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WARRANTLESS GOVERNMENT DRONE SURVEILLANCE: A CHALLENGE TO THE FOURTH AMENDMENT

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ABSTRACT

The Federal Aviation Administration Modernization and Reform Act of 2012 aims to integrate drones into the United States national airspace by 2015. While the thought of prevalent private and public daily drone use might seem implausible now, the combination of this new legislation and the increasing availability of inexpensive, technologically advanced small drones will make it a reality. From detectaphones to pen registers and most recently, the GPS, the Supreme Court has faced a plethora of unreasonable search challenges to the warrantless use of such sense augmentation devices by law enforcement to collect information. Acting as the privacy safeguard of the Constitution, the Fourth Amendment has been invoked to challenge the warrantless governmental use of this ever-evolving timeline of devices. The gauge of Fourth Amendment protection has been society's view of what is or is not a reasonable expectation of privacy. However, with the voluntary increase in the dissemination of personal, private information society's objective view of reasonable expectations of privacy has become blurred. With the ability to capture high-resolution images and video, sustain mass surveillance, and long-term data retention, the drone presents one of the greatest challenges to society's privacy expectations under the Fourth Amendment.

As the drone is poised to become the newest in a long line of surveillance tools available to law enforcement, an important inquiry is whether such use will require a warrant. This Comment will analyze

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United States Supreme Court case law concerning various surveillance devices challenged under the Fourth Amendment and argue for several approaches to be taken to ensure the protection of privacy rights without needlessly hindering government use of a potentially important investigative device.

INTRODUCTION

On February 4, 2010 Joseph McStay, his wife, Summer, and their two sons went missing from their home in Fallbrook, California.[1] Police and family were puzzled over their disappearance because the McStay family left behind their family dogs, recently purchased food, and untouched bank accounts.[2] The family's SUV was found abandoned close to the Mexican border, almost eighty miles from their Fallbrook home.[3] On February 26, 2010 Texas EquuSearch[4] joined the search for the missing family and brought special equipment that investigators did not have at their disposal: a radio-controlled drone.[5] The drone was used to search forty miles of an isolated highway between the McStay's home and the location of their abandoned SUV.[6] The drone, by providing precise aerial images in a fraction of the time of a ground search, proved to be a significant aid in the search for the McStay family.[7] The drone relayed digital images of the forty-mile expanse and the

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1. *Drones Aid in Search for Missing Family*, SAN DIEGO NEWS (Feb. 25. 2010), http://www.10news.com/news/drones-aid-in-search-for-missing-family.

2. Kristina Davis, *McStay Family Disappearance Remains Mystery*, U-T SAN DIEGO NEWS (Aug. 4, 2010), http://www.utsandiego.com/news/2010/aug/04/mcstay-family-disappearance-remains-mystery/.

3. On February 8, the family's SUV was found abandoned near the Mexican border in San Ysidro, California. *Id.*; *Drones Aid in Search for Missing Family*, *supra* note 1.

4. *See generally Mission Statement*, TEXAS EQUUSEARCH, http://texasequusearch.org/mission-statement/ (last visited Dec. 17, 2013); *About TES*, TEXAS EQUUSEARCH, http://texasequusearch.org/category/about/ (last visited Dec. 17, 2013) (formed in 2000, Texas EquuSearch is a non-profit, all-volunteer search and rescue organization based in Dickinson Texas. Texas EquuSearch assists law enforcement in searching for missing persons by searching areas on foot, by horse, aircraft, and now even by drone); *Report a Person Missing*, TEXAS EQUUSEARCH, http://texasequusearch.org/report-a-person-missing/ (last visited Dec. 17, 2013) (stating that an individual can request help from Texas EquuSearch but only if a formal missing person complaint has been filed with law enforcement and with consent of the law enforcement agency investigating the missing person case).

5. *Drones Aid in Search for Missing Family*, *supra* note 1.

6. Emily Friedman, *Three Weeks Later, Still No Sign of California's McStay Family,* ABC NEWS (Feb. 26, 2010), http://abcnews.go.com/TheLaw/mcstay-family-missing-calfornia-weeks/story?id=9957171.

7. *Drones Aid in Search for Missing Family*, *supra* note 1 (stating that one search with a drone can "take the place of a hundred ground searches" and the drone could "search every inch of a 15-mile area in a matter of minutes."). Additionally, the drone is able to detect footprints and clothing that might not be visible from human aerial observation in a helicopter or plane. Friedman, *supra* note 6.

corresponding GPS data to the search team.[8] When the drone operator observed an object, the search team on the ground would be directed to that specific GPS location rather than scanning the entire area.[9]

Four months later and 2,000 miles away, the Nelson County Sheriff in North Dakota attempted to execute a search warrant on the Brossart family to search their farm for six missing cows.[10] Three members of the family armed with rifles subsequently chased the Sheriff off the property.[11] The Sheriff then called in back up – an unarmed Predator B drone.[12] The drone observed the Brossart's 3,000-acre farm for four hours at an altitude of two miles. Live video and thermal images of two of the Brossart sons and their mother were relayed to officers parked on a nearby road.[13] From these thermal images officers were able to observe where the suspects were located on the farm and moved in to arrest them when the suspects were observed to be unarmed.[14]

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8. *Drones Aid in Search for Missing Family*, *supra* note 1.

9. *Id.*

10. Clay Dillow, *For the First Time, Predator Drones Participate in Civilian Arrests on U.S. Soil*, POPULAR SCIENCE (Dec. 12, 2011), http://www.popsci.com/technology/article/2011-12/first-us-citizens-have-been-arrested-help-predator-drone.

11. *Id.* The six members of the Brossart family were allegedly a part of the Sovereign Citizen Movement, an antigovernment group that the F.B.I. categorizes as a violent extremist group. The family also had previous clashes with the local police. Brian Bennett, *Predator Drone Spy Planes Used in Civilian Arrests*, STARS AND STRIPES (Dec. 11, 2011), http://www.stripes.com/news/us/predator-drone-spy-planes-used-in-civilian-arrests-1.163154.

12. The Predator B drone is the most commonly used drone by the American military. The Predator B drone is a large drone, looking similar to a military plane and can hover at an altitude of 25,000 feet for up to forty hours. The Predator B is equipped with an infrared and a regular camera that employ license plate recognition capabilities. One of its tasks in modern warfare has been on "hunter-killer" missions in which the Predator B is armed and sent to search and destroy specified targets. *See generally Predator B UAS*, GENERAL ATOMICS AERONAUTICAL, http://www.ga-asi.com/products/aircraft/predator_b.php (last visited Dec. 17, 2013); Jonathan Skillings, *Hunter-killer Drone Hits Afghan Target*, CNET (Oct. 30, 2007), http://news.cnet.com/8301-10784_3-9807416-7.html.

The Predator B drone used to search the Brossart farm belonged to the nearby unit of the U.S. Customs and Border Protection and was returning from a 10-hour patrol of the Canadian-U.S. border when the Sheriff called for assistance. U.S. Customs and Border Protection currently operate ten Predator drones on the Canadian and Mexican borders in the United States and have employed the use of unarmed drones since 2005. Bennett, *supra* note 11.

13. During the four-hour observation, the suspects remained armed and the officers decided to withdraw. The Predator B drone was sent out again the next day for about three hours until officers were able to determine using thermal images from the drone that the suspects were unarmed and ordered the SWAT team to make the arrests. These images were viewed from a live feed on a government, password-protected website. Bennett, *supra* note 11.

14. Brian Bennett, *Police Employ Predator Drone Spy Planes on Home Front*, L.A. TIMES (Dec. 10, 2011), http://articles.latimes.com/2011/dec/10/nation/la-na-drone-arrest-20111211.

The arrest of the Brossart family members became the first arrest of U.S. citizens with the aid of a drone.[15]

The above two above cases illustrate how drones will be used routinely throughout the United States. The Federal Aviation Administration ("FAA") Modernization and Reform Act of 2012 directs the FAA to safely integrate public and private drone use into the national airspace by 2015.[16] The image of drones flying above a city and monitoring the daily movements of its citizens may seem absurdly futuristic but cities across the United States have been increasing the amount of law enforcement surveillance.[17] The New York Police Department operates a data system that utilizes video cameras, radiation detectors, and license plate readers throughout New York City.[18] This highly sophisticated system can alert law enforcement to the presence of unattended packages in buildings and quickly locate a suspect vehicle through access to over 100 license plate readers on city streets, bridges, tunnels and law enforcement vehicles.[19] Additionally, a number of cities have begun to outfit their patrol forces with body cameras to record audio and video of police interactions with civilians.[20]

The increase in government surveillance comes at a time when gun-related officer deaths have increased while a large portion of law

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15. *Id.*

16. Bill Summary & Status H.R. 658, LIBRARY OF CONGRESS, *available at* http://thomas.loc.gov/cgi-bin/bdquery/z?d112:HR00658:@@@R (last visited Dec. 17, 2013).

17. For example, the City Marshal's office in Fort Worth Texas controls 469 cameras, the Transportation Department has thirteen traffic cameras, and the Public Works Department controls twenty cameras throughout the city. Bill Hanna, *DFW Authorities Increasingly Using Surveillance Tech*, STAR-TELEGRAM (Apr. 21, 2012), http://www.star-telegram.com/2012/04/20/3901072/dfw-authorities-increasingly-using.html. Atlanta operates a "video integration center" linking police to 100 cameras across downtown Atlanta. Jeremiah McWilliams, *Atlanta Increases Surveillance of City*, ATLANTA JOURNAL CONSTITUTION (Sept. 19, 2011), http://www.ajc.com/news/news/local/atlanta-increases-surveillance-of-city/nQLxT/.

18. The system uses technology developed by Microsoft and is called the "Domain Awareness System." The system is available to law enforcement worldwide. Elinor Mills, *Surveillance City? Microsoft, NYPD Team on Crime Fight System*, CNET (Aug. 8, 2012), http://news.cnet.com/8301-1009_3-57489636-83/surveillance-city-microsoft-nypd-team-on-crime-fight-system/.

19. *Id.*

20. *See generally* Caroline Lowe, *Burnsville Police First to Use Body Cameras*, CBS MINNESOTA (Mar. 2, 2011), http://minnesota.cbslocal.com/2011/03/02/burnsville-police-first-to-use-body-cameras/; *Denver Police To Pilot Body Cameras*, HUFFINGTON POST (Oct. 26, 2011), http://www.huffingtonpost.com/2011/10/26/denver-police-to-pilotbo_n_1033287.html. A manufacturer of law enforcement body cameras, Vievu, reported that it has sent their cameras to over 1,100 law enforcement agencies nationwide. Erica Goode, *Video, a New Tool for the Police, Poses New Legal Issues, Too*, N.Y. TIMES (Oct. 11, 2011), http://www.nytimes.com/2011/10/12/us/police-using-body-mounted-video-cameras.html?pagewanted=all.

enforcement budgets have decreased.[21] Citywide, integrated video surveillance systems and officer body cameras can potentially provide a cost-effective increase in the safety of both officers and civilians.[22] Governmental drone use builds upon these advantages, but due to their mobility the number of scenarios where law enforcement will employ drones is greater than that of other surveillance devices such as integrated video surveillance systems or officer body cameras.[23]

The two above cases illustrate how the assistance of drones is an important tool for law enforcement in differing scenarios. In a missing person case such as the *McStay* case, the largest amount of area has to be searched within the smallest amount of time and this is exactly what the drone provided to the search team.[24] In North Dakota the drone aided law enforcement officers to end a potentially dangerous standoff situation without firing a single shot.[25] However, there is apprehension in the use of domestic drones due to several safety[26] and privacy

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21. The number of fatal shootings of police officers went from forty-nine in 2009 to fifty-nine in 2010 and at the mid-point of 2011, forty officers had been killed by shootings as opposed to thirty at the mid-point of 2010. Out of 608 police departments surveyed, seventy percent reported that there had been budget cuts in training. Kevin Johnson, *Fatal Shootings of Police Officers are on the Rise*, USA TODAY (July 21, 2011), http://www.usatoday.com/news/nation/2011-07-20-police-shooting-deaths-gunfire-ambushes-budget-cuts_n.htm; s*ee also* OFFICE OF COMMUNITY ORIENTED POLICING SERVICES, U.S. DEP'T OF JUSTICE, THE IMPACT OF THE ECONOMIC DOWNTURN ON AMERICAN POLICE AGENCIES (2011), *available at* http://cops.usdoj.gov/Publications/e1 01113406_Economic%20Impact%20Publication%20vFIN_19APR12.pdf (information on the nationwide budget cuts of law enforcement agencies and the relation to the crime rate); Chip Johnson, *Officer-involved Shootings a Trend Nationwide*, SAN FRANCISCO CHRONICLE (Aug. 9, 2012), http://www.sfgate.com/bayarea/johnson/article/Officer-involved-shootings-a-trendnationwide-3619254.php.

22. City-wide surveillance could let police track a suspect for blocks after a crime has occurred, warn officers of potentially harmful situations, alert officers to the presence of unattended packages, and put criminals on notice of being on camera across a city. *See generally* Lowe, *supra* note 20; *Denver Police to Pilot Body Cameras*, *supra* note 20; Goode, *supra* note 20; Mills, *supra* note 18.

