Drone Technology and the Fourth Amendment: Aerial Surveillance Precedent and Kyllo Do Not Account for Current Technology

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COMMENTS

DRONE TECHNOLOGY AND THE FOURTH AMENDMENT: AERIAL SURVEILLANCE PRECEDENT AND KYLLO
DO NOT ACCOUNT FOR CURRENT TECHNOLOGY AND PRIVACY CONCERNS

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INTRODUCTION

Drones. They’re the third most annoying things in the sky after mosquitoes and plastic bags caught in the breeze . . . . All of a sudden, drones are everywhere. If you happen to live under drones, not thinking about them is not an option. Having drones hovering above you is bound to mess with your head, especially because you might not be able to see them . . . . Congratulations everyone, we did it! We’ve managed to make one of the last remaining symbols of pleasantness, blue sky, completely f***ing terrifying!

- John Oliver

While John Oliver was specifically commenting on drone use abroad, his sentiments apply to the use of drones in the United States. Drones are now commonplace in the United States. In fact, the Federal Aviation Administration (FAA) estimates that “30,000 drones could be in the nation’s skies by 2020.” Congress gave the FAA, the agency charged with flight safety, the responsibility to create a series of regulations for civil and public drone use. Courts, however, will have to grapple with the obvious constitutional question—namely, is warrantless drone surveillance a search under the Fourth Amendment?

2. See Alistair Barr & Elizabeth Weise, Underground Drone Economy Takes Flight, USA TODAY (Dec. 2, 2013), http://www.usatoday.com/story/tech/2013/12/02/underground-drone-economy/3805387. Drones are already being used in the film, real estate, sports, and mining industries. Id. Entrepreneurs have already capitalized on the booming industry. Id. For example, “Airware, which makes software and systems that control drones, raised more than $10 million this year from Andreessen Horowitz, a large venture capital firm, and Google’s venture capital arm.” Id. “Amazon.com CEO Jeff Bezos says in the future drones delivering packages will be as common as mail trucks.” Id.
5. Id. § 334 (2012).
This comment discusses how current Fourth Amendment case law is inadequate to address the serious privacy implications of drones. The Supreme Court should create a new rule that acknowledges the high-technological capabilities of drones and provides for commensurate privacy protections. This new rule should move beyond the current aerial surveillance precedent and incorporate Justice Sotomayor’s mosaic theory from her concurrence in United States v. Jones\(^6\) as well as the privacy rationale from Riley v. California.\(^7\)

I. WHAT ARE DRONES?

A drone,\(^8\) also known as an Unmanned Aircraft System or Uninhabited Aerial Vehicle (UAV) is an “aircraft or vehicle flown without an on-board human pilot.”\(^9\) Drones are available in a variety of shapes and sizes, which range from very small versions of blimps or helicopters to the more traditional, full-sized aircraft design.\(^10\) There are three types of drones: (1) the preprogrammed drone; (2) the smart drone; and (3) the remotely piloted drone.\(^11\)

The preprogrammed drone operates through a timer located on the aircraft; the pilot pre-schedules and programs maneuvers and different settings involving speed, destination, and altitude.\(^12\) After the drone completes its programmed routine and mission, pilots may recover it


\(^7\). Riley v. California, 134 S. Ct. 2473 (2014).

\(^8\). For purposes of simplicity, uninhabited aerial vehicles or unmanned aircraft systems will be referred to as “drones” throughout this comment.


\(^11\). Myose & Strohl, supra note 9.

\(^12\). Id.
via parachute. Unlike the preprogrammed drone, the smart drone’s sensors and on-board computer adjust course and altitude during flight, allowing for more sophisticated uses.

The remotely piloted drone is the most advanced type of drone. Pilots may maneuver this drone in real time, through radio links, during the entire length of the drone’s journey. Operators may also use a laser to connect the drone to an enemy target. Remotely piloted drones are useful for reconnaissance and information gathering, because they are equipped with radar or infrared sensors, which enable pilots to see imagery in real time. These capabilities make the remotely piloted drone ideal for military use.

Although military use of drones dates back to World War I, during World War II, the United States military expanded its use of drones for bombing missions against Germany. Germany also used drone bombs. In the Pacific theater, the Navy used TDR-1 Assault Drones to drop 2000 pounds of bombs on Japanese ground targets. Navy circling aircrafts deployed TDR-1 Assault Drones from a safe distance, “through television and telemetry links.” Thereafter, during the Vietnam War, the United States developed the next generation of remotely piloted UAVs for surveillance. The Firebee was about the size of the modern day Predator drone, and the military used it for simple reconnaissance. “These missions produced

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13. Id.
14. Id.
15. Id.
16. Id.
17. Id.
18. Id.
19. Id.
20. Mark Bowden, How the Predator Drone Changed the Character of War, SMITHSONIAN MAG. (Nov. 2013), available at http://www.smithsonianmag.com/history/how-the-predator-drone-changed-the-character-of-war-3794671/?no-ist. For example, the United States sent radio-controlled B-24s to bomb Germany. Id.
22. Id.
23. Id.
24. Myose & Strohl, supra note 9.
25. Id.
significant intelligence and targeting information without risking aircrews,” but military crews had to recover the drone and process the film, which caused delays.\textsuperscript{26}

The United States and other countries continued to develop drone technology through the 1990s.\textsuperscript{27} In the Persian Gulf War, the United States relied on television imagery provided by drones to spot gunfire and offshore battleships.\textsuperscript{28} Both the United States and coalition forces also used remotely piloted drones to drop bombs during Operations Desert Storm and Desert Shield.\textsuperscript{29} “The psychological effect of the heavy bombardment was so great that on one occasion, Iraqi soldiers surrendered to an orbiting Pioneer before naval gunfire commenced.”\textsuperscript{30} This powerful advantage in warfare created a new industry for drones in the United States.\textsuperscript{31} This effectiveness makes it easy to understand why militaries around the world use drones.

