to the 'plain view' of outsiders [is] not 'protected'" because no intention to keep it private "has been exhibited."²⁵³ When a person exposes something to the plain view of the public, he also willingly discloses certain information along with it.²⁵⁴ A voluntary disclosure, however, does not forfeit all related expectations of privacy—or the minimum protections guaranteed by the Fourth Amendment.

*Bond v. United States*²⁵⁵ provides a key example of the scope of an exposure of information to others, although the case was decided using the objective-expectation-of-privacy requirement.²⁵⁶ In *Bond*, a CBP officer checked bus passengers' identifications and squeezed luggage bags in the bus's overhead bins to check for illicit drugs.²⁵⁷ The officer squeezed Steven Bond's bag and identified a "'brick-like' object," which was found to be a package of methamphetamine.²⁵⁸ The Supreme Court held that Bond had exhibited a subjective expectation of privacy in the contents of his luggage bag by storing his items within the bag and placing the bag in the overhead bin directly above him.²⁵⁹ By placing the bag in the public bin, Bond exposed the bag to typical visual observation and casual physical contact by others

252. DRESSLER & THOMAS, *supra* note 38, at 88; *see Katz*, 389 U.S. at 352 ("But what he sought to exclude when he entered the booth was not the intruding eye—it was the uninvited ear.").

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

254. *See United States v. Jones*, 132 S. Ct. 945, 957 (2012) (Sotomayor, J., concurring) ("I would not assume that all information voluntarily disclosed to some member of the public for a limited purpose is, for that reason alone, disentitled to Fourth Amendment protection.").

255. *Bond v. United States*, 529 U.S. 334 (2000).

256. *See id.* at 338–39 (analyzing whether society would recognize Bond's subjective expectation as reasonable and holding that the government's conduct violated his Fourth Amendment rights).

257. *Id.* at 335.

258. *Id.* at 336.

259. *Id.* at 339.

intending to move the bag.²⁶⁰ The extent of this public exposure, however, did not invite or permit handling of the bag in a purposeful, “exploratory manner.”²⁶¹

As *Bond* illustrates, the concept of information “expose[d] to the ‘plain view’ of outsiders,” articulated in Justice Harlan’s *Katz* concurrence, relates to the level and extent of the exposure.²⁶² Just as *Bond* exposed his bag to only a certain level of observation and handling, a public exposure does not forfeit all expectations of privacy in the protected person or effects. Furthermore, the level of the exposure of information that is readily detectable by others is limited because the information must be exposed to the plain view of the public. People do not expose information to the plain view of the public when acquiring that information would require invasive, sense-enhancing technology or long-term monitoring—surveillance that reveals more information than a plain-view observer is able to uncover.

For example, consider again a RoboBee equipped with a sniffer to test the air for chemical and biological agents. A person probably knows that any strong or detectable odors emanating from his body or effects are susceptible to being smelled by others. The person probably would not believe, however, that scents or agents undetectable by the natural olfactory senses would be at risk of exposure by advanced technology. Not only does he not knowingly or willingly intend to expose this information, but this information is also unavailable to the plain view and the natural senses of the public. The government is able to elicit this information only by inspecting the individual in a purposeful “exploratory manner,” similar to the CBP officer squeezing the bag in *Bond*.

Another helpful illustration is the above-mentioned example of an ARGUS-equipped SolarEagle, which monitors an individual for an extended period of time. When the person steps into the public view, he willingly exposes his person and effects to observation by others. The SolarEagle, however, may uncover far more information by compiling an extensive amount of data on the observed person’s public activities. By aggregating this information, the SolarEagle could produce a detailed log of every location the person has visited, along with the dates, times, and durations of those visits. This

260. *Id.* at 338.

261. *Id.* at 338–39.

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

surveillance reveals more detailed information than what is available to the plain view of the ordinary public observer.

Some might argue that by engaging in any activity, behavior, or expression that is exposed to the public, an individual forfeits all associated expectations of privacy.²⁶³ These opinions fail to recognize that our private lives are not derived solely from the comings and goings that transpire exclusively within the sanctity of the home. Our private lives consist of numerous activities, behaviors, and expressions occurring at home, in public, at work,²⁶⁴ and in society as a whole—both in solitude and in the presence of others. Secrecy does not equate to privacy and Fourth Amendment jurisprudence must come to reflect this distinction.²⁶⁵ Although expectations of privacy may be nebulous, individuals still expect certain information to remain private and free from government intrusion. This is the very heart of the Fourth Amendment. And as long established by the Supreme Court, “the Fourth Amendment protects people, not places.”²⁶⁶