23. Draganfly's "Draganflyer X4" helicopter drone advertises several uses for law enforcement including surveillance, evidence gathering at a crime scene, and investigation of traffic accidents. *Government Applications*, DRAGANFLY INNOVATIONS, INC., http://www.draganfly.com/uav-helicopter/draganflyer-x4/applications/government.php (last visited Dec. 19, 2013). Similarly, AeroVironment's "Qube" drone promotes law enforcement uses for searching for missing persons, hostage situations, fire-fighting, and disaster response. *Qube: Public Safety Small UAS,* AEROVIRONMENT, http://www.avinc.com/uas/small_uas/qube/ (last visited Dec. 19, 2013).

24. One drone search can "take the place of hundred ground searches" and the drone's cameras can pick up minute details such as footprints that even ground searchers might miss. *Drones Aid in Search for Missing Family, supra* note 1.

25. Bennett, *supra* note 11.

26. Researchers at the University of Texas were able to hack a drone and give it false GPS instructions. This presents a potential for in-air collisions with other aircraft or terrorist attacks. Michael Harper, *Hackable Drones Worry Government Agencies*, RED ORBIT (July 20, 2012), http://www.redorbit.com/news/technology/1112660569/hackable-

concerns.[27] For example, in the North Dakota case, it was revealed that there had been "at least two dozen drone surveillance flights since June" by local law enforcement.[28] What has not been disclosed is whether the drone captured images of the private activities of various North Dakota residents while en route to the Brossart's home.

The Fourth Amendment prohibits the invasion of an individual's privacy by forbidding warrantless searches and seizures of an individual and of their effects.[29] The advancement of technology has created new investigative tools for law enforcement but these advancements have corresponded with constitutionality challenges under the Fourth Amendment.[30] The Supreme Court has analyzed Fourth Amendment challenges to governmental aerial surveillance,[31] listening devices,[32] tracking devices,[33] and even a thermal imaging device.[34] Generally, the Supreme Court has ruled that warrantless governmental aerial surveillance is permitted[35] while use of a thermal imaging device[36] and tracking devices[37] to obtain information regarding the activities of an individual's home requires a warrant. Since drone technology gives law enforcement officers aerial surveillance equipped with thermal imaging, license plate recognition, and GPS technology, the question

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drones-worry-government-agencies/. A forty-four foot Navy drone crashed in Maryland. Spencer Ackerman, *Navy Loses Giant Drone in Maryland Crash*, WIRED (June 11, 2012), http://www.wired.com/dangerroom/2012/06/bams-crash/.

27. The ACLU has stated numerous concerns over civilians' privacy being invaded by constant drone surveillance such as chilling free speech, discriminatory profiling, and leaking of data or videos taken by law enforcement. Catherine Crump & Jay Stanley, *Protecting Privacy from Aerial Surveillance,* ACLU (Dec. 2011), https://www.aclu.org/files/assets/protectingprivacyfromaerialsurveillance.pdf.

28. Bennett, *supra* note 14.

29. U.S. CONST. amend. IV.

30. Olmstead v. United States, 277 U.S. 438 (1928) (wiretapping); Goldman v. United States, 316 U.S. 129 (1942) (detectaphone); Silverman v. United States, 365 U.S. 505 (1961) (spike mike); Smith v. Maryland, 442 U.S. 735 (1979) (pen register); United States v. Knotts, 460 U.S. 276 (1983) (beeper); United States v. Jones, 132 S. Ct. 945 (2012) (GPS).

31. California v. Ciraolo, 476 U.S. 207, 207 (1986); Florida v. Riley, 488 U.S. 445, 445 (1989).

32. *See generally* Katz v. United States, 389 U.S. 347 (1967) (listening device); *Goldman*, 277 U.S. at 129 (detectaphone); *Silverman*, 365 U.S. at 505 (spike mike).

33. *Smith*, 442 U.S. at 735 (pen register); *Knotts*, 460 U.S. at 276 (beeper); *Jones*, 132 S. Ct. at 945 (GPS).

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

35. *Riley*, 488 U.S. at 448; *Ciraolo*, 476 U.S. at 207; Dow Chem. Co. v. United States, 476 U.S. 227, 277 (1986).

36. *Kyllo*, 533 U.S. at 27.

37. United States v. Karo, 468 U.S. 705, 705 (1984); United States v. Jones, 132 S. Ct. 945, 945 (2012) (GPS).

becomes whether the Fourth Amendment permits warrantless governmental drone use.[38]

This Comment will examine previous Supreme Court cases on various surveillance techniques and how these holdings will impact the projected widespread use of drone technology in the United States. Part I will provide an overview of drone capabilities and the current FAA regulations on drones. Part II will give an overview of the Supreme Court's case law regarding various forms of government-employed surveillance as challenged under the Fourth Amendment. Part III will discuss how this case law will affect the proposed widespread use of unmanned aircraft within the United States. Finally, Part IV will discuss the changes that need to be made in the Supreme Court's Fourth Amendment analysis in order to adequately protect privacy interests without unduly burdening law enforcement.

BACKGROUND

PART I: DRONES AND THE FEDERAL AVIATION ADMINISTRATION

The term "drone" conjures up many thoughts from an unmanned lethal military weapon to a futuristic Orwellian spying device.[39] So what exactly is a drone? The FAA defines an unmanned aircraft as "a device that is used, or is intended to be used, for flight in the air with no onboard pilot."[40] Commercially, there are several terms used, including unmanned aerial vehicle ("UAV"), unmanned aircraft system ("UAS"), and the more commonly used term of "drone."[41] For the purposes of this Comment, the term "drone" will be used to denote unmanned aircraft.

Drones come in a wide array of sizes, weights, and technology.[42] Larger drones, such as the Predator B drones, resemble commercial planes and can stay in the air for over thirty hours.[43] Possibly the smallest drones in development are nano air vehicles ("NAVs").

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38. Harry Geiger, *The Drones Are Coming*, CENTER FOR DEMOCRACY & TECHNOLOGY (Dec. 21, 2011), https://www.cdt.org/blogs/harley-geiger/2112drones-are-coming.

39. George Orwell wrote the classic book "1984" envisioning a future of a "big brother" government watching one's every move. *See generally George Orwell,* THE BIOGRAPHY CHANNEL, http://www.biography.com/people/george-orwell-9429833?page=1 (last visited Dec. 18, 2013).

40. Nicholas Sabatini, *Unmanned Aircraft Operations in the National Airspace System*, FEDERAL AVIATION ADMINISTRATION (Feb. 6, 2007), http://www.faa.gov/about/initiatives/uas/reg/media/frnotice_uas.pdf.

41. *Drones Moving From War Zones to the Home Front*, NPR TALK OF THE NATION (Apr. 17, 2012).

42. *See generally*, Crump & Stanley, *supra* note 27.

43. *Id.*

An example of a NAV is AeroVironment's "Hummingbird" which as its name suggests looks like a robotic hummingbird.[44] The Hummingbird has a wingspan of 6.5 inches and weighs less than an AA battery.[45] Despite its small size, the Hummingbird still packs a communications system, versatile mobility, and a video camera.[46] Smaller drones such as the Qube and Micro-Air Vehicles ("MAVs")[47] are estimated to be the most sought after type of drone in both the public and private sector.[48] Compared to larger drones, smaller drones are relatively inexpensive to purchase and maintain,[49] easy to transport,[50] and possess comparable technology.[51] Most small drones can be controlled through a smartphone, tablet, or laptop computer making these drones relatively easy to operate.[52] The live video from the drone is streamed right to the user's smartphone or other electronic device.[53]

The United States is not the only country to recognize the potential of drones and multiple counties now use the small unmanned

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44. For a video of the "Hummingbird" in flight, see Jason Paur, *Hummingbird Drone Does Loop-de-Loop*, WIRED (Feb. 8 2011), http://www.wired.com/dangerroom/2011/02/video-hummingbird-drone-can-perform-loops/.

45. W.J. Hennigan, *It's a Bird! It's a Spy! It's Both*, L.A. TIMES (Feb. 17, 2011), http://articles.latimes.com/2011/feb/17/business/la-fi-hummingbird-drone-20110217.

46. The Hummingbird can hover, fly backwards, and has been able to maintain flight for ten minutes. Paur, *supra* note 44; Hennigan, *supra* note 45.

47. An example of an MAV is the Honeywell T-Hawk. It has been used for detecting roadside bombs in Iraq and Afghanistan, only weighs seventeen pounds and can be transported in a backpack. The drawback of the T-Hawk is that it can only be operated for approximately forty-six minutes up to an altitude of 10,000 feet, which is much less than compared to the larger drones. *T-Hawk Micro Air Vehicle*, HONEYWELL AEROSPACE (July 5, 2012), http://aerospace.honeywell.com/markets/defense/unmanned-systems/2012/07-July/t-hawk; Graham Warwick, *Stop and Look*, AVIATION WEEK (June 14/21, 2010), *available at* http://www51.honeywell.com/aero/common/documents/myaerospacecatalog-documents/Defense_Brochures-documents/Aviation_Week_Eprint.pdf.

As compared to the Predator B UAS which can operate for over thirty hours, up to 50,000 feet and has a wing span of sixty feet. *Predator B UAS*, *supra* note 12.

48. *Drones Aid in Search for Missing Family, supra* note 1.

49. The Parrot AR. Drone can be purchased on Amazon.com for $299.00. The AR. Drone links with an iPhone, iPod, and iPad. Additionally, the AR. Drone permits interaction between other AR. Drone users. The AR. Drone is powered by high-density batteries. *Parrot AR Drone 2.0*, PARROT, http://ardrone2.parrot.com/ (last visited Oct. 7, 2013).

50. Aerovironment's Qube can be transported in the trunk of a car. *Qube: Public Safety Small UAS*, *supra* note 23. The Honeywell T-Hawk can be transported in a backpack. *T-Hawk Micro Air Vehicle*, *supra* note 47.

51. For example, Draganfly's "DraganFlyer X4" possesses thermal infrared cameras and an onboard DVR. This allows the DraganFlyer to locate people, vehicles or other objects in the dark and record the live video. *DraganFlyer X4 Features*, DRAGANFLY INNOVATIONS, INC., http://www.draganfly.com/uav-helicopter/draganflyer-x4/features/flir-camera.php (last visited Oct. 7, 2013).

52. *Parrot AR Drone 2.0, supra* note 49.

53. *Id.*

aircraft in agriculture,[54] scientific research,[55] and industrial maintenance.[56] However, currently the largest use of unmanned aircraft is by the United States military.[57] The United States military has been exponentially utilizing drone technology for various conflicts.[58] Drone use has not been limited to military operations overseas and since 2005 the Customs and Border Protection Agency ("CBP") has used drones for surveillance along both the Mexican and Canadian borders.[59] Unarmed drones have also joined the fight against Mexican drug cartels.[60] The next transition for drone technology will be public use by law enforcement.[61] Drones are increasingly being used in a vast array of civilian and governmental situations.[62] An example of a future law enforcement

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54. In Brazil, drones are being used to survey the growth patterns of soybeans and sugar cane. Paul Marks, *Civilian Drones to Fill the Skies after Law Shake-up*, NEW SCIENTIST (Feb. 4, 2012), http://www.newscientist.com/article/mg21328506.200-civilian-drones-to-fill-the-skies-after-law-shakeup.html#.UeQ0fRNOldg. In Japan, farmers are using small drones to spray crops with pesticides. W.J. Hennigan, *Idea of Civilians Using Drone Aircraft May Soon Fly with FAA*, L.A. TIMES (Nov. 27, 2011), http://articles.latimes.com/2011/nov/27/business/la-fi-drones-for-profit-20111127.

55. Teams from Australia and South Wales used remote controlled helicopter drones to map the progress of the growth of moss beds to determine climate change. The drone technology was needed because satellite imagery was insufficient. Arko Lucieer, *UAV Antarctic Moss Bed Case Study*, ARKO LUCIEER RESEARCH, http://www.lucieer.net/research/uav3.html (last visited Oct. 7, 2013). In Russia, archaeologists used a thirty-eight ounce, twenty-seven inch helicopter drone to create a 3-D model of burial mounds over 2,000 years old. *Tiny Drones Used in Archaeology*, RUSSIAN UNMANNED VEHICLE SYSTEMS ASSOCIATION (Sept. 7, 2011), http://en.ruvsa.com/news/unmanned_systems_development/tiny_drones_used_in_archaeology/.

56. In Germany, small drones are used to inspect the blades of the country's almost 22,000 wind turbines. This alleviates the need for workers to have to climb the turbines and visually inspect the blades. In France, TGV trains travelling at 200 m.p.h. use helicopter drones to film the track in order to find potentially harmful dents. Marks, *supra* note 54.

57. Sabatini, *supra* note 40.

58. From 2005 to 2012, the percentage of military drones grew from five to thirty-one percent. The U.S. military now possesses 7,494 drones. Spencer Ackerman & Noah Shactman, *Almost 1 in 3 U.S. Warplanes Is a Robot*, WIRED (Jan. 9, 2012), http://www.wired.com/dangerroom/2012/01/drone-report/.

59. CBP operates seven Predator B drones along the Mexican and Canadian borders. The drones are remotely operated by pilots in Arizona, North Dakota, and Florida. Crump & Stanley, *supra* note 27.