In addition, “the technology can in principle greatly reduce the ratio of civilian to combatant deaths.”\textsuperscript{32} “[F]rom the most accurate estimates by scholars at the Brookings Institution, it appears that no more than one-in-seven to one-in-ten people . . . killed in drone strikes to date have been civilians.”\textsuperscript{33} This is because drones eliminate the danger of leaving civilians’ fates in the hands of pilots “whose attention is divided between flying the aircraft, looking for (and possibly evading) surface-to-air missiles and ground fire, identifying the target, assessing the proportionality of the attack, and accurately

\begin{footnotesize}
\begin{enumerate}
\item[26.] Id.
\item[27.] Id.
\item[28.] Id.
\item[30.] Myose & Strohl, \textit{supra} note 9; \textit{see also} Frontline, \textit{supra} note 29.
\item[31.] \textit{See} Peter Bergen, \textit{Drones Will Fill the Sky}, CNN (May 13, 2014, 8:56 PM), http://www.cnn.com/2014/05/13/opinion/bergen-armed-drones-key-future-warfare/.
\item[32.] Bowden, \textit{supra} note 20.
\end{enumerate}
\end{footnotesize}
delivering the weapon." 34 Given the significant cuts to military budgets, 35 drones are also attractive alternatives because a single drone is only one-twentieth the cost of a manned aircraft. 36 

Drones are not only useful for the military; in the United States, law enforcement and other agencies use drones to carry out their missions. 37 The RQ-4 Global Hawk resembles an airliner and is the largest drone in existence. 38 This $200 million drone "provided imagery over the California wildfires in 2008, the Haitian earthquake in 2010, and the Japanese post-tsunami disaster in 2011." 39 Agencies use drones "to inspect pipelines, survey and monitor crops, monitor storm damage and flooding, monitor wildlife populations, and track poachers." 40 NASA and universities also use drones for scientific and environmental research. 41 Different law enforcement authorities now


35. Paul D. Shinkman, Massive Budget Cuts Would Redefine U.S. Military, U.S. NEWS & WORLD REP. (Feb. 24, 2014, 2:38 PM), http://www.usnews.com/news/articles/2014/02/24/pentagons-massive-budget-cuts-would-redefine-the-us-military. Id. This means “[t]he new budget would create a force that could only respond to one major ground campaign, as opposed to the military that took on widespread fights simultaneously in Iraq and Afghanistan.” Id. The military may have to say goodbye to many of their manned aircrafts like the U-2 spy plane "in favor of a drone alternative, the Global Hawk." Id. “This decision represents a broad approach for the military, enticed by the cost-effectiveness of unmanned platforms like the Global Hawk, as well as the Predator and Reaper drones that cut their teeth in the skies over Iraq and Afghanistan.” Id.


38. Melanie Reid, Grounding Drones: Big Brother’s Tool Box Needs Regulation Not Elimination, 20 RICH. J.L. & TECH. 9, 8 (2014) (citing GOLDBERG ET AL., UNIV. OF OXFORD REUTERS INST. FOR THE STUDY OF JOURNALISM, REMOTELY PILOTED AIRCRAFT SYSTEMS & JOURNALISM: OPPORTUNITIES AND CHALLENGES OF DRONES IN NEWS GATHERING 24 (2013)).

39. Id. at 8 n.23.

40. Id. at 7 (footnotes omitted).

implement drones in training, with police forces testing and experimenting with drones as early as 2007.\textsuperscript{42} “As one drone manufacturer put it, ‘if the job is too dull, dirty, or dangerous—get a UAV to do it.’”\textsuperscript{43}

Drones’ adaptability makes them an attractive resource for our nation, especially for law enforcement agencies like the Border Patrol. Today, the Department of Homeland Security uses drones to serve in the place of humans for border surveillance and port regulation.\textsuperscript{44} “According to the Electronic Frontier Foundation, a digital privacy watchdog group, the Customs and Border Protection (CBP) increased its drone flights eight-fold between 2010 and 2012.”\textsuperscript{45} The Department of Defense has also utilized drones in Mexican territory to gather information about major drug trafficking patterns.\textsuperscript{46} In fact, drones have been quite successful at stopping illegal immigration and drug smuggling. In a Department of Defense drone operation from 2004 through 2005, one Predator drone assisted officers in capturing 2300 illegal migrants and 3760 kilograms of marijuana.\textsuperscript{47} In 2005, the Department of Defense officially integrated the Predator along with seismic sensors, infrared cameras, and laser illuminators.\textsuperscript{48}

\begin{footnotesize}
\begin{enumerate}
\item[43.] Reid, supra note 38 at 1 (quoting GOLDBERG ET AL., supra note 38, at 1).
\item[46.] Reid, supra note 38, at 9 (citing STANLEY & CRUMP, supra note 42, at 7).
\item[47.] Finn & Wright, supra note 44, at 189.
\item[48.] Id.
\end{enumerate}
\end{footnotesize}
With the rise in popularity of drones, the government has noted significant safety concerns. According to Dyke Weatherington, Director of Unmanned Warfare for the Pentagon, “Flying is inherently a dangerous activity. You don’t have to look very far, unfortunately, to see examples of that. . . . I can look you square in the eye and say, absolutely, the [Defense Department] has got an exceptional safety record on this and we’re getting better every day.”49 However, some of the fundamental safety hurdles for government drone use include: the limited ability to detect and avoid trouble, pilot error, persistent mechanical defects, and unreliable communication links.50

II. DRONE LEGISLATION

Multiple states have enacted their own laws to regulate the use of drones. However, Congress has struggled to pass any sort of uniform legislation. Because of the federal government’s silence, state drone laws are inconsistent and often fail to account for the privacy guarantees of the Fourth Amendment. This comment will detail Congress’ struggle to regulate the use of drones through a discussion of drone laws in Oregon, Texas, and California.