The extent and level of exposure of information to the plain view of the public is especially relevant to drone technology. Just as a “careful [tactile] exploration of the outer surfaces of a person’s clothing all over his or her body” violates the sanctity of his body and the level and extent of information he exposes to the public,²⁶⁷ invasive explorations and investigations of a person or her effects by drones may also violate this sanctity and the extent of the information she has exposed. Thus, by driving an automobile down a public road,

263. Cf. *Oliver v. United States*, 466 U.S. 170, 182 (1984) (“[W]e reject the suggestion that steps taken to protect privacy establish that expectations of privacy in an open field are legitimate.”); *Katz*, 389 U.S. at 365 (Black, J., dissenting) (applying a textualist interpretation to a Fourth Amendment issue and concluding that “[a] conversation overheard by eavesdropping, whether by plain snooping or wiretapping, is not tangible and, under the normally accepted meaning of the words, can neither be searched nor seized”).

264. In the workplace context, the Supreme Court has “recognized that employees may have a reasonable expectation of privacy against intrusions by police” and “[g]iven the societal expectations of privacy in one’s place of work[,] . . . [has] rejected the contention . . . that public employees can never have a reasonable expectation of privacy in their place of work.” *O’Connor v. Ortega*, 480 U.S. 709, 716–17 (1987). This expectation of privacy, however, “must be assessed in the context of the employment relation.” *Id.* at 717.

265. See *United States v. Jones*, 132 S. Ct. 945, 957 (2012) (Sotomayor, J., concurring) (“But whatever the societal expectations [for privacy], [persons] can attain constitutionally protected status only if our Fourth Amendment jurisprudence ceases to treat secrecy as a prerequisite to privacy.”); *Oliver*, 466 U.S. at 182 (“The test of [Fourth Amendment] legitimacy is not whether the individual chooses to conceal assertedly ‘private’ activity.” (emphasis added)).

266. *Katz*, 389 U.S. at 351.

267. *Bond v. United States*, 529 U.S. 334, 337 (2000) (alteration in original) (quoting *Terry v. Ohio*, 392 U.S. 1, 16–17 (1968)).

a person exposes the exterior portions of the car to the public, and a law-enforcement officer's observation of the car does not constitute a search.²⁶⁸ However, many people—including, perhaps, members of the Supreme Court—would find it deeply disturbing for the government to monitor their every move in public.²⁶⁹ Drones render such monitoring possible. Public movements, however, should not be deemed to expose to the public's plain view an intricate, detailed map of the exact dates, times, and locations of an individual over an extensive period of time. Similarly, individuals should not be deemed to expose the biological and chemical agents emanating from their persons and effects, which may be detected by the hovering RoboBee, to the plain view of the public.

CONCLUSION

When issues concerning the use of drones by the government arise, courts should apply the reasonable-expectation-of-privacy test and expand on the subjective-expectation-of-privacy requirement. In applying the test, they should determine whether there is a subjective expectation of privacy, whether the scope of that privacy expectation extended to the acquired information, and then whether the person exposed the information to the plain view of the public. Analysis of the subjective requirement, however, should not be overlooked as courts have commonly done. Courts should also recognize that an absence of expressive factors exhibiting a subjective expectation of privacy does not defeat a subjective requirement. Expressive factors merely evidence the existence of a subjective expectation; they do not create it. When expressive factors are absent, an individual can still demonstrate that a subjective expectation existed. Finally, courts should also recognize that a subjective expectation of privacy extends to a defined scope of information and that an exposure of this information forfeits the Fourth Amendment protections attached only to the information that is exposed to the plain view of the public.

The analysis outlined in this Note provides guidance for resolving many of the current difficulties in applying Fourth Amendment jurisprudence to drones. These difficulties are especially troubling given the numerous practical benefits that drones could

268. *New York v. Class*, 475 U.S. 106, 114 (1986).

269. *See* Transcript of Oral Argument at 9–16, *Jones*, 132 S. Ct. 945 (No. 10-1259) (asking whether the government may, without a warrant, monitor the Supreme Court Justices' public movements for a month).

provide to law enforcement and others. The advancement and successes of drone technology, however, will likely be achieved only if there is a proper balance between the government's investigative powers and an individual's constitutional rights, as the Fourth Amendment seeks to achieve. Future cases considering the government's use of drones for surveillance should recognize the critical analysis provided by the subjective requirement. Perhaps only then will Fourth Amendment jurisprudence find an appropriate balance between governmental surveillance by drones and the Fourth Amendment's protections from governmental intrusion.