60. Under an agreement signed by President Obama and the Mexican government, the U.S. is authorized, and has operated, unarmed drones to fly over Mexican territory in an effort to combat the Mexican drug trade. Spencer Ackerman, *U.S. Drones Are Now Sniffing Mexican Drugs*, WIRED (Mar. 16, 2011), http://www.wired.com/dangerroom/2011/03/u-s-drones-are-now-sniffing-mexican-drugs/.

61. For a list of several law enforcement agencies already operating or owning drones, see Crump & Stanley, *supra* note 27.

62. Draganfly's "Draganflyer X4" boasts government, industrial, educational, and professional applications such as using the Draganflyer X4 to take pictures of real estate properties up for sale. *Applications*, DRAGANFLY INNOVATIONS, INC.,

drone is AeroVironment's "Qube," already advertised as "targeting the needs of first responders."[63] Among the highlighted features of the Qube is its size,[64] mobility,[65] and advanced technology.[66] Smaller drones, like the Qube, will cost significantly less than current police helicopters.[67]

In response to the growing interest in domestic drones, a need for the development of regulatory standards has been recognized.[68] Since 1958 the FAA has been charged with ensuring the safe and efficient operation of aircraft in national airspace.[69] Therefore, the FAA will regulate the operation of domestic drones since drones will be flown in the national airspace.[70] Under current FAA policy, unmanned aircraft use is prohibited in the National Airspace System without specific FAA authorization.[71] In light of increasing demand for drones and several safety concerns with drone operation in the national airspace, the FAA published guidelines for operating drones in 2007.[72] These FAA guidelines

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http://www.draganfly.com/uav-helicopter/draganflyer-x4/applications/ (last visited Oct. 7, 2013).

63. *Qube: Public Saftey Small UAS, supra* note 23.

64. *Qube Overview*, AEROVIRONMENT, http://www.avinc.com/downloads/Qubedata sheet.pdf (last visited Dec. 18, 2013) (the Qube is only three feet long and weighs a mere five and one-half pounds).

65. *Id.* The Qube is able to engage in a forty minute flight, has a range of one kilometer or just over half a mile and has a maximum altitude of 500 feet. It also has a "quiet, hover-and-stare capability." *Id.*

66. For example, AeroVironment's "Qube" is operated by a tablet computer in which the operator needs only to use the touchscreen map to direct the Qube. The tablet transmits a live video of the images from the Qube, which is equipped with a high-resolution color camera and a thermal camera. *Id.*

67. The Qube has been estimated to cost around $40,000.00. *Id.* Whereas the Los Angeles County Sheriff's Department reported that it bought twelve new helicopters for $1.7 million each. Hennigan, *supra* note 54. Further, it has been suggested that an increase of camera surveillance might lead to fewer complaints against officers, which would reduce the cost of litigation and officer investigations. Hanna, *supra* note 17.

68. The FAA has estimated as many as 30,000 drones will be in the national airspace within ten years. David Uberti, *Rise of the Machines: Domestic Drones Take Off*, MEDILL NATIONAL SECURITY ZONE (Apr. 3, 2012), http://nationalsecurityzone.org/site/rise-of-the-machines-domestic-drones-take-off/.

69. On August 23, 1958, the Federal Aviation Act was signed into law and the FAA was created. *A Brief History of the FAA*, FEDERAL AVIATION ADMINISTRATION (Feb. 1, 2010), http://www.faa.gov/about/history/brief_history/. The FAA's stated mission is to "provide the safest, most efficient aerospace system in the world." *Mission*, FEDERAL AVIATION ADMINISTRATION (Apr. 23, 2010), http://www.faa.gov/about/mission/.

70. *See generally* Sabatini, *supra* note 40.

71. This authority differs depending on the intended use of the UAV; for public use an operator must be issued a COA; for civil use an operator must be issued a special airworthiness certificate; for model aircraft use an operator is guided by AC 91-57. R. J. Van Vuren, *Advisory Circular 91-57*, FEDERAL AVIATION ADMINISTRATION (June 9, 1981), http://www.faa.gov/documentLibrary/media/Advisory_Circular/91-57.pdf.

72. Sabatini, *supra* note 40.

distinguish between civil and public drone use.[73] For civil drone use to be authorized, the operator must be issued a Special Airworthiness Certificate.[74] The FAA presently only issues a Special Airworthiness Certificate for experimental uses. [75] An operator who has been issued an experimental certificate may not use a drone for "compensation or hire."[76] The FAA denotes law enforcement drone use as "public use."[77] For public operation of a drone, the law enforcement entity must be issued a Certification of Authorization or Waiver ("COA").[78] The COA outlines the limitations on the use of the drone.[79] The operator of the drone must also meet certain FAA requirements.[80]

On February 14, 2012, President Obama signed into law the FAA Modernization and Reform Act of 2012.[81] The Act not only details FAA funding for the next four years but also mandates the FAA to develop guidelines for civil and public unmanned aircraft integration into the national airspace.[82] The Act ultimately requires the FAA to have implemented regulations for public and civilian drone use by December 2015.[83] The Act expressly directs the FAA to permit law enforcement

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73. *Id.*

74. Applicants must describe the design and manufacture of their UAV and demonstrate that it can operate within a designated test area without causing harm to the public. When the certificate is issued to the operator, addition limitations applicable to that particular UAV will be assigned. *Unmanned Aircraft Systems Certifications and Authorizations*, FEDERAL AVIATION ADMINISTRATION (Mar. 19, 2013) http://www.faa.gov/about/initiatives/uas/cert/ [hereinafter *Unmanned Aircraft Systems Certifications*].

75. The FAA lists six purposes for the special airworthiness certificates to be issued in the experimental category: research and development, showing compliance with regulations, crew training, exhibition, air racing and market surveys. *Experimental Category*, FEDERAL AVIATION ADMINISTRATION (June 7, 2011) http://www.faa.gov/aircraft/air_cert/airworthiness_certification/sp_awcert/experiment/.

76. Sabatini, *supra* note 40.

77. *Id.*

78. The COA gives FAA approval for specific drone flight operation. Van Vuren, *supra* 71.

79. *Unmanned Aircraft Systems Certifications*, *supra* note 74; *Aircraft Systems Certifications and Authorizations*, FEDERAL AVIATION ADMINISTRATION (Mar. 19, 2013), http://www.faa.gov/about/initiatives/uas/cert/ (the FAA objective for issuing a COA is to ensure that the drone is operated at the equivalent safety level as manned aircraft. When issued the FAA COA, the public entity is only permitted use with the particular drone, purpose, and area specified in the COA).

80. *Qube: Public Safety Small UAS*, *supra* note 23 (restrictions on operators include medical tests, training requirements and knowledge of FAA regulations and operation of the drone).

81. Bill Summary & Status H.R. 658, LIBRARY OF CONGRESS, *available at* http://thomas.loc.gov/cgibin/bdquery/z?d112:HR00658:@@@R (last visited Apr. 9, 2012).

82. Pub. L. No. 112-95, §331-34, 126 Stat. 77 (2012).

83. The Act gives the FAA several deadlines regarding the integration of governmental and civilian drone use. FAA guidelines for government drone use must be issued by November 10, 2012 and the final regulations must be in place by December 31, 2015. The FAA has been directed to produce recommendations to Congress regarding the operation of civil drone operation by February 14, 2013. By August 14, 2014, the FAA must

operation of unmanned aircraft that weigh less than 4.4 pounds under specified restrictions.[84]

The FAA's stated mission and focus while working to integrate unmanned aircraft into the national airspace is safety.[85] One of the biggest safety concerns over the integration of drones into the national airspace is the absence of a "sense and avoid" capability in most drones.[86] Recent crashes[87] and hacks[88] have also raised safety concerns over the future nationwide use of drones. In response to the Act, the FAA has started making changes to the current unmanned aircraft guidelines.[89] The process for publicly operated drones remains similar to the 2007 process, requiring law enforcement agencies to first apply for a COA.[90] This COA will serve training and evaluation purposes and if the agency can prove to be proficient in flying its drone it will be granted an operational COA.[91]

Along with safety concerns, privacy concerns have also developed over the authorization of governmental domestic drone use.[92]

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publish a final rule permitting the operation of small civilian drones. December 14, 2015 is the deadline for the FAA to implement guidelines for the operation of civilian drones in national airspace. Harley Geiger, *Drone Countdown*, CENTER FOR DEMOCRACY AND TECHNOLOGY (Mar. 27, 2012), https://www.cdt.org/blogs/harley-geiger/2703drone-countdown.

84. The Act mandates authorization of "government public safety" operation of an unmanned aircraft that weighs under 4.4 pounds and meets the following restrictions: the aircraft must be flown within the sightline of the operator, the aircraft can only be flown less than 400 feet from the ground, the aircraft can only be flown during daylight, and the flight must take place more than five miles from an airport. *FAA Makes Progress with UAS Integration*, FEDERAL AVIATION ADMINISTRATION (May 14, 2012), http://www.faa.gov/news/updates/?newsId=68004.

85. *Id.*

86. The sense and avoid capability in aircrafts allows the aircraft to maintain a safe distance from other aircraft and avoid collisions. Pub. L. No. 112-95, §331, 126 Stat. 77 (2012); Russ Niles, *Drone Tests to Expand*, AVWEB (Aug. 28, 2011), http://www.avweb.com/avwebflash/news/Drone_Tests_To_Expand_205285-1.html.

87. In June 2012, a forty-four foot Navy drone crashed into an uninhabited area in Maryland. Ackerman, *supra* note 26. In December 2012, a Mexican drone crashed into an El Paso, Texas private backyard. *Mexican Drone Crashes in South Texas*, CBS NEWS (Dec. 17, 2010), http://www.cbsnews.com/2100-201_162-7159594.html.

88. University of Texas researchers demonstrated the ability to hack and trick a drone into following the hacker's GPS instructions instead of the operator's. This presents a potential for in-air collisions with other aircraft and if the drone is armed can be an even more dangerous situation. Harper, *supra* note 26.

89. The FAA developed an online COA application system in an effort to expedite the process. The length of authorization for a drone flight has been changed from twelve months to twenty-four months. The FAA now operates a new UAS integration office. *FAA Makes Progress with UAS Integration*, *supra* note 84.

90. *Id.*

91. *Id.*

92. Crump & Stanley, *supra* note 27; Pete Kasperowicz, *Sen. Paul Proposes Bill Protecting Americans From Drone Surveillance*, THE HILL (June 13, 2012),

The general privacy concern is that drone use will infringe upon areas protected under the Fourth Amendment, areas in which individuals enjoy a reasonable expectation of privacy.[93] Privacy concerns have already been raised regarding the use of drones for surveillance along the Canadian and Mexican borders. [94] New advances in drone technologies increase such privacy concerns. [95] Many privacy organizations have called for the FAA to include privacy concerns in the new regulations of unmanned aerial vehicles.[96] However, it has also been suggested that the FAA is not properly equipped to create regulations that properly consider individual privacy.[97] There is also concern that knowledge that an individual's daily movements will be under constant surveillance could lead to an overall chilling of First Amendment protected expressions.[98] The American Civil Liberties Union ("ACLU") has also expressed concerns over law enforcement drones being used for mass tracking and surveillance of civilians and the amount of time that images and data collected from drones will be retained.[99]

In response to the several privacy concerns expressed over governmental drone use, state and federal legislation has been proposed.[100]

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http://thehill.com/blogs/hillicon-valley/technology/232489-sen-paul-proposes-bill-protecting-americans-from-drone-surveillance.

93. Crump & Stanley, *supra* note 27.

94. The Predator B drone has the ability to "identify an object the size of a milk carton from an altitude of 60,000 feet." 70-75% of Canadians live within five miles of the U.S. border and millions of Mexicans live within ten miles of the U.S. border. *Posner on the Privacy Implications of Unmanned Aerial Border Surveillance,* 2011 EMERGING ISSUES 6022 (Oct. 21, 2011) [hereinafter *Posner on the Privacy Implications*].

95. Researchers at Progeny Systems Corporation, who have recently won a contract with the United States Army, are working on developing facial recognition technology for drones. Noah Shachtman, *Army Tracking Plan: Drones that Never Forget a Face*, WIRED (Sept. 28, 2011), http://www.wired.com/dangerroom/2011/09/drones-never-forget-a-face/.

A former Air Force contractor and a former Air Force consultant designed and displayed a fourteen pound, six foot UAV named "WASP." It is an autonomous UAV that is capable of posing as a cell phone tower to trick cell phones into connecting with the WASP instead of their phone carriers. This gives the WASP the ability to eavesdrop on an individual's cell phone conversations. Clay Dillow, *A DIY UAV That Hacks Wi-Fi Networks, Cracks Passwords, and Poses As A Cell Phone Tower*, POPULAR SCIENCE (July 29, 2011), http://www.popsci.com/technology/article/2011-07/diy-uav-hacks-wi-fi-networks-cracks-passwords-and-poses-cell-phone-tower.

96. Jay Stanley, *New Eyes in the Sky: Protecting Privacy from Domestic Drone Surveillance*, ACLU (Dec. 15, 2011), http://www.aclu.org/blog/national-security-technology-and-liberty/new-eyes-sky-protecting-privacy-domestic-drone.