While the FAA develops regulations to address the safety concerns discussed in the previous section, those regulations do not address “serious misgivings for those concerned with privacy protection”51 to which the rapid influx of drones has given rise. Federal and state lawmakers have recognized this, as evidenced by a slew of recently proposed legislation addressing civilian and law enforcement use of drones for surveillance. The laws, however, do not, and will not, ensure that drone surveillance will not violate the Fourth Amendment. To the contrary, lawmakers assume the courts will fill this role.52

50. Id.
52. See infra Part II.B.2.
A. Federal Legislation

In 2012, Congress required the FAA to create regulations for the certification and approval of domestic drones through the FAA Modernization and Reform Act of 2012 (FAA Act of 2012), which was enacted to update and streamline the aircraft approval process under 49 U.S.C. § 44704.53 Under the FAA Act of 2012, the FAA must draft and implement agreements with other government agencies. Through these agreements, the FAA will:

allow a government public agency to operate unmanned aircrafts weighing 4.4 pounds or less, if operated—(i) within the line of site of the operator; (ii) less than [four hundred] feet above the ground; (iii) during daylight conditions; (iv) within Class G airspace; and (v) outside of five statute miles from any airport . . . or other location with aviation activities.54

The FAA has not created official regulations for public use yet, but in the meantime, the FAA has protocol for air traffic, which it implemented on July 11, 2014.55 The protocol requires a state agency to obtain a certificate of authorization, which is often in effect for up to two years.56 Civilian applicants must also apply for Special Airworthiness Certificates.57 These current policies may encourage both law enforcement and civilians to pursue drone use without following proper FAA procedure.58 Because the FAA demands public

56. See id.
57. Id.
authorities to apply for certificates of authorization, the process to obtain a drone certificate is slow; the review process takes up to sixty business days.\(^\text{59}\) Thus, if the FAA uses its current protocol, law enforcement could miss out on crucial opportunities to investigate crimes or assist with natural disaster recovery. Additionally, the FAA’s sixty-day process still cannot guarantee that every FAA-approved drone use will respect Fourth Amendment protections. Because of this, Congress has tried to tackle privacy issues associated with drones.

Representative Austin Scott introduced the Preserving Freedom from Unwarranted Surveillance Act of 2013.\(^\text{60}\) This Act would prohibit law enforcement from using drones to investigate criminal activity without a warrant.\(^\text{61}\) The only warrantless exceptions allowed would be for the Border Patrol, exigent circumstances, and possible terrorist activity leading to an attack.\(^\text{62}\) The Act would restrict drone surveillance “more than Fourth Amendment jurisprudence currently requires for a fixed-wing aircraft or helicopter.”\(^\text{63}\)

Another unsuccessful bill, the Drone Aircraft Privacy and Transparency Act of 2013 (H.R. 1262), would have amended the FAA Modernization and Reform Act of 2012 to create regulations for governmental use of drones.\(^\text{64}\) This bill would have required all drone

\footnotesize


\(^{61} \) Id.

\(^{62} \) Reid, supra note 38, at 29–30 (citing H.R. 972, supra note 60).

\(^{63} \) Id.

\(^{64} \) RICHARD M. THOMPSON II, CONG. RESEARCH SERV., R42701, DRONES IN DOMESTIC SURVEILLANCE OPERATIONS: FOURTH AMENDMENT IMPLICATIONS AND
applications for drone usage to include a “data collection statement,” listing individuals allowed to operate the drone, the drone’s location, the maximum period of time the drone would be used, and whether the drone would gather information about citizens. If an agency intended to use the drone for monitoring citizens, then the statement would have also included:

[T]he circumstances in which such information will be used, the kinds of information collected and the conclusions drawn from it, the type of data minimization procedures to be employed, whether the information will be sold, and if so, under what circumstances, how long the information would be stored, and procedures for destroying irrelevant data.

The bill would have also required that law enforcement create policies for information gathered from drones and file a data minimization statement explaining the policies to:

- minimize the collection of information and data unrelated to the investigation of a crime under a warrant, require the destruction of data that is no longer relevant to the investigation of a crime, establish procedures for the method of such destruction, and establish oversight and audit procedures to ensure the agency operates a UAS in accordance with the data collection statement filed with the FAA.

This bill would have regulated drones so excessively that the government could not employ drones effectively. It may be for this reason that the bill did not pass. The inability of Congress to protect privacy through drone legislation supports the proposition that the Supreme Court must do so through an analysis of whether drone surveillance is a Fourth Amendment search.

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65. Id. at 20 (citing H.R. 1262, supra note 60).
66. Id.
67. Id.
68. Id.
B. State Drone Legislation

More than twelve states have passed regulations that restrict how law enforcement agencies may use drones. But, are states any better equipped to address the privacy concerns associated with drone surveillance? A discussion of legislation in Texas, Oregon, and California supports the conclusion that reliance on state laws and existing legal precedent alone cannot ensure Fourth Amendment protections.

1. Texas: Giving Law Enforcement Broad Authority to Use Drones with Minimal Executive Oversight

Texas passed lengthy legislation on September 1, 2013 that provided law enforcement with a tremendous amount of discretion regarding drone surveillance. Texas allows law enforcement to use drones in the absence of a warrant, if law enforcement has “reasonable suspicion or probable cause to suspect a person has committed an offense (not including misdemeanors or offenses punishable by fine) . . .” Drones may also be used for crime scene documentation, crime scene investigation, motor vehicle accident investigation, missing person searches, and more.

Nonetheless, law enforcement drone usage in Texas is not completely without oversight. Agencies must issue reports of drone use to the governor in every odd year. Texas law also makes it an offense for civilians to capture images of others “with the intent to conduct surveillance on the individual or property.”

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70. See TEX. GOV’T CODE § 423 (West 2014).
71. Id. § 423.002(a)(2)(8)(A)–(B) (emphasis added).
72. Id. § 423.002(a)(2)(8)(C)–(E).
73. Id. § 423.008(a).
74. Berry & Syed, supra note 69 (quoting TEX. GOV’T CODE § 423.003(a) (West 2014)). The authors note, however, that Texas law does not define “surveillance.”
protections keep pace with technology while curbing possible corporate espionage and other unauthorized snooping.”

2. Oregon: Drone Laws Reflect Reliance on the Judiciary to Protect Privacy

Similarly, Oregon allows law enforcement to use drones without a warrant if they have “probable cause to believe that a person has committed a crime, is committing a crime or is about to commit a crime, and exigent circumstances exist that make it unreasonable for the law enforcement agency to obtain a warrant authorizing use of a drone.” Otherwise, law enforcement must obtain a warrant, which specifies the time period for allowable drone use, with the maximum time period being thirty days. The statute also specifies that drones must not be weaponized. Further, agencies “may operate a drone, acquire information through the operation of a drone, or disclose information acquired through the operation of a drone” to assist individuals in emergencies if the agency “reasonably believes” an imminent threat to safety exists. A law enforcement official must file a sworn statement with the circuit court describing the emergency and necessity for drone use within forty-eight hours. Oregon’s attempt to curtail police abuse with drones during emergency circumstances places discretion with the circuit court judges—who must use the current Fourth Amendment precedent—to determine whether the warrantless emergency operation was reasonable under the circumstances. This reliance on the judiciary reflects the necessity for updated Fourth Amendment jurisprudence, which should consider modern privacy protections.

Like in other jurisdictions, various public organizations weighed in on Oregon’s drone legislation. The Oregon Association Chiefs of Police, for example, submitted a letter to the legislature encouraging

76. OR. REV. STAT. ANN. tit. 62, § 837.320(1)(b) (West 2014).
77. Id. § 837.320(2).
78. Id. § 837.365.
79. Id. § 837.335(2)(a).
80. Id. § 837.335(2)(b).
liberal drone laws, reasoning that “the court system is well suited to evaluate the proper use of these technologies and other emerging technologies over time.”  

In contrast, the Oregon Criminal Defense Lawyers Association (OCDLA) and the ACLU both opposed the liberal application of drones for law enforcement. The OCDLA advocated for maximum privacy protections in the legislation because history revealed “governments do not consensually surrender powers back to its citizenry.” The OCDLA requested that the government be prohibited from using drones except in very limited circumstances, and emphasized that the vague use of the term “surveillance” was more a term of art than an exact definition. Further, the OCDLA pointed out that the drone legislation only discussed when agencies may use drones, and not when law enforcement may not use drones. The OCDLA recommended only two exceptions for when law enforcement may use a drone: (1) with a warrant; and (2) for “accountability, transparency, and oversight” of law enforcement policies to maximize privacy protections.

The ACLU argued in its letter to the Oregon legislature that drone surveillance is equivalent to that of a sensory enhancement device. Therefore, law enforcement must obtain a search warrant based on probable cause before a drone may capture any evidence of criminal activity. The consensus of the ACLU and the OCDLA, therefore, was that law enforcement must obtain a warrant before utilizing a drone to obtain criminal evidence, and use of drones by law enforcement must be heavily regulated. Despite these efforts by the

81. Id.
83. Id.
84. Id.
85. Id.
87. Id.
88. See id; see also Letter from Or. Criminal Def. Lawyers Ass’n, supra note 82.
OCDLA and ACLU, Oregon was still able to pass its drone legislation.89

3. California: Inability to Pass Drone Legislation Leaves Law Enforcement with No Oversight

While law enforcement in California has been using drones since 2006,90 California has been unable to pass legislation that will allow law enforcement to effectively utilize drones and protect civilian’s personal liberty interests.91 Lawmakers came close on September 8, 2014, when the California Assembly presented AB 1327 to the governor for approval.92 The bill allowed law enforcement to use drones without a warrant in emergency situations involving an imminent threat to life or great bodily harm.93 The proposed legislation also required public agencies to give the public reasonable notice before deploying unmanned aircraft systems.94 The bill would also have required that images, footage, or data gathered from drones be destroyed within one year.95 Governor Brown, however, vetoed the bill because it was too narrowly drawn and would “impose requirements beyond what is required by either the Fourth

90. In 2006, the Los Angeles Sheriff’s Department experimented with a drone called SkySeer, which has a wingspan of 6.5 feet, weighs four pounds, and has a camera attached to it. Finn & Wright, supra note 44, at 189 (citing Peter Bowes, High Hopes for Drones in LA Skies, BBC NEWS, http://news.bbc.co.uk/2/hi/americas/5051142.stm (June 6, 2006)); see also Xeni Jardin, Launching ‘Big Brother’ Flying Drones Over L.A., NPR (Apr. 6, 2006, 1:00 PM). More recently, the Seattle Police Department gave the Los Angeles Police Department (LAPD) two Draganflyer X drones. However, the LAPD will not use the drones before it has developed policies and procedures for their use.
93. Id.
94. Id.
95. Id.
Amendment or the privacy provisions in the California Constitution.”

While the bill accounted for agency oversight and regulation, it did not adequately address the real life implications of law enforcement operations. The Governor’s comments concerning his veto were brief, but his veto may suggest that drone laws should allow for reasonable suspicion as a justification for the use of drones. California’s attempt to restrict drone usage shows the importance of privacy rights for citizens, but perhaps the Governor’s view is the more realistic one. After all, “[s]uch a restriction [for law enforcement] may mean that the police will never be able to develop the probable cause necessary to get a warrant . . .”

Texas’ liberal drone laws, Oregon’s reliance on the judiciary, and California’s failure to pass more restrictive drone legislation indicate that most states will ignore Fourth Amendment liberties in the pursuit of deference to law enforcement. Moreover, the successful use of drones to find suspects and detect criminal behavior may increase popular support for law enforcement’s use of drones without a warrant. Indeed, this was the case after the Boston Marathon bombing in 2013.