97. Benjamin Wittes & John Villasenor, *Drones and the FAA: A Bad Match*, WASH. POST (Apr. 20, 2012) *available at* http://www.highbeam.com/doc/1P2-31196943.html (suggests that to "ask the FAA to take on the role of privacy czar for UAVs would be a mistake").

98. Crump & Stanley, *supra* note 27.

99. *Id.*

100. A bill is being developed by Delegate C. Todd Gilbert (R. Woodstock) and the Virginia ACLU to regulate the use of drones in Virginia. The legislation would ban government drone use unless a search warrant based on probable cause has been obtained or

The common principle among the proposed legislation is the requirement of a warrant for any governmental drone use subject to certain exceptions.[101] Multiple law enforcement agencies have countered the privacy concerns by emphasizing that the real motivation for drone use lies in the life-saving capabilities for officers and civilians.[102] Additionally, there have been self-imposed restrictions and guidelines on governmental drone use.[103]

Unless federal legislation is passed forbidding warrantless governmental drone surveillance, challenges to such use will fall under the purview of the Fourth Amendment.

PART II: THE FOURTH AMENDMENT AND GOVERNMENT SURVEILLANCE

A. The Prohibition of Writs of Assistance: The Fourth Amendment

The Fourth Amendment protects the privacy of individuals in their property and of their person by prohibiting unreasonable searches and

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there is an emergency situation where lives are in danger. The legislation also proposes restrictions on image retention, the requirement of public notice, and independent audits of the drone use. *ACLU of Virginia and Del. Todd Gilbert Propose Legislation to Regulate Unmanned Aerial Drones in Virginia*, ACLU (July 17, 2012), http://www.aclu.org/ national-security/aclu-virginia-and-del-todd-gilbert-propose-legislation-regulate-unmanned-aer ial [hereinafter *ACLU of Virginia*]. H.R. 6199, the Preserving American Privacy Act of 2012 was introduced on July 24, 2012. The Act would not allow state or federal law enforcement to obtain authorization from the FAA to fly a drone in the national airspace without a warrant. This prohibition would not apply to border patrol or applicable warrant exceptions. *H.R. 6199 – Preserving American Privacy Act of 2012*, OPEN CONGRESS, http://www.opencongress.org/bill/112-h6199/show (last visited Dec. 19, 2013) [hereinafter *H.R. 6199 – Preserving American Privacy*]. Senator Rand Paul introduced the Preserving Freedom from Unwarranted Surveillance Act of 2012. The Act prohibits government drone use without a warrant except for border patrol, circumstances where there is imminent danger to life, and terrorist attacks. The Act also gives an individual standing to sue the government for violations and prohibits evidence obtained in violation of the Act from being admissible. *Sen. Paul Introduces Bill to Protect Americans Against Unwarranted Drone Surveillance*, RAND PAUL (June 12, 2012), http://paul.senate.gov/?p=press_rel ease&id=545 [hereinafter *Sen. Paul Introduces Bill*].

101. *See generally ACLU of Virgina*, *supra* note 100; *H.R. 6199 – Preserving American Privacy*, *supra* note 100; *Sen. Paul Introduces Bill*, *supra* note 100.

102. The UAS Operations Manager at the Mesa County Sheriff's Office stated that the two drones that the Office currently uses are employed for search and rescue missions and taking pictures of crime scenes with "probably one percent" of the drone use for surveillance. Similarly, a member of the Miami-Dade Police Department stated that the department's drones are used to provide visual support to police units as in hostage situations. Jillian Rayfield, *One Nation Under The Drone: The Rising Number of UAVs In American Skies*, TALKING POINTS MEMO (Dec. 22, 2011), http://tpmmuckraker.talking pointsmemo.com/2011/12/one_nation_under_the_drone.php.

103. The UAS Operations Manager at the Mesa County Sheriff's Office stated that a warrant is obtained for drone use occurring under 400 feet. *Id.*

seizures.[104] The Fourth Amendment can be broken down into two clauses.[105] The search and seizure clause of the Fourth Amendment provides "the right of the people to be secure in their persons, houses, papers, and effects against unreasonable searches and seizures."[106] The warrant clause of the Fourth Amendment states "no Warrants shall issue but upon probable cause, supported by Oath and affirmation and particularly describing the place to be searched and the persons or things to be seized."[107] The Fourth Amendment was meant to prohibit courts from issuing general warrants or "writs of assistance"[108] instead of providing a specified cause for intruding on a specific individual.[109] The Fourth Amendment mandates three requirements for a warrant to be valid: probable cause,[110] judicial approval[111] and particularity.[112] A search or seizure conducted pursuant to a warrant that fails to conform to any of these three requirements is unconstitutional.[113] Absent exigent circumstances[114] and exemptions,[115] evidence secured in violation of these requirements is generally excluded in an effort to deter illegal

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104. Elkins v. United States, 364 U.S. 206, 222 (1960) (the Constitution does not forbid all searches and seizures, only those that are unreasonable).

105. U.S. CONST. amend. IV.

106. *Id.*

107. *Id.*

108. *The Fourth Amendment*, REVOLUTIONARY WAR AND BEYOND, http://www.revolutionary-war-and-beyond.com/4th-amendment.html (last visited Dec. 19, 2013); Thomas Y. Davis, *How Important Should History Be To Resolving Fourth Amendment Questions, And How Good A Job Does The Supreme Court Do In Constructing History?*, 43 TEX. TECH L. REV. 51, 51 (2010) (writs of assistance were employed by Parliament against the American Colonies in response to a rise in smuggling by colonists. The writs were search warrants allowing a broad search of a property, without notice or a given reason and gave officers the right to question anyone on the premises).

109. *Id.*

110. United States v. Grubbs, 547 U.S. 90, 95 (2006) (probable cause is present when there is a fair probability that evidence will be found in a particular place).

111. *Id.* at 99 (discussing that an impartial judicial officer must review the affidavit asking for a warrant to determine its validity).

112. *Id.* at 98 (stating that particularity requires that the place to be searched and the persons or things to be seized must be described in the warrant).

113. Groh v. Ramirez, 540 U.S. 551, 559 (2004).

114. Kentucky v. King, 131 S.Ct. 1849, 1858 (2011) (stating that warrantless searches are permitted in reasonable exigent circumstances, such as to prevent the destruction of evidence, and the exigent circumstance must not have been created or furthered by police).

115. Whren v. United States, 517 U.S. 806, 812 (1996) (exceptions to the requirement of a warrant and probable cause include the inventory search exemption and the administrative inspection exemption. An inventory search allows a search of property already lawfully seized for the purposes of ensuring it is harmless, securing any valuable items and protecting against false claims of damage. An administrative inspection is an inspection by authorities for regulatory purposes such as an unannounced inspection of a business for safety compliance).

police conduct and uphold judicial integrity.[116] An individual can give his non-coerced consent to a warrantless search under the Fourth Amendment.[117]

In a warrantless search or seizure situation, the inquiry becomes whether the government's intrusion upon an individual's privacy and property is reasonable under the Fourth Amendment.[118] A warrantless search or seizure within an individual's home is presumed unreasonable and therefore in violation of the Fourth Amendment.[119] Generally, a warrantless search or seizure must be within a limited scope and level of intrusiveness.[120] Therefore, a search or seizure can become unreasonable if it goes beyond a reasonable scope or level of intrusiveness even if it was reasonable at its inception.[121]

B. From Property to Privacy: The Evolution of the Fourth Amendment

The advancement of technology has in turn produced more efficient and detailed governmental surveillance. The Supreme Court has been faced with challenges under the Fourth Amendment against warrantless searches involving various modes of surveillance equipment.[122] While early Court decisions turned up whether or not there had been a physical trespass upon an individual, the *Katz* decision altered this perception and developed the standard under which electronic surveillance is analyzed today.[123] This evolution can be best understood by reviewing the timeline of various surveillance tools challenged under the Fourth Amendment.

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116. Terry v. Ohio, 392 U.S. 1, 12 (1968) (stating that excluding evidence acquired by means violating the Fourth Amendment serves principally to discourage "lawless police conduct" and without such an exclusionary effect the only deterrent would be the "mere words" of the Fourth Amendment). *Id.* at 13 (excluding such evidence upholds judicial integrity by prohibiting the use of the fruits of illegal searches and seizures. The admission of evidence in a judicial proceeding has a legitimizing effect on the methods or conduct by which the evidence was procured).

117. Schneckloth v. Bustamonte, 412 U.S. 218, 248 (1973) (consent must be voluntarily given and not the product of coercion or duress from law enforcement). *Id.* at 243 (the conduct of the search must be the same as if the police had obtained a warrant).

118. *Terry*, 392 U.S. at 19.

119. *Groh*, 540 U.S. at 559.

120. *Terry*, 392 U.S. at 19-30.

121. *Id.* (determining that a "stop and frisk" is permitted when limited to the scope of the officer seeking to discover hidden weapons that present a danger to the officer and when limited in intrusiveness to patting down the suspect as opposed to reaching in pockets or under clothing).

122. *See generally* Smith v. Maryland 442 U.S. 735 (1979) (the governmental use of a pen register); Kyllo v. United States, 533 U.S. 27 (2001) (the governmental use of a thermal imaging device); Goldman v. United States, 277 U.S. 129 (1942) (the governmental use of a spike mike).

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

1. *Big Brother is Listening: The Fourth Amendment, Listening Devices, and the Emergence of the Katz Test*

Wiretapping an individual's telephone is one of the first major technological advancements utilized for government surveillance and is challenged as an unreasonable search.[124] Earlier Supreme Court decisions regarding governmental eavesdropping revolved around whether or not there had been some form of a physical intrusion upon the location of the conversations.[125] In some instances, the level of physical intrusion was a matter of "fractions of inches."[126]

In *Olmstead v. United States*, the Supreme Court considered whether the warrantless wiretapping of defendants for five months in both their offices and homes constituted a search under the Fourth Amendment.[127] The Court held that there was no search under the Fourth Amendment as there was no physical search or seizure upon the defendants.[128] The Court stated that the historical purpose of the Fourth Amendment was to prevent forceful searches and seizures of a man's house, property, person, and effects by the government.[129] Therefore, a violation of the Fourth Amendment required a warrantless physical intrusion upon an individual or his home.[130] Since the actual wiretapping of defendants' home and office occurred in public streets, there was no physical intrusion upon the individuals.[131] The Court dismissed the argument that the wiretap had augmented the officers' sense of hearing and held that the evidence was acquired by "the use of sense of hearing and that only."[132]

Similarly, in *Goldman v. United States*, the Supreme Court found no search had occurred when officers listened in on defendant's conversation through the use of a detectaphone[133] in the next room.[134] Without a warrant, officers placed a detectaphone up to the wall adjoining defendant's office and transcribed the overheard conversations.[135]

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124. Olmstead v. United States, 277 U.S. 438, 438 (1928).

125. *See id.* at 466 (stating that the Fourth Amendment requires an actual physical invasion of the person or property); *see also* Silverman v. United States, 365 U.S. 505, 511 (1961) (discussing that the level of physical intrusion does not matter so long as there is an actual, physical intrusion).

126. *Silverman*, 365 U.S. at 512.

127. *Olmstead*, 277 U.S. at 457.

128. *Id.* at 465.

129. *Id.* at 463.

130. Olmstead v. United States, 277 U.S. 438, 464 (1928).

131. *Id.*

132. *Id.*

133. Goldman v. United States, 316 U.S. 129, 132 (1942) (holding that a detectaphone is a listening device employing a receiver with the capability of amplifying sounds through an attached set of earphones).

134. *Id.* at 134.

135. *Id.* at 131-32.

The defendant argued that despite the lack of a physical intrusion into the office, an individual expects that conversations held in his private office will not be subject to outside eavesdropping.[136] The defendant's argument was dismissed; and in accordance with *Olmstead,* the Court held since there was no physical entry upon the defendant's office there was no search under the Fourth Amendment.[137]

In *Silverman v. United States*, the Supreme Court considered whether the warrantless use of a spike mike[138] to listen in on the defendants constituted a search under the Fourth Amendment.[139] Officers believed that the defendants' residence was being used as a gambling headquarters.[140] After officers gained permissible access to an adjacent house, they installed a spike mike to listen to the defendants' conversations next door.[141] The spike mike was inserted under a baseboard and through a gap between the two houses until it contacted a heating duct leading into the defendants' house.[142] Distinguishing *Goldman* and *Olmstead*, the Court held that since there had been a physical intrusion upon the defendants, there was a search under the Fourth Amendment.[143] The Court dismissed the lower court's refusal to find a physical intrusion based on the "fraction of inches" with which the spike mike made contact with the defendants' heating duct and instead held that a physical intrusion, no matter how minor, violated the Fourth Amendment.[144]

The Supreme Court's focus on the element of physical intrusion was altered by the decision in *Katz v. United States*.[145] Officers attached a listening device to the outside of a public telephone booth, which the defendant had been known to use to place gambling bets.[146] Officers used this device to listen to and record the defendant's conversations.[147] The Court rejected the government's argument that since the defendant was in a public phone booth, he willingly exposed his conversations to the public.[148] Instead, the Court stressed that public activi-

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136. *Id.* at 135.
137. *Id.*
138. Silverman v. United States, 365 U.S. 505, 505 (1961) (holding that a spike mike is a microphone with a foot long spike attached and allows listening through the use of headphones).
139. *Id.*
140. *Id.* at 506.
141. *Id.*
142. *Id.* at 507.
143. *Id.* at 511.
144. Silverman v. United States, 365 U.S. 505, 512 (1961).
145. Katz v. United States, 389 U.S. 347, 347 (1967).
146. *Id.* at 348.
147. The defendant was subsequently convicted of violating federal statutes based on the content of his recorded conversations. *Id.*
148. *Id.* at 352.

ties sought to remain private may be protected under the Fourth Amendment.[149] Therefore, by shutting the phone booth door and paying the fee, the defendant was entitled to assume that his conversations inside the phone booth would not be "broadcast to the world."[150] The Court then rejected the argument that without a physical intrusion upon the phone booth there was no search.[151] Instead the Court embraced the notion of a technical trespass, stating that the Fourth Amendment protects "people, not places" so a physical intrusion is not required for the Fourth Amendment to be violated.[152]

The importance of the *Katz* decision rests upon not only the rejection of a physical requirement for Fourth Amendment protection, but also in what has become known as the *Katz* test.[153] In his concurrence, Justice Harlan stated that for a technical, non-physical trespass, the inquiry is first whether an individual has manifested an actual or subjective expectation of privacy and second whether that expectation is one that society is objectively prepared to recognize as reasonable.[154] Thus, in the *Katz* case the defendant manifested a subjective expectation of privacy by shutting the door to the phone booth and paying the fee to make the phone call.[155] Society recognizes an expectation that conversations held in a phone booth will be private and not intruded upon.[156]

Equally important to Fourth Amendment analysis is the differing levels of protection dependent on where law enforcement observations take place.