As a result, new federal legislation and clear guidance by the Supreme Court are required to ensure that state laws adequately address and protect the Fourth Amendment and do not simply cater to popular support, deference to police authority, or expediency.

96. Id.
100. See Maggie Clark, Boston Bombings Show Future Use For Police Drones, HUFFINGTON POST (May 1, 2013, 9:50 AM), http://www.huffingtonpost.com/2013/05/01/boston-bombing-drones_n_3192694.html.
III. SURVEILLANCE TECHNOLOGY AND THE FOURTH AMENDMENT

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 [w]arrants 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.”

The Supreme Court has ruled on Fourth Amendment limitations on surveillance technology under trespass and privacy theories; the Court has not, however, ruled on whether drone surveillance constitutes a “search” under these established Fourth Amendment tests. An analysis of these cases will help understand why the Court needs to create a new rule for drones.

A. Surveillance Technology and the “Reasonable Expectation of Privacy” Test

Ciraolo v. California was one of the first Supreme Court cases involving aerial surveillance. In 1984, the police flew over Ciraolo’s residence without a warrant and discovered that he was cultivating marijuana. Flying 1000 feet above the residence, in navigable airspace, Officer Shultz observed and photographed a marijuana


102. “In assessing probable cause, the magistrate must consider the facts and circumstances presented in the warrant application, including the supporting affidavit, in a practical, common-sense manner and must find that ‘there is a fair probability that contraband or evidence of a crime will be found in a particular place.’” The Warrant Requirement, 40 GEO. L.J. ANN. REV. CRIM. PROC. 22, 23–24 (2011) (quoting Illinois v. Gates, 462 U.S. 213, 237 (1983)).

103. U.S. CONST. amend. IV.

104. Reid, supra note 38, at 5.


106. Id. at 209.
garden in Ciraolo’s backyard. From these observations, Officer Shultz obtained a search warrant for Ciraolo’s home.

The Supreme Court held that law the officer’s observations did not violate the Fourth Amendment. To determine whether the warrantless aerial observation was a search under the Fourth Amendment, the Court used the test outlined in Katz v. United States. That test emphasizes not the physical trespass component of a search, but the individual privacy that a person reasonably should expect in his or her own residence. The Court concluded that the “respondent’s expectation that his garden was protected from such observation is unreasonable and is not an expectation that society is prepared to honor.”

Similarly, in Dow Chemical Co. v. United States, the Court held that the Environmental Protection Agency (EPA) did not violate the Fourth Amendment when it took photographs of the Dow Chemical plant from an aircraft. The aircraft flew from altitudes of 1200, 3000, and 12,000 feet. The Court held that Dow Chemical did not have a reasonable expectation of privacy with respect to overhead surveillance; therefore the surveillance was not a search. The Court reasoned, because the EPA used conventional photography used in mapmaking, the aerial photographs did not violate the Fourth Amendment. Further, the photography did not reveal intimate details of the facility and only provided images of the outline of the facility’s buildings. “The Court observed that any person with an airplane and an aerial camera could duplicate the photographs at

107. Id.
108. Id.
109. Id. at 213.
111. Id.
112. Ciraolo, 476 U.S. at 214.
114. Id.
115. Id. at 239.
116. Id. at 238.
117. Id.
issue.”118 “The mere fact that human vision is enhanced somewhat, at least to the degree here, does not give rise to constitutional problems.”119

Three years after Dow Chemical Co., the Supreme Court addressed warrantless aerial surveillance over a residence in Florida v. Riley.120 Riley lived in a mobile home with a greenhouse ten to twenty feet behind the residence.121 Shrubbery and trees surrounded the greenhouse and two of the panels (about ten percent of the greenhouse) were missing.122 Riley had posted a “Do Not Enter” sign on a wire fence surrounding the property.123 An investigating officer decided to examine the property after he received an anonymous tip that Riley’s greenhouse contained marijuana.124 The officer could not see the contents of the greenhouse from the road, and decided to use a helicopter to fly four-hundred feet over the property.125 From the helicopter, and without any sensory enhancing devices, the officer identified what he believed was marijuana and obtained a warrant on that basis.126

The Supreme Court reasoned “[a]ny member of the public could legally have been flying over Riley’s property in a helicopter at the altitude of 400 feet and could have observed Riley’s greenhouse.”127 The Court emphasized the greenhouse’s panels were exposed and, therefore, Riley could not reasonably expect that law enforcement would not examine its contents.128 The Court concluded Riley did not have a reasonable expectation of privacy; thus, the officer’s

121. Id.
122. Id.
123. Id.
124. Id.
125. Id.
126. Id. at 448–49.
127. Id. at 451.
128. Id. at 450.
observation from the helicopter was not a search under the Fourth Amendment.\textsuperscript{129}

In \textit{United States v. Kyllo},\textsuperscript{130} the Court applied the privacy test to sensory enhancing technology. Kyllo challenged the warrantless use of a thermal imaging device, which resulted in his conviction for manufacturing marijuana.\textsuperscript{131} The Court distinguished this case from the aerial surveillance cases on the basis that the thermal imaging device was not easily accessible to the public,\textsuperscript{132} and “explore[d] details of the home that would previously have been unknowable without physical intrusion.”\textsuperscript{133} Therefore, the Court determined the use of thermal imaging without a warrant was a Fourth Amendment search, because it violated Kyllo’s reasonable expectation of privacy.\textsuperscript{134}