2. *Curtilage v. Open Fields: Where Fourth Amendment Protection Can Be Asserted*

The highest level of protection the Fourth Amendment affords is in the "sanctity of the home."[157] There is a great level of protection against unwarranted government intrusions within an individual's home.[158] The Fourth Amendment also provides protection for business offices and commercial buildings but to a lesser extent than that of the home.[159] Similarly, the level of Fourth Amendment protection extended

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149. *Id.*
150. *Id.*
151. Katz v. United States, 389 U.S. 347, 353 (1967).
152. *Id.*
153. *Id.* at 361 (Harlan, J., concurring).
154. *Id.*
155. *Id.*
156. *Id.*
157. Oliver v. United States, 466 U.S. 170, 178 (1984).
158. *Id.*
159. *Id.*

to automobiles is not equivalent to the level of protection provided to an individual's home.[160] When reviewing challenges to police observations under the Fourth Amendment the Supreme Court distinguishes between areas within the curtilage of the home and areas covered by the open fields doctrine.[161]

The open fields doctrine originated in 1924, when the Court rejected the defendant's claim that his jug of moonshine had been illegally searched under the Fourth Amendment.[162] The defendant argued that the search violated the Fourth Amendment because the officer searched the defendant's jug without a warrant while the jug was still on his father's land.[163] Justice Holmes stated that the Fourth Amendment protection to people in their "persons, houses, papers, and effects" does not extend to open fields.[164] The Court has subsequently held that there is no constitutional difference between police observations conducted in a public place and observations conducted while standing in the open fields.[165] Therefore, the open fields doctrine allows warrantless observations or surveillance by law enforcement because there is no legitimate expectation of privacy within an area designated an open field.[166]

On the other hand, areas considered to be curtilage of the home are given Fourth Amendment protection.[167] Curtilage is an area in

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160. Rakas v. Illinois, 439 U.S. 128, 148 (1978) (recognizing the Court has an "automobile exception" permitting officers to perform a warrantless search of an individual's car where there is probable cause that the vehicle contains contraband. Under this exception, the officer may lawfully search the entire vehicle including compartments and any containers therein, citing United States v. Ross, 456 U.S. 798, 800 (1982)).

161. Dow Chem. Co. v. United States, 476 U.S. 227, 235 (1986) (areas considered to be part of the curtilage of the home are afforded protection under the Fourth Amendment whereas areas considered to be part of open fields are not).

162. Hester v. United States, 265 U.S. 57, 59 (1924).

163. *Id.* Based on information that Hester was manufacturing moonshine, officers went to his father's house and observed the house from a hundred yards away. *Id*. at 58. During this observation officers saw Hester come out of the home and hand another man a jug. *Id.* The men were alerted to the presence of the officers and started to run. *Id.* While in pursuit Hester dropped the jug and officers examined the broken remains of the jug eventually determining that it had contained moonshine. *Id*.

164. *Id.* at 59. Hester argued that the officers had been on his land; therefore, they trespassing when they searched and seized the evidence of the moonshine. *Id*. at 58. The Court stated that even if there had been a trespass, Hester's acts were committed out in the open and disclosed the jug to the officers. *Id*. The Court then emphasized that the officers did not obtain the evidence by an entry into Hester's house and the Fourth Amendment does not extend to areas outside of the home. *Id*. at 59.

165. Oliver v. United States, 466 U.S. 170, 170 (1984).

166. The term "open fields" can be deceiving. *Id.* at 181. Open fields does not necessarily mean open land or literally a field. *Id*. at 180. Open fields for Fourth Amendment purposes can include undeveloped land such as wooded areas. *Id*.

167. United States v. Dunn, 480 U.S. 294, 300 (1987) (stating that the language of the Fourth Amendment itself denotes protection of the home and so the concept of curtilage extends this protection to areas immediately surrounding the home and areas thought to be associated with the home).

which intimate activities that are associated with the privacy of one's home occur.[168] Such an area is considered part of the home for determination of Fourth Amendment protection.[169] In determining whether the area in question contains such intimate and private activities associated with the home, the Supreme Court looks at several factors including proximity of the disputed area to the home, the nature of the uses within the disputed area, and any steps taken to protect the area from public or private observation.[170] However, Supreme Court precedent shows the determination between curtilage and open fields has been incongruous.[171]

In *Oliver v. United States,* the Court considered two consolidated cases that involved the issue of whether the open fields doctrine permitted officers to enter and search defendant's secluded property without a warrant.[172] In the first case, officers investigated an anonymous tip that the defendant had been growing marijuana on his farm.[173] Without a warrant or probable cause,[174] the officers arrived at the defendant's farm, entered onto property, and came upon a locked gate with a "No Trespassing" sign.[175] Officers followed a footpath for several hundred yards that led around the locked gate and found a field of marijuana on defendant's farm.[176] The field was a relatively secluded area over a mile from defendant's home.[177] The defendant was subsequently arrested and challenged the discovery of the marijuana field as an illegal search of a protected curtilage area.[178] In the second case, officers similarly investigated a tip that the defendants were growing marijuana in the woods located behind his residence.[179] The officers gained access to the wooded area through a path located between the defendants' residence

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168. *Oliver*, 466 U.S. at 180.

169. *Id.* (defining the concept of curtilage as "the area around the home to which the activity of home life extends").

170. *Dunn*, 480 U.S. at 301.

171. Oliver v. United States, 466 U.S. 170, 175 (1984).

172. *Id.* at 170.

173. *Id.* at 174.

174. *Id.* at 173 (discussing that the officers admitted that they did not have a warrant or probable cause to obtain a search, and there were no exceptional circumstances allowing them to enter upon defendant's farm).

175. *Id.*

176. *Id.* at 173-74.

177. Oliver v. United States, 466 U.S. 170, 173-74 (1984).

178. *Id.* at 173 (stating that the District Court agreed and suppressed the evidence while the Court of Appeals for the Sixth Circuit held that the officers were within open fields and reversed the District Court. The District Court held that the defendant had a reasonable expectation of privacy as to the fields, which did not fall within the open fields doctrine. The Sixth Circuit held that the Katz reasonable expectation of privacy test did not conflict with the open fields doctrine as activities that take place within open fields are not subject to an expectation of privacy).

179. *Id.* at 170.

and a neighboring house.[180] The officers came upon two fenced-in areas with "No Trespassing" signs and observed that these areas contained marijuana.[181]

The Supreme Court granted certiorari to decide the appropriate legal standard in determining whether the warrantless searches of the two disputed areas violated the Fourth Amendment.[182] The Court held in both cases that the open fields doctrine was applicable.[183] While the name "open fields doctrine" might imply application literally only to open fields, the Court stated that such an area need not be either open or a field.[184] Therefore, the wooded area surrounding the defendants' residence in the second case fell under the open fields doctrine.[185]

The Court discounted the measures taken by both defendants of posting "No Trespassing" signs, erecting fences around the property, and conducting their activities in secluded areas.[186] These measures may have proven a subjective expectation of privacy, but this expectation was not legitimate for Fourth Amendment protections because society is not prepared to protect any expectation of privacy in open, secluded fields.[187] The Court refused to adopt a case-by-case analysis of whether an open field was subject to a reasonable expectation of privacy.[188] Additionally, the Court dismissed a connection between the defendants' possible claim for trespass for the officer's presence on their property and a claim under the Fourth Amendment.[189] The law of tres-

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180. *Id.*

181. *Id.* (the state trial court suppressed the evidence holding that the open fields doctrine was inapplicable and the state's highest court upheld the suppression of the evidence).

182. *Id.* at 175.

183. Oliver v. United States, 466 U.S. 170, 175 (1984).

184. *Id.* at 180.

185. *Id.*

186. *Id.* at 182 (stating that not only do "No Trespassing" signs not block the public from viewing open fields but also that the Framers could not have intended the Fourth Amendment to protect criminal activity simply because individuals post "No Trespassing" signs and other barriers).

187. *Id.* Open fields are not settings for such intimate activities that the Fourth Amendment is intended to protect from government interference. *Id.* at 179. As such, society has no interest in protecting the activities that occur in open fields such as growing crops. *Id.* Further, usually these fields are open and accessible to the public, defeating any claim to privacy by the owner. *Id.*

188. *Id.* at 181-82 (the Court denying this approach for the following two reasons: (i) a case-by-case analysis would undo the balance between law enforcement needs and interests protected by the Fourth Amendment as it would require officers to make a guess as to whether or not an individual had adequately manifested a reasonable expectation of privacy in an open field before he entered the area; and (ii) most of the areas considered open fields are not in proximity to any area that can be considered part of the curtilage and that in most cases the lines between the home and open fields will be clear and easily understood from "our daily experience").

189. Oliver v. United States, 466 U.S. 170, 183 (1984). The defendants argued that the officers were physically trespassing on their property. The Court dismissed this ar-

pass is broader than that of the Fourth Amendment and protects interests that have no ties to privacy.[190] The defendants' ownership of the land that the officers entered and searched is only one element to be considered in a Fourth Amendment analysis to determine a legitimate reasonable expectation of privacy.[191]

The following year, in *Dow Chemical Company v. United States*, the Supreme Court considered whether warrantless aerial surveillance by government officials of commercial property fell under the open fields doctrine.[192] The Dow Chemical Company ("Dow") maintained a 2,000-acre facility consisting of both covered buildings and exposed manufacturing equipment.[193] The Environmental Protection Agency ("EPA") employed an aerial photographer to take photographs from altitudes of 12,000 to 1,200 feet of the Dow plant for regulatory compliance purposes.[194] The EPA neither informed Dow of this observation nor obtained a search warrant.[195] Dow argued that the observation by the EPA constituted a search under the Fourth Amendment and violated its trade secret protections.[196] The Supreme Court dismissed Dow's trade secret claim and focused on whether the industrial complex constituted curtilage or an open field area.[197] The Court recognized Dow's legitimate expectation of privacy within the buildings but refused to extend this protection to the exposed, outdoor areas of a manufacturing complex because it lacks the presence of any intimate activities such as those associated with one's home.[198] The Court noted, however, if more sophisticated equipment had been used to reveal intimate activities or private conversations, the analysis would be different.[199]

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gument by stating that the existence of a violation of an individual's property right is only one element to consider when determining reasonable privacy expectations. *Id.* Even when the individual has a property interest, there still may be an insufficient or unreasonable expectation of privacy. *Id.*

190. *Id.* at 184.

191. *Id.*

192. Dow Chem. Co. v. United States, 476 U.S. 227, 227 (1985).

193. *Id.* at 231.

194. *Id.* at 232.

195. *Id.*

196. *Id.* (dismissing the trade secret claim stating that the role of the EPA was to regulate and not to compete with Dow and if the EPA were to use the photographs in such a way Dow might have a takings claim under the Fifth Amendment).

197. *Id.*

198. Dow Chem. Co. v. United States, 476 U.S. 227, 236 (1985) (Powell, J., dissenting). The dissent criticized the majority's distinction that while Dow was entitled to protection against physical entry into any of their buildings, there was no protection against warrantless observations from the air. *Id.* at 250 (Powell, J., dissenting). The dissent further questioned the majority's holding that society was not willing to extend an expectation of privacy to an industrial complex arguing that the existence of trade secret protection laws showed society's recognition of a right in industrial privacy. *Id.*

199. *Id.* at 239 (Powell, J., dissenting).

Following *Dow Chemical Co.* the Supreme Court addressed the open fields doctrine once again in *United States v. Dunn*.[200] Federal agents obtained a warrant to place beepers in equipment bought by the defendant in order to track him while he was driving his truck.[201] The trip ended at the defendant's 198-acre ranch.[202] The ranch was surrounded by an outer perimeter fence and several inner barbed wire fences including one around the defendant's home.[203] Two barns were located from his home, the larger of which the defendant closed off by a wooden fence and waist level locked gates.[204] Above the locked gates was an overhang and from the top of the gates to the overhang was fish netting intended to obscure the view into the barn.[205] Without securing a search warrant, the officers crossed the outer perimeter fence, one of the inner barbed wire fences, and the wooden fence in front of the larger barn.[206] The officers smelled chemicals emanating from the barn and heard the sound of a running motor from within the barn.[207] Although they did not enter the barn, they walked under the overhang and shined a flashlight through the netting into the barn.[208] The officers then observed what they believed to be a drug laboratory.[209] The officers left and returned to the ranch twice the next day to confirm that they saw a drug laboratory before obtaining a warrant to seizure the contents of the barn.[210]

The Supreme Court held that the defendant's barn and the area surrounding it were not within the curtilage of defendant's home and focused on four main points.[211] First, the proximity of the immediate barn area was fifty yards from the fence where the officers had first observed the barn and sixty yards from the defendant's home.[212] This was too far of a distance for the barn area to be considered associated with the defendant's home.[213] Second, the separate fences erected between the barn and house manifested a separation between the barn

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200. United States v. Dunn, 480 U.S. 294, 294 (1987).
201. *Id.* at 296.
202. *Id.*
203. *Id.* at 297.
204. *Id.*
205. *Id.*
206. *See* United States v. Dunn, 480 U.S. 294, 297-98 (1987). After entering the premises through the outer perimeter fence, officers crossed over an inner barbed wire fence and first approached the second barn. After only observing empty boxes in the second barn they then crossed another inner barbed wire fence to the second barn. *Id.*
207. *Id.* at 298.
208. *Id.*
209. *Id.*
210. *Id.*
211. *Id.* at 301.
212. United States v. Dunn, 480 U.S. 294, 302 (1987).
213. *Id.*

and the residence.[214] Third, the officers gathered information prior to shining a light into the barn, which allowed them to determine that the barn was not an area defendant used for private activities.[215] Specifically, the officers observed defendant's truck, with the equipment at issue, being backed into the barn, heard a motor running as they approached the barn, and followed the odor of the chemicals to the barn.[216] Finally, the defendant did not take effective measures to protect the disputed barn area from observation of the surrounding open fields.[217]

The defendant argued that he had manifested a reasonable expectation of privacy by erecting several different fences around the barn area.[218] The Supreme Court dismissed this argument and held that the purpose of the fences were functional to the ranch and were not intended to prevent outside observation of the activities within the fenced-in area.[219] While the Court recognized that the defendant's barn itself was a protected area that could not be entered without a search warrant, there was no entry into the barn itself or entry into any structure on the defendant's property.[220] The Court likened the officers shining the flashlight into the barn to previous decisions upholding officers shining a flashlight into the interior of a suspect's car without a warrant.[221] Accordingly, the Court held that the officer's use of the flashlight directed at the netted opening of the barn did not render their observations an illegal search.[222]

Justice Brennan dissented, arguing that the barn was protected curtilage and the defendant had a legitimate expectation of privacy in the contents inside the barn under the *Katz* test.[223] Justice Brennan noted several state and federal cases holding the general rule that a barn is part of the curtilage of a farmhouse in recognition of the im-

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214. *Id.*

215. *Id.*

216. *See id.* at 303 (stating that they had been drawn towards the second barn due to the smell of phenyl acetic acid, the officers noted that the smell became the strongest when they approached the second barn).

217. *Id.*

218. United States v. Dunn, 480 U.S. 294, 303-04 (1987).

219. *See id.* at 303 (stating that the inner barbed wire fences on the defendant's property were "typical ranch" fences used to control livestock. The fences were described as wooden posts with various strings of barbed wire between the posts).

220. *Id.* at 303-04.

221. *Id.* at 305 (citing Texas v. Brown, 460 U.S. 730, 739-40 (1983) and United States v. Lee, 274 U.S. 559, 563 (1927)).

222. *Id.*

223. *Id.* at 306 (Brennan, J., dissenting) (citing Katz v. United States, 389 U.S. 347 (1967). The dissent emphasized that the opening through which officers had shined their flashlight required them to stand immediately in front of the netting and under the barn's overhang as standing even a few feet away would render visibility obscured. Additionally, the defendant's residence was not visible from either the public road or from the outer perimeter fence. *Id.*

portant role barns play in rural life.[224] Justice Brennan also criticized the majority's view on the distance between the barn and the residence,[225] the role of the fences,[226] the importance of the officers smelling the chemicals,[227] and the defendant's ineffective protective measures against observation.[228]

In *Kyllo v. United States*, the Supreme Court rejected the government's argument that the warrantless use of a thermal imaging device was not a search because the device was limited in scope and only detected heat radiations.[229] Acting on a tip that the defendant was growing marijuana in his home, officers pointed the thermal imaging device at the defendant's home in an effort to detect any unusual heat sources inside the home.[230] The Court held that despite the fact that the device was only able to detect heat sources within the defendant's home, those heat sources could identify intimate and private activities that the Fourth Amendment protects.[231] In order to obtain the information that the thermal imaging device relayed, the officers would have had to physically enter the defendant's home without a warrant.[232] The Court noted that while the thermal imaging device at issue was relatively crude, the Court must take into account more sophisticated surveillance devices that were already in use or being developed.[233] Failing to recognize the privacy interests that are violated by the use of heat im-

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224. United States v. Dunn, 480 U.S. 294, 307-08 (1987) (Brennan, J., dissenting).

225. *Id.* at 309 (Brennan, J., dissenting).

226. There was a "well walked" path connecting the barn to the residence and the barn, the residence and other outbuildings were cluster in a clearing together apart from the surrounding wooded area. *Id.*

227. *Id.* at 310-11 (Brennan, J., dissenting). Justice Brennan discounted the majority's emphasis on the officer's smelling the odor of the chemicals and hearing the running motor. Justice Brenan argued that the officers were already in a protected curtilage area between the barns and the farmhouse and the evidence was gathered after an intrusion had occurred and therefore did not justify the intrusion for occurring in the first place. Further, a running motor inside the barn was not conclusive evidence of a non-domestic use. *Id.*

228. *Id.* at 312 (Brennan, J., dissenting). Justice Brennan criticized the majority's view that the defendant did not take adequate measures to protect the barn area from observation by officers standing in open fields. Justice Brennan emphasized that defendant indeed took various protective steps and the Fourth Amendment does not require "the posting of a twenty-four hour guard to preserve an expectation of privacy." *Id.* Specifically, the defendant had locked his driveway, fenced in the barn and covered the barn's front opening with a locked gate and fishnet to obscure visibility. *Id.*

229. Kyllo v. United States, 533 U.S. 27, 36 (2001).

230. *Id.*

231. *Id.* at 38 (stating that by monitoring the heat sources in an individual's home, law enforcement could determine at "what hour each night the lady of the house takes her daily sauna").

232. *Id.* at 40.

233. *Id.* at 36.

aging would leave the door open for more invasive surveillance of an individual's home.[234]

Fourth Amendment protection can vary depending on where the challenged government activity takes place. Warrantless searches are permitted under the open fields doctrine because it stands for the idea that an individual cannot reasonably expect privacy protection for activities conducted outside the home in areas that cannot be considered part of the curtilage of the home.[235] Accordingly, protection against unreasonable search and seizures under the Fourth Amendment can turn on whether the area is deemed to be curtilage or open fields, and as Supreme Court precedent shows, this distinction has not been easily made or uniformly applied.[236]

Since the inception of the *Katz* test, the Supreme Court has applied the *Katz* analysis when faced with forms of electronic or nonphysically intrusive forms of governmental surveillance. As these cases show, the open fields doctrine and the *Katz* test are intertwined and crucial to the determination of the constitutionality of warrantless government drone use.

3. *Big Brother is Watching: Aerial Surveillance and the Fourth Amendment*

Despite differences in the type of aircraft used,[237] altitude,[238] and type of area[239] observed by law enforcement, the Supreme Court did not hold any of these aerial surveillance cases[240] to be a search under the Fourth Amendment.[241] The collection of warrantless governmental aerial surveillance cases exhibit a common application of what is known as the third party doctrine, which stands for the concept that the Fourth Amendment does not provide protection to activities or information that an individual knowingly exposes to the public or a third party.[242] As the

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234. *Id.*

235. Oliver v. United States, 466 U.S. 170, 175 (1984).

236. *Id.* (commenting on the confusion that the open fields doctrine has created in both state and federal courts).

237. *See* California v. Ciraolo, 476 U.S. 207, 207 (1986) (fixed-wing airplane); *see* Florida v. Riley, 488 U.S. 445, 445 (1989) (helicopter).

238. *See Ciraolo*, 476 U.S. at 207 (1,000 feet); *see Riley*, 488 U.S. at 445 (400 feet); *see* Dow Chem. Co. v. United States, 476 U.S. 227, 227 (1986) (12,000 to 1,000 feet).

239. *See Ciraolo*, 476 U.S. at 207 (defendant's backyard); *see Riley*, 488 U.S. at 445 (defendant's green house); *see Dow Chem. Co.*, 476 U.S. at 227 (industrial complex).

240. *See Ciraolo*, 476 U.S. at 207; *see Dow Chem. Co.*, 476 U.S. at 227; *see Riley*, 488 U.S. at 445.

241. *See Ciraolo*, 476 U.S. at 207; *see Dow Chemical Co.*, 476 U.S. at 227; *see Riley*, 488 U.S. at 445.

242. Smith v. Maryland, 442 U.S. 735, 735 (1979) (stating that the Court "consistently has held that a person has no legitimate expectation of privacy in information he voluntarily turns over to third parties"); Katz v. United States, 389 U.S. 347, 351 (1967) (stat-

cases below show, the Supreme Court has consistently applied this concept to warrantless aerial surveillance by law enforcement, holding that activities exposed to the general public flying overhead are not subject to Fourth Amendment protection.[243]

In *California v. Ciraolo*, the Supreme Court considered whether warrantless aerial surveillance of the defendant's backyard from an altitude of 1,000 feet in a fixed-wing airplane constituted an unreasonable search.[244] The defendant erected a 6-foot outer fence and a 10-foot inner fence surrounding his backyard in an effort to block ground-level observations.[245] Without securing a warrant, officers hired a private plane to fly over the defendant's backyard at an altitude of 1,000 feet.[246] Officers were then able to observe marijuana plants growing in the defendant's backyard.[247] The Court agreed that by erecting the fences around his yard, the defendant manifested a subjective expectation of privacy from ground-level observations but he could have no reasonable expectation of privacy from all observations of his yard including those from legal, navigable airspace.[248] Additionally, the Court emphasized that the officers had made naked-eye observations of the defendant's field and had not used any sense-augmenting devices.[249] Therefore, had any member of the public flying in navigable airspace such as the officers were would have been able to observe the defendant's yard and what was growing there.[250]

Three years later the Supreme Court was again faced with low altitude aerial surveillance of an individual's backyard. In *Florida v. Riley*, the Court considered whether governmental surveillance of the defendant's partly enclosed greenhouse at an altitude of 400 feet from a helicopter constituted a search.[251] The defendant lived on five acres of rural land, which included his mobile home and a greenhouse ten to twenty feet behind the mobile home.[252] Officers received an anonymous tip that the defendant had been growing marijuana on his property and

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ing "what a person knowingly exposes to the public, even in his own home or office, is not a subject of Fourth Amendment protection"). This concept has become to be known as the "third party doctrine." *See generally*, Erin Smith Dennis, *A Mosaic Shield: Maynard, the Fourth Amendment, and Privacy Rights in the Digital Age*, 33 CARDOZO L. REV. 737, 737 (2011); Orin S. Kerr, *The Case for the Third-Party Doctrine*, 107 MICH. L. REV. 561, 561 (2009).

243. California v. Ciraolo, 476 U.S. 207, 212 (1986); Florida v. Riley, 488 U.S. 445, 445 (1989).

244. *Ciraolo*, 476 U.S. at 207.

245. *Id.* at 209.

246. *Id.*

247. *Id.*

248. *Id.* at 212.

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

250. *Id.*

251. Florida v. Riley, 488 U.S. 445, 448 (1989).

252. *Id.*

focused on the defendant's greenhouse.[253] The greenhouse was enclosed on only two sides but the defendant had blocked view from the other two sides with trees, shrubs and his mobile home.[254] The greenhouse was also enclosed with a roof but only half of the panels were opaque and some panels were missing.[255] The officer circled over the defendant's property twice from an altitude of 400 feet and made naked eye observations of the marijuana inside the greenhouse through the missing roof panels and unenclosed sides.[256] The Court held that the aerial surveillance was not a search under the Fourth Amendment pursuant to its holding in *Ciraolo* three years prior.[257]

The Supreme Court focused on several factors concerning the manner in which the surveillance was conducted. First, notwithstanding the defendant's protective measures against observation from the ground-level, the sides and roof were viewable from the air.[258] Thus, the defendant could not reasonably expect privacy against private or public observation from above the greenhouse.[259] Second, the helicopter was flying in FAA authorized airspace.[260] The Court dismissed any distinction between the fixed-wing plane in *Ciraolo* and the use of a helicopter.[261] The Court also dismissed any distinction between the difference in altitude of 1,000 feet of the fixed-plane in *Ciraolo* and the 400 feet of the helicopter.[262] Rather the Court emphasized the holding in *Ciraolo* that despite a subjective manifestation of an expectation of priva-

253. *Id.*

254. *Id.*

255. *Id.* Surrounding the defendant's property, including the mobile home and greenhouse, was a wire fence with a posted "Do Not Enter" sign. The officers were unable to see inside the greenhouse from the public road by defendant's property; therefore, they employed the use of a helicopter to fly over the defendant's land. *Id.*

256. *Id.*

257. Florida v. Riley, 488 U.S. 445, 449 (1989).

258. *Id.* at 450.