The Court stated, “[i]t 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.”\textsuperscript{135} “For example,... the technology enabling human flight has exposed to public view (and hence, we have said, to official observation) uncovered portions of the house and its curtilage that once were private.”\textsuperscript{136} Even though the Court noted thermal imaging was a tool, not available to the public, that revealed intimate details of the home, the Court conceded advancement of technology might redefine what is considered “private.”\textsuperscript{137} This was demonstrated in \textit{Dow Chemical Co.},\textsuperscript{138} \textit{Florida v. Riley},\textsuperscript{139} and \textit{Ciraolo},\textsuperscript{140} where the Court denied that the challengers had a reasonable expectation of privacy because of the commonality of airplanes. This same reasoning may also apply to drones.

\begin{itemize}
\item \textsuperscript{129} \textit{Id.}
\item \textsuperscript{130} \textit{United States v. Kyllo}, 533 U.S. 27 (2001).
\item \textsuperscript{131} \textit{Id.} at 30.
\item \textsuperscript{132} \textit{Id.} at 34.
\item \textsuperscript{133} \textit{Id.} at 40.
\item \textsuperscript{134} \textit{Id.} at 34.
\item \textsuperscript{135} \textit{Id.} at 33–34.
\item \textsuperscript{136} \textit{Id.} at 34.
\item \textsuperscript{137} \textit{See id.}
\item \textsuperscript{138} \textit{See Dow Chem. Co. v. United States}, 476 U.S. 227, 238 (1986).
\item \textsuperscript{139} \textit{See Florida v. Riley}, 488 U.S. 445, 451 (1989).
\item \textsuperscript{140} \textit{California v. Ciraolo}, 476 U.S. 207, 214 (1986).
\end{itemize}
Under these cases, whether drone surveillance is a Fourth Amendment search will turn on whether a drone is “available to the public.” With the increasing normalcy and affordability of drones in American society, drone technology will increasingly allow for an inside look at citizens’ private spheres that were once secluded from public view. At the same time, the normalcy and affordability of drones would mean that under this line of cases, drone surveillance may not trigger Fourth Amendment protections because any individual may purchase a drone and could easily view an individual’s property. After all, “[t]he rationale for this notion is that officers are not required to avert their eyes when they see illegal activity in plain view.”

**B. GPS Trackers and Justice Sotomayor’s Mosaic Theory**

GPS tracking cases may provide a better solution to protect individual privacy interests and also serve the need for law enforcement agencies to combat crime. In *United States v. Jones*, the Court ruled on whether a GPS tracker installed on a defendant’s vehicle to track the defendant’s movements was a search or seizure. Law enforcement applied for a warrant to track the defendant’s movements to investigate whether the defendant, a nightclub owner, was trafficking drugs. The District of Columbia District Court granted a search warrant to allow installation of a tracking device on the defendant’s car, which was valid for a maximum of ten days. The Government violated the scope of that warrant, however, when it tracked the vehicle’s movements over the next twenty-eight days and even replaced the battery on the installed GPS. Based on a four-

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141. See Barr & Weise, *supra* note 2. The public can buy drones on Amazon.com at affordable prices as low as $69.15 for a Quadcopter with a camera attached. Search “drones” Amazon.com, for more information. See *id.*


143. *Id.*


145. *Id.* at 948.

146. *Id.*

147. *Id.*
week tracking period, the Government filed an indictment against the defendant for drug trafficking.\footnote{148} The Court relied on the property-based definition of a search: trespass.\footnote{149} Rejecting the Government’s argument that the information gathered was on an “open field,”\footnote{150} the Court held that the GPS tracking was an unlawful “search,” because the Government physically intruded on the defendant’s personal “effect”—the vehicle.\footnote{151} The plurality did not, however, answer the question of whether the electronic means of obtaining the information qualified as a violation of the defendant’s reasonable expectation of privacy.\footnote{152}

Both Justice Alito’s and Justice Sotomayor’s separate concurrences emphasized that the majority should have held that the Government’s search was unlawful because it violated the defendant’s reasonable expectation of privacy.\footnote{153} Justice Sotomayor analyzed the Government’s behavior in totality, which occurred over the course of a month.\footnote{154} She articulated that the Court should have considered “whether people reasonably expect that their movements will be recorded and aggregated in a manner that enables the Government to ascertain, more or less at will, their political and religious beliefs, sexual habits, and so on.”\footnote{155} Justice Sotomayor “would also consider the appropriateness of entrusting to the Executive, in the absence of any oversight from a coordinate branch, a tool so amenable to misuse, especially in light of the Fourth Amendment’s goal to curb arbitrary exercises of police power to and prevent ‘a too permeating police surveillance.’”\footnote{156}

With this rationale in mind, Justice Sotomayor focused on several points regarding police use of electronic devices: “(1) the wealth of detail connected over intimate matters, (2) exceedingly resource-efficient collection of data by law enforcement, (3) the specter of

\begin{footnotes}
\item[148] Id.
\item[149] Id. at 949–50.
\item[150] Id. at 953.
\item[151] Id.
\item[152] Id. at 954.
\item[153] Id. at 955 (Sotomayor, J., concurring), 958 (Alito, J., concurring).
\item[154] Id. at 954–56 (Sotomayor, J., concurring).
\item[155] Id. (Sotomayor, J., concurring) (emphasis added).
\item[156] Id. (quoting United States v. Di Re, 332 U.S. 581, 595 (1948)).
\end{footnotes}
governmental abuse, and (4) the chilling effects on citizens’ autonomy by pervasive surveillance.” Both Justices Sotomayor and Alito thought “the length of time an individual is kept under surveillance and the breadth of information collected through such surveillance may inform a reviewing court whether a particular surveillance practice constitutes a Fourth Amendment search.”

C. Considering Personal Information

The above cases all dealt with the question of whether the use of technology is a search. Assuming the use of drone technology constitutes a search, the question becomes whether that search is reasonable. The Court has held that reasonable searches do not violate the Fourth Amendment. However, the potential for abuse of new technology to expose intimate information—that which individuals would otherwise not make public—impacts the reasonableness of the search.