259. *Id.*

260. *Id.* Helicopters are not subject to lower limits of navigable airspace as fixed-wing aircraft.*Id.* at 452 (O'Connor, J., concurring). Justice O'Connor's concurrence questioned the majority's reliance on FAA regulations in determining whether the aerial surveillance violated the defendant's reasonable expectation of privacy under the Fourth Amendment. *Id.* Justice O'Conner stated that the FAA determines whether particular aircraft can fly at certain altitudes for safety purposes and not in consideration of an individual's privacy. *Id.* at 453 (O'Connor, J., concurring). Therefore, society's reasonable expectation of privacy in regards to aircraft altitude will not be the same as the FAA's. *Id.* Further, Justice O'Connor questioned the majority's comparison between police observations of curtilage from the ground-level to police observations of curtilage from navigable airspace. *Id.* at 454-55 (O'Connor, J., concurring). An individual may take effective protective measures to obscure observations from public roads or sidewalks such as erecting tall fences but conversely, individuals cannot obscure all conceivable views of their backyards from aerial observation without rendering such areas useless. *Id.* at 454 (O'Connor, J., concurring).

261. *Id.* at 450.

262. *Id.*

cy, the officer was entitled to make observations from a "public vantage point where they have a right to be."[263] Had the greenhouse contents been viewable from the road, the officer would have been permitted to make such observations and so likewise, the officer was permitted to make such observations from navigable airspace where he had a legal right to be.[264]

Third, the Supreme Court emphasized that the flight of both private and commercial helicopters is routine across the country and equally the use of helicopters by police is pervasive.[265] The defendant then cannot reasonably believe that his greenhouse would be protected from such observations.[266] The Court noted that the outcome might be different had the helicopter been flying at an altitude prohibited by law or regulation.[267] Finally, there were no intimate activities revealed, nor was there any undue noise, wind, dust, or injury inflicted upon the defendant during the operation of the helicopter.[268] While it was not of any importance that the surveillance had occurred within the curtilage of the defendant's home, the Court stated that not all aerial observation of curtilage will be protected.[269]

Both Justice Powell's dissent in *Ciraolo* and Justice O'Connor's concurrence in *Riley* questioned the majority's holding that the defendants exposed their private activities to aerial observations by law enforcement.[270] Justice Powell emphasized that the police observations invaded the defendant's curtilage and as such, the manner by which the

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263. Florida v. Riley, 488 U.S. 445, 450 (1989).

264. *Id.*

265. *Id.* at 450-51 (noting that police in every state currently employ the use of helicopters and more than 10,000 private and public helicopters were registered in the United States at the time).

266. *Id.*

267. *Id.* at 451.

268. *Id.*

269. Florida v. Riley, 488 U.S. 445, 454-55 (1989) (O'Connor, J., concurring). Justice Brennan distinguished the holding in *Ciraolo* by stating that the altitude of 1,000 feet at which the surveillance occurred in *Ciraolo* was an altitude in which was common for commercial flight as to be compared to a public thoroughfare. *Id.* at 456 (Brennan, J., dissenting). The dissent argued that the vantage point of the officer in the helicopter was not one in which any citizen could easily engage in. *Id.* Further, the surveillance here used expensive and sophisticated equipment that most citizens would not have access to. *Id.* In accord with Justice O'Connor's concurrence, Justice Brennan questioned the majority's reliance on FAA regulations for determining that the officer was at a permitted vantage point and emphasized that FAA regulations prohibit fixed-wing aircraft below 500 feet whereas helicopters are permitted below that level. *Id.* at 458-59 (Brennan, J., dissenting). Such a decision leaves an individual's expectation of privacy reliant on whether the aerial surveillance was made from a helicopter or a fixed-wing plane. *Id.* at 451.

270. California v. Ciraolo, 476 U.S. 207, 216 (1986) (Powell, J., dissenting); *Riley*, 488 U.S. at 452 (O'Connor, J., concurring).

observations occurred should not be material.[271] Justice Powell also discounted that the defendant knowingly exposed the activities in his backyard to the general public in navigable airspace because there is a "qualitative difference" in the observations made by ordinary airplane passengers and law enforcement.[272] While ordinary airplane passengers might look out the window, they are not searching an individual's backyard for evidence of crimes such as law enforcement officers are.[273] Finally, Justice Powell questioned the measures an individual would need to take to adequately protect the activities in areas surrounding the home.[274]

Justice O'Connor's concurrence in *Riley* questioned the majority's reliance on FAA regulations in determining whether the aerial surveillance violated the defendant's reasonable expectation of privacy under the Fourth Amendment.[275] Justice O'Conner stated that the FAA determines whether particular aircraft can fly at certain altitudes for safety purposes and not in consideration of an individual's privacy.[276] Therefore, society's reasonable expectation of privacy in regards to aircraft altitude will not be the same as the FAA's.[277] Justice O'Connor argued that the inquiry post-*Ciroalo* should be whether or not the aircraft is at an altitude at which the public travels regularly and not whether the aircraft is at an altitude permitted by FAA regulations.[278] Therefore, if the public regularly travels at such an altitude, the defendant

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271. *Ciraolo*, 476 U.S. at 216 (Powell, J., dissenting) (arguing that the use of a "product of modern technology," the airplane, invaded the defendant's curtilage and the Katz test protects against such a technical trespass).

272. *Id.* at 224.

273. *Id.* at 225.

274. *Id.* at 224. Justice Powell noted that "few build roofs over their backyards," and the failure to build such adequate barriers should not equate the notion that individuals knowingly expose their activities. *Id.*

275. Florida v. Riley, 488 U.S. 445, 450-54 (1989) (O'Connor, J., concurring). Justice Brennan's dissent echoed Justice O'Connor's concurrence in this aspect. Justice Brennan distinguished the holding in Ciraolo stating that the altitude of 1,000 feet at which the surveillance occurred in Ciraolo was an altitude in which was common for commercial flight as to be compared to a public thoroughfare. *Id*. at 456 (Brennan, J., dissenting). The vantage point of the officer in the helicopter was not one in which any citizen could easily engage in. *Id*. Further, the surveillance here used the expensive and sophisticated equipment that most citizens would not have access to. *Id*. In accord with Justice O'Connor's concurrence, Justice Brennan questioned the majority's reliance on FAA regulations for determining that the officer was at a permitted vantage point and emphasized that FAA regulations prohibit fixed-wing aircraft below 500 feet whereas helicopters are permitted below that level. *Id.*at 458-59 (Brennan, J., dissenting). The dissent argued such a decision leaves an individual's expectation of privacy reliant on whether the aerial surveillance was made from a helicopter or a fixed-wing plane. *Id.* at 451, 454-55 (O'Connor, J., concurring).

276. *Id.* at 450-54 (O'Connor, J., concurring).

277. *Id.*

278. *Id.*

cannot have a reasonable expectation of privacy from such an altitude and should be considered to have knowingly exposed his activities to the public.[279] In accord with Justice Powell's *Ciroalo* dissent, Justice O'Connor questioned the majority's comparison between police observations of curtilage from the ground-level to police observations of curtilage from navigable airspace.[280] An individual may take effective protective measures to obscure observations from public roads or sidewalks such as erecting tall fences, but individuals cannot obscure all conceivable views of their backyards from aerial observation without rendering such areas useless.[281]

In *Dow Chemical Company*, the Supreme Court held that government aerial observations of an industrial complex did not violate the Fourth Amendment.[282] The EPA hired a commercial photographer to take photographs of the Dow complex.[283] Using an airplane equipped with professional mapping cameras, photographs were taken of several buildings, equipment, and piping that was exposed to aerial observation.[284] These photographs were taken at altitudes between 1,000 feet and 12,000 feet.[285] The Court denied that Dow had any reasonable expectation of privacy against aerial observations of the complex.[286] First, the airplane was within legal navigable airspace.[287] Second, the industrial complex was not curtilage but instead fell under the open fields doctrine.[288] The Court stated that "any person with an airplane and aerial camera"[289] could take similar photographs; therefore, Dow could not reasonably expect privacy in the exposed components of its facility.[290]

Justice Powell dissented, questioning the majority's view that Dow had not taken adequate measures to manifest a reasonable expectation of privacy against aerial surveillance of the complex.[291] Justice Powell argued that "short of erecting a roof" over the entire complex, Dow had several security measures[292] in place to adequately protect against

279. *See id.* at 454-55 (O'Connor, J., concurring).
280. Florida v. Riley, 488 U.S. 445, 452-54 (1989) (O'Connor, J., concurring).
281. *Id.* at 450-54 (O'Connor, J., concurring).
282. Dow Chem. Co. v. United States, 476 U.S. 227, 229 (1986).
283. *Id.*
284. *Id.* at 232.
285. *Id.*
286. *Id.* at 239.
287. *Id.*
288. Dow Chem. Co. v. United States, 476 U.S. 227, 239 (1986).
289. *Id.* at 231.
290. *Id.* at 239.
291. *Id.* at 240-41 (Powell, J., dissenting).
292. *Id.* Dow took several measures including surrounding the complex with an eight foot chain link fence, security guards, surveillance cameras monitored by closed-circuit T.V., motion detectors, and a security guard post at the front gate. In terms of aerial observations, Dow informed its employees to report to the company when planes other

ground-level and aerial observations. Since Dow took more than adequate measures to protect against ground-level observations, aerial observations should likewise require a warrant.[293]

Collectively, these cases demonstrate that the Supreme Court has generally disregarded the subjective prong of the *Katz* test and focused almost entirely on the objective prong in analyzing warrantless government aerial surveillance under the Fourth Amendment.

4. *Nowhere to Hide: Tracking Devices and the Fourth Amendment*

The Supreme Court has reviewed several different surveillance devices that monitor and track the movements of a suspect and augment law enforcement's natural observation capabilities.[294] The Supreme Court's analysis of various tracking devices will be particularly indicative of the Court's analysis of warrantless government drone use as a drone's tracking capabilities far exceed that of any device reviewed by the Court to date.

In *Smith v. Maryland*, the Supreme Court held that the warrantless installation and use of a pen register[295] to record phone numbers dialed from the suspect's home phone was not a search under the Fourth Amendment.[296] After being robbed, a woman gave police a description of the robber and a car that had been seen at the scene of the crime.[297] Shortly after the robbery, she began to receive threatening and obscene phone calls from a man claiming to be the robber.[298] Officers observed a car matching the description of the car from the robbery driving around the victim's neighborhood and traced the license plate to the defendant.[299] Officers requested that the phone company install a pen register at the company's offices in an effort to record the numbers dialed from the defendant's home phone.[300] Through the pen register, officers discovered that a phone call was made from the defendant's

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than commercial airliners were flying above the complex. Dow would then relay this information to the police. *Id.* at 241-42 (Powell, J., dissenting).

293. *See id.* at 250-51 (Powell, J., dissenting).

294. *See* United States v. Karo, 468 U.S. 705, 705 (1984) (beeper); *see also* Smith v. Maryland, 442 U.S. 735, 736 (1979) (pen register); *see also* United States v. Jones, 132 S. Ct. 945, 945 (2012) (GPS).

295. *Smith*, 442 U.S. at 735, fn. 1 (a pen register is a device that records on paper all the phone numbers dialed on a specific phone).

296. *Id.* at 735.

297. *Id.* at 737.

298. *Id.* (describing that during one call the man told the woman to step outside onto her porch and after doing so, she observed the same car she had reported at the scene of the robbery drive past her house).

299. *Id.*

300. Smith v. Maryland, 442 U.S. 735, 737 (1979) (stating that the officers had discovered the defendant's address from the license plate of the car that had been seen driving around the victim's neighborhood).

home to the victim's phone.[301] The defendant challenged the warrantless installation of the pen register as a violation of the Fourth Amendment.[302]

The Supreme Court determined first that there was no physical intrusion upon the defendant since the pen register was installed on the telephone company's property with its permission.[303] Next, the Court considered whether the defendant had a reasonable expectation of privacy that the warrantless use of the pen register violated.[304] The scope of information that a pen register can obtain is limited to the phone numbers that are dialed.[305] A pen register cannot listen in on or record a phone conversation and is unable to identify the caller or recipient of the dialed phone numbers.[306] Under the first prong of the *Katz* test, the Court denied that an individual has a reasonable expectation of privacy in telephone numbers that are dialed.[307] Phone users are aware that their phone numbers will be conveyed to the phone company and that the phone company has the ability to record such information.[308] Under the third party doctrine, an individual has no reasonable expectation of privacy in information voluntarily conveyed to third parties.[309] When a phone user dials a phone number, he knowingly exposes the phone number information to the phone company.[310] Therefore, the Court held that society is not prepared to recognize a legitimate expectation of privacy in an individual's telephone numbers.[311]

The Supreme Court next reviewed two cases challenging warrantless government surveillance aided by the use of a beeper.[312] First, in *United States v. Knotts*, the Court analyzed whether the warrantless monitoring of the defendant's movements by the use of a beeper violat-

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301. *Id.* Based partly on the evidence from the pen register, officers obtained a search warrant for the defendant's home. *Id.* The search of his home revealed a phone book with the victim's name indicated and the defendant was arrested. *Id.* The victim subsequently identified the defendant in a line-up as the man who robbed her. *Id.*

302. *Id.* at 737-38.