The rationale in Riley v. California illustrates the possibility of significant privacy intrusion via high-technological devices. Using that rationale, the Court should not follow in the steps of Texas and Oregon, where law enforcement may use drones without a warrant; the Court should instead consider the great risk of jeopardizing privacy with warrantless drone use.

In Riley v. California, the Court addressed “whether the police may, without a warrant, search digital information on a cell phone seized from an individual who has been arrested.” The police pulled over the defendant for driving with expired registration tags. The defendant also had a suspended license, causing law enforcement to impound and search his vehicle per inventory procedure.

158. THOMPSON, supra note 64 (citation omitted).
160. Id. at 33.
162. Id. at 2480.
163. Id.
164. Id.
the routine search and inventory, the police recovered two handguns. The defendant was arrested for possession of concealed and loaded firearms.

An officer searched the defendant incident to arrest, and found the defendant’s smart phone. The officer looked through the phone and found some messages with the letters “CK,” which he presumed stood for “Crips Killers,” a term for a local gang. Subsequently, a gang detective also went through the defendant’s phone and found photographs of the defendant standing near a car that law enforcement believed was involved in a past shooting. Based on these photographs, the Government charged the defendant for the prior shooting in furtherance of a gang. He was convicted and received a sentence of fifteen years to life.

Applying Chimel v. California, the Court ruled officers may not search cell phones incident to arrest, because cell phones do not place anyone in danger. Additionally, securing an individual’s phone does not further law enforcement’s immediate need to preserve evidence, because the possibility for remote-wiping a phone

165. Id.
166. Id.
167. Law enforcement may search suspects “incident to arrest” to ensure office safety and to preserve evidence that may be destroyed. Chimel v. California, 395 U.S. 752, 762–63 (1969) (explaining “[t]here is ample justification . . . for a search of the arrestee’s person and the area ‘within his immediate control’—construing that phrase to mean the area from within which he might gain possession of a weapon or destructible evidence.”). See also Arizona v. Gant, 556 U.S. 332, 343 (concluding that “circumstances unique to the vehicle justify a search incident to lawful arrest when it is ‘reasonable to believe evidence relevant to the crime of arrest might be found in the vehicle’”) (quoting Thornton v. United States, 541 U.S. 615, 632 (2004) (Scalia, J., concurring)).
169. Id.
170. Id. at 2480–81.
171. Id. at 2481.
172. Id.
175. The Court uses this term to reference erasing the phone’s data. See Sara M. Corradi, Comment, Be Reasonable! Limit Warrantless Smart Phone Searches to Gant’s Justification For Searches Incident to Arrest, 63 CASE W. RES. L. REV. 943,
continues to exist, even at the station house. Therefore, privacy was the ultimate concern for the Court. “Before cell phones, a search of a person was limited by physical realities and generally constituted only a narrow intrusion of privacy.” Justice Sotomayor correctly noted that police may access an entire person’s personal history through their phones:

An Internet search and browsing history, for example, can be found on an Internet-enabled phone and could reveal an individual’s private interests or concerns—perhaps a search for certain symptoms of disease, coupled with frequent visits to WebMD. Data on a cell phone can also reveal where a person has been. Historic location information is a standard feature on many smart phones and can reconstruct someone’s specific movements down to the minute, not only around town but also within a particular building.

Because of the expanding avenues for intruding on a person’s privacy through a cell phone, the Court held law enforcement must first secure a warrant to search a cell phone, even when the police seize a cell phone incident to a suspect’s arrest. This reasoning should also apply to drones.

Similar to the ability for law enforcement to learn private details of an individual’s life through a person’s cell phone, law enforcement may also use drones to discover an individual’s intimate information. This is because drones do not merely follow individuals; drone capabilities make it possible for law enforcement to track and record an individual’s life within and outside the home. Further, law enforcement’s temporary restraint from using drones will not ruin an investigation rooted in probable cause, because law enforcement may still investigate exigent circumstances without drones.

960 (2013) for more information about remote wiping and searches incident to arrest.
177. *Id.* at 2489.
178. *Id.* (citation omitted).
179. *Id.* at 2490 (citing United States v. Jones, 132 S. Ct. 945, 955 (2012) (Sotomayor, J., concurring)).
180. *Id.* at 2493.
IV. THE COURT SHOULD CREATE A NEW FOURTH AMENDMENT TEST FOR DRONE SURVEILLANCE

The Supreme Court should not analyze drone surveillance using the same analysis it has used in other aerial surveillance cases, because drones have greater capabilities than helicopters or airplanes, and at a far lower cost.\textsuperscript{181} Failure by the Court to create new guidelines for the use of drones by police will allow law enforcement unprecedented access to observe private property and individuals without a warrant.\textsuperscript{182} This lack of regulation and oversight risks compromising citizen privacy in a way that is both invasive and unexpected.

The Court should recognize that drones are complex, just as it recognized the unreasonableness of searches of cell phones due to their technological capabilities and capacities.\textsuperscript{183} Like cell phones, drones can capture images\textsuperscript{184} and gain access to intimate areas of an individual’s life. Drones may not have access to a person’s Facebook account or phone contacts the way cell phones do, but they are powerful tools for collecting information about a person’s location, much like a GPS tracker. Justice Sotomayor addressed these privacy concerns about drones and has asserted, “There are drones flying over the air randomly that are recording everything that’s happening on what we consider our private property. That type of technology has to stimulate us to think about what is it that we cherish in privacy and how far we want to protect it and from whom.”\textsuperscript{185}

\begin{flushleft}
\textsuperscript{181} See Barr & Weise, supra note 2; see also Hiltner, supra note 51, at 401 (describing a particular drone with a “high-resolution electro-optic or infrared optic mounted on a turret, and can be upgraded with a quieter engine, improved night vision, and longer flight times”) (citation omitted).
\textsuperscript{182} Talai, supra note 157, at 732 n.9.
\textsuperscript{183} See Riley v. California, 134 S. Ct. 2473, 2489 (2014).
\textsuperscript{184} For example, the Defense Advanced Research Projects Agency (DARPA) has created the ARGUS-IS, a camera with a 1.8-gigapixel resolution to be attached to drones. DARPA’s Big Eye: 1.8-Gigapixel Camera for Air Surveillance, RT (Jan. 29, 2013, 6:26 PM), http://rt.com/usa/surveillance-camera-drone-unmanned-001/. This means it can capture images as small as fifteen centimeters from an altitude of six kilometers. Id.
\textsuperscript{185} Jacob Gershman, Sotomayor: Americans Should be Alarmed by Spread of Drones, WALL ST. J. BLOG (Sept. 12, 2014, 12:07 PM).
\end{flushleft}
Though Kyllo recognized that surveillance technology can amount to a Fourth Amendment search, the opinion emphasized that heat sensory devices were not available to the public.\textsuperscript{186} Drones are more publicly available and commonplace;\textsuperscript{187} therefore, under Kyllo, drone surveillance would not constitute a Fourth Amendment search. However, widespread availability of drones should not discount the device’s powerful intrusion on individual privacy. A reasonable person does not expect to be under constant surveillance within and outside their home. It is frightening to think that availability and affordability of a high-technological device makes it reasonable for law enforcement to use in gaining access inside the home without a warrant. For that reason, the Court should create a rule for drone surveillance based on the mosaic theory from Justice Sotomayor’s concurrence in \textit{United States v. Jones}. Instead of viewing events in sequence to determine whether a search or seizure occurred, the mosaic theory looks at the totality of the surveillance.\textsuperscript{188} The D.C. Circuit applied this theory when it held that “around-the-clock GPS tracking of a suspect’s movements on public roads for twenty eight days ‘aggregated’ to a search within the meaning of the Fourth Amendment.”\textsuperscript{189} The mosaic approach applies common sense reasoning that people expect law enforcement to surveil their trips on public roads, but do not reasonably expect surveillance to continue for prolonged periods of time.\textsuperscript{190} This theory may help reconcile the issue of searches with electronic devices.

However, “[c]ommentators and jurists have criticized the mosaic theory of the Fourth Amendment as ahistorical, contrary to precedent, unsound in theory, and unworkable in practice.”\textsuperscript{191} Applying the mosaic theory to drones, whether a drone monitoring an individual is a

\textsuperscript{187} See Barr & Weise, \textit{supra} note 2.
\textsuperscript{188} United States v. Maynard, 615 F.3d 544, 555–56, 558 (D.C. Cir. 2010) (footnote omitted).
\textsuperscript{189} Talai, \textit{supra} note 157, at 757.
\textsuperscript{190} \textit{Id.} at 758.
\textsuperscript{191} \textit{Id.} (citing Orin S. Kerr, \textit{The Mosaic Theory of the Fourth Amendment}, 111 MICH. L. REV. 311, 314–15 (2012)).
search depends on the duration of the drone’s surveillance.\textsuperscript{192} Therefore, even though the mosaic theory is a creative and refreshing response to the complex issue of technological surveillance to protect individual privacy, the mosaic theory does not easily create a rule for law enforcement to follow. While the Court has not embraced the mosaic theory as an applicable rule for law enforcement, the Court has emphasized the need to protect individual’s privacy as stated in \textit{Riley v. California}\textsuperscript{193} regarding the search of an arrestee’s cell phone.

As lawmakers in Texas, Oregon, and elsewhere have recognized, if warrantless drone surveillance is \textit{never} permitted, law enforcement will not be able to use drones effectively. The Supreme Court must craft a more practical rubric for law enforcement and consider a concrete timeline for drone operation during an emergency. A reasonable rule might be to allow law enforcement to use drones in exigent circumstances without a warrant for the reasonable amount of time it takes an agent to obtain a warrant based on \textit{probable cause}.\textsuperscript{194} With this rule, law enforcement would be accountable for drone use while also being able to pursue crime immediately during emergencies. If the Court does not move forward and embrace the emerging drone technology, not only will privacy be compromised, law enforcement will be crippled.

V. CONCLUSION

The federal government has been unable to pass drone legislation while states have created drone legislation that defers to law enforcement. This creates a strong risk for police abuse, which

\textsuperscript{192} Talai, \textit{supra} note 157, at 765.

\textsuperscript{193} Riley v. California, 134 S. Ct. 2473 (2014).

\textsuperscript{194} A magistrate judge is available twenty-four hours a day to issue a search warrant. See United States v. Song Ja Cha, 597 F.3d 995, 1005 (9th Cir. 2010) (“In fact, the magistrate judge found that the officers involved should have known that when ‘there is an urgency to obtain a search warrant, a detached magistrate may be located at any hour to approve a warrant application.’”). It is reasonable that forty-eight hours is sufficient time for an agent to draft a warrant supported by probable cause and get a magistrate judge to sign the warrant. See \textit{A Guide To The Federal Magistrate Judge System} for more information on the duties of a magistrate judge. Peter G. McCabe, Esq., \textit{A Guide To The Federal Magistrate Judge System}, Federal Bar Association (Aug. 2014), available at http://www.fedbar.org/PDFs/A-Guide-to-the-Federal-Magistrate-Judge-System.aspx?FT=.pdf.
compromises individual privacy. Aerial surveillance technology precedent and *Kyllo* are not adequate to prevent this abuse and to protect privacy. Thus, despite the problems with the mosaic theory, it is the best option for creating a series of guidelines for drone use in police searches that protect the Fourth Amendment guarantees of privacy.

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* J.D. Candidate 2015, California Western School of Law. I would like to dedicate this comment to my family—I would not be the person I am today without their unwavering love and support. A special thanks to my wonderful boyfriend, Collin Vincent, for his constant love and encouragement. Finally, I would like to thank Professor Roberta Thyfault for her guidance throughout the writing process.