303. *Id.* at 741.

304. *Id.* at 742.

305. *Id.* at 741.

306. Smith v. Maryland, 442 U.S. 735, 741 (1979).

307. *Id.* at 742.

308. *Id.* at 742-43 (noting that phone users know they reveal their phone numbers to the phone company because it is the phone company's equipment that completes their calls. Further, phone companies keep records of users' phone numbers for purposes of billing for long distance calls and users receive these bills).

309. *Id.* at 743-44.

310. *Id.* at 744.

311. *Id.* at 743.

312. United States v. Knotts, 460 U.S. 276, 277 (1983) (a beeper is a radio transmitting device that sends intermittent signals which are picked by a radio receiver); *see also* United States v. Karo, 468 U.S. 705, 705 (1984).

ed his Fourth Amendment rights.[313] Officers placed a beeper inside a container of chloroform purchased by one of the defendants.[314] The container was placed inside the defendant's car and officers monitored his movements with the beeper signals and visual surveillance.[315] During the surveillance officers lost both visual contact and the beeper signal but were able to pick up the beeper signal with the aid of a law enforcement helicopter in the area.[316] The officers then monitored the signal to the defendant's cabin.[317] Based on the information discovered from the beeper and three days of visual surveillance, officers obtained a search warrant for the defendant's house.[318] The Court held that the beeper surveillance was equivalent to the officers following a vehicle on public streets and an individual has no reasonable expectation of privacy in his movements along public streets.[319] When the defendants chose to travel along public roadways, they voluntarily conveyed their movements and destinations to the public, effectively removing any claim to a reasonable expectation of privacy.[320]

The defendants argued that the officers had impermissibly gained knowledge of the location of the cabin through the monitoring of beeper signals after they had lost visual contact with the vehicle.[321] The Court stated that the Fourth Amendment does not prohibit law enforcement from using sense-augmenting devices in a situation where the information obtained by officers could have been equally obtained by visual surveillance.[322] Although the Court recognized that the officers lost visual contact with the vehicle and therefore could not have located the cabin without the beeper signals, the Court noted that had police not lost visual contact the location of the cabin would still have been discoverable through visual observation.[323] The scope of the beeper signals

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313. *Knotts*, 460 U.S. at 277.

314. *Id.* at 277-78 (stating that officers obtained consent to install the beeper inside the chloroform container from the company where defendant Armstrong purchased the chloroform).

315. *Id.* at 277.

316. *Id.* at 278-79.

317. *Id.* at 279.

318. United States v. Knotts, 460 U.S. 276, 277 (1983).

319. *Id.* at 281 (emphasizing that individuals enjoy a lesser expectation of privacy in their cars since the car's primary function is transportation and does not host intimate activities as does the home).

320. *Id.* at 281-82 (reaffirming that Knotts had an expectation of privacy while inside his cabin but not with respect to the governmental surveillance of automobiles arriving at the cabin and leaving the cabin, or the movement of certain objects (i.e. the container of chloroform outside the cabin in the open fields)).

321. *Id.* at 282.

322. *Id.* at 282-83.

323. *Id.* at 284-85 (emphasizing that once officers had discovered the location of the cabin they no longer relied on the beeper signals for any information).

was limited and officers discovered no information they could not have ascertained through visual surveillance.[324]

The following year in *United States v. Karo*, the Supreme Court considered whether the warrantless monitoring of a beeper by law enforcement that reveals information which could not have been obtained through visual observation violates the Fourth Amendment.[325] The defendant and two other men ordered fifty gallons of ether from a photography company in Albuquerque, New Mexico and the company subsequently contacted police.[326] The officers obtained a search warrant authorizing the installation and monitoring of a beeper in one of the cans of ether and with the consent of the photography company the officers switched one of the company's cans of ether for a law enforcement can holding a beeper inside.[327] Officers visually observed the defendant picking up the ether from the company and proceeded to follow him both visually and with the aid of the beeper.[328] The surveillance lasted several days and through monitoring the beeper, officers followed the can of ether while it was moved four times and eventually arrived at a storage facility.[329] Officers observed the smell of ether from a locker in the storage facility and with the facility's permission installed a closed-circuit video camera inside the locker.[330] The video surveillance of the locker showed two men removing the ether and loading it into a truck owned by Horton, an associate of the defendant's.[331] Through both visual surveillance and monitoring the beeper, the officers tracked Horton's truck to a residence in Taos, New Mexico.[332] After the truck left the res-

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324. United States v. Knotts, 460 U.S. 276, 284-85 (1983).

325. United States v. Karo, 468 U.S. 705, 705 (1984) (considering whether the installation of a beeper in a container of chemicals delivered to a buyer with knowledge of the presence of the beeper constitutes a search or seizure).

326. *Id.* at 708. Ether can be used to extract cocaine from clothing that has been imported into the United States and so the large quantity that Karo purchased aroused police suspicions. *Id.*

327. *Id.*

328. *Id.*

329. *Id.* The monitored can of ether was followed to two different storage facilities. *Id.* The beeper was not technologically advanced enough to locate the precise locker in the storage facility where the ether was. *Id.* Officers obtained a subpoena for the facility's records and found that a locker had been rented by Horton, an associate of Karo. *Id.* Officers verified that the can was in Horton's locker by narrowing down the origin of the beeper signals to the row containing Horton's locker. *Id.* The officers then smelled the ether emanating from Horter's locker and obtained an order allowing them to install a door alarm on the locker, which would alert police when the locker was opened. *Id.* at 709. Horton managed to open the locker and remove the can without setting off the door alarm. *Id.* The officers then continued to track the beeper and followed the trail to another storage facility three days later. *Id.*

330. *Id.*

331. United States v. Karo, 468 U.S. 705, 709 (1984).

332. *Id.* The first stop from the storage facility was to the residence of another associate of Horton and Karo, Rhodes. *Id.* Through visually observing Rhodes' residence, offic-

idence, the officers used the beeper to discover that the ether was still inside the residence and had not been moved again in the truck.[333] A search warrant for the residence was then obtained based in part on the information discovered from monitoring the beeper.[334]

The Court first determined that the installation of the beeper itself in the can of ether did not violate the defendant's Fourth Amendment rights.[335] The Court then considered whether the officers violated the Fourth Amendment by monitoring the beeper while it was inside the Taos residence.[336] The Court held that the warrantless use of an electronic device by law enforcement to obtain information that cannot be gathered from observation outside the home is an unreasonable search under the Fourth Amendment just as if one of the officers had entered the residence without a warrant to confirm the presence of the ether.[337] Although monitoring an electronic device such as a beeper is less intrusive than a physical search, the device still reveals important facts about activities regarding the interior of an individual's home that the government cannot obtain without a warrant.[338] The officers had the ability to discover the Taos residence solely using visual surveillance but they relied on the beeper to verify that the ether was still located inside the residence.[339] The Court distinguished this case from *Knotts* by noting that the beeper in *Knotts* did not convey any information regarding activities inside Knotts' cabin and was limited to information that any member of the public could have observed.[340] The beeper monitoring of the Taos residence indicated that the ether was inside the residence, information that was not subject to general visual observation.[341]

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ers were able to determine that the ether was being moved again. *Id*. Employing both visual and beeper surveillance the officers tracked the ether to the residence in Taos. *Id*.

333. *Id.* at 709-10.

334. *Id.* at 710. Officers had also observed that the windows of the residence were open on a cold, windy day and believed that the ether was being used inside. *Id*. Karo was subsequently indicted for conspiracy to possess cocaine. *Id*.

335. *Id.* at 711 (holding that Karo had no legitimate expectation of privacy in the can of ether since the ether belonged to the photography company who consented to the government invasion of the ether. *Id*. Additionally, the substituted can belonged to the Drug Enforcement Agency and Karo would have no claim of privacy in the can. *Id*. The transfer of the can containing the beeper to Karo created no violation because it did not convey any information that Karo could expect to keep private. *Id*. at 712.

336. *Id.* at 714.

337. United States v. Karo, 468 U.S. 705, 715 (1984).

338. *Id.*

339. *Id.* at 715-18.

340. *Id.*

341. *Id.* Similarly, the Court held that since the beeper only revealed that the ether was in one of the lockers within the storage facility the search of first locker did not violate the Fourth Amendment. *Id*. at 719-20. The beeper did not reveal the contents of the locker and the police officers used their sense of smell to locate the specific locker with the

The most recent examination of a tracking device was in *United States v. Jones* where the Supreme Court held that the warrantless installment and use of a GPS device constituted a search under the Fourth Amendment.[342] Officers suspected the defendant of drug trafficking and obtained a warrant for the installation of a GPS device on the defendant's vehicle.[343] The warrant required that the GPS installation occur within ten days in the District of Columbia.[344] Officers failed to comply with the warrant by installing the GPS on the defendant's vehicle in Maryland eleven days later.[345] The GPS monitoring resulted in over 2,000 pages of data regarding the defendant's movements over twenty-eight days.[346] The defendant filed a motion to suppress the GPS evidence alleging that it was the fruit of an illegal search under the Fourth Amendment.[347] Since the officers failed to comply with the search warrant requirements, the search warrant was rendered invalid and the installment and use of the GPS was a warrantless action.[348] The issue then became whether the warrantless GPS tracking of the defendant's movements constituted a search under the Fourth Amendment.[349]

While the Court found the attachment of the GPS to require a warrant, the focus was not on the *Katz* test of privacy expectations.[350] Instead, the Court placed emphasis on the physical intrusion of the defendant's property – the car – by the installation of the GPS.[351] The Court dismissed the government's argument that there was no reasonable expectation of privacy in the bottom of Jones's car and found that the physical attachment of the GPS rendered an analysis under the

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ether. *Id.* at 720. If the beeper had disclosed the contents of the locker, Horton's expectation of privacy would have been violated. *Id.* at 721.

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

343. *Id.*

344. *Id.*

345. *Id.*

346. *Id.* (using satellites, the GPS relayed the vehicle's location within fifty to 100 feet to a law enforcement cell phone and subsequently to a government computer).

347. *Id.* The defendant was indicted on multiple drug charges including conspiracy to distribute and possess cocaine. The District Court partially granted the defendant's motion and suppressed the GPS data gathered while the defendant's car was parked in a garage attached to his residence. *Id.* at 948. The District Court allowed the remaining GPS data because it was obtained while the defendant was traveling on public roads and he had no reasonable expectation of privacy in this information. *Id.* The United States Court of Appeals for the District of Columbia reversed and found the warrantless use of the GPS to violate the Fourth Amendment. *Id.*

348. United States v. Jones, 132 S. Ct. 945, 945 (2012) (stating that noncompliance with a warrant generally renders the warrant useless; therefore, any subsequent actions are made without a valid search warrant. The government conceded that the officers had not complied with the search warrant here).

349. *Id.* at 948.

350. *Id.*

351. *Id.*

Katz test unnecessary.[352] Where there is a physical intrusion by law enforcement on a constitutionally protected area, a search under the Fourth Amendment has occurred.[353] When the officers installed the GPS device on the defendant's vehicle in violation of the search warrant the defendant's Fourth Amendment rights were subsequently infringed upon.[354]

The Court rejected the government's comparison of the GPS information gathered to information gathered by beepers in *Karo* and *Knotts*.[355] The government argued that the defendant's movements that were tracked by the GPS were mostly on public roads comparable to the movements tracked in *Knotts*.[356] The Court did not discuss whether the defendant's movements along public roads were subject to Fourth Amendment protection but focused on the installation components of the beeper in *Knotts* and *Karo*.[357] In both *Knotts* and *Karo*, the beeper was placed in containers before the defendants took possession of the containers whereas the GPS device was installed on the defendant's vehicle while the defendant was in possession of the vehicle.[358] The Court acknowledged that had the GPS device not physically intruded upon the defendant's protected property, the Fourth Amendment analysis would be conducted under the *Katz* test.[359] The question of whether long-term monitoring of a defendant's movements along public roads without a physical trespass constitutes a search under the Fourth Amendment was reserved.[360]

Both Justice Sotomayor's and Justice Alito's concurrences raised concerns about future invasive governmental surveillance that does not require any physical trespass upon an individual.[361] Justice Sotomayor agreed that the warrantless installation of the GPS device had constituted a search under the Fourth Amendment due to a physical intrusion upon the defendant's property.[362] Justice Sotomayor emphasized, however, that many devices are capable of GPS-like monitoring without requiring a physical installation, such as smartphones with

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352. *Id.* at 950.
353. United States v. Jones, 132 S. Ct. 945, 948 (2012).
354. *Id.*
355. *Id.* at 952.
356. *Id.*
357. *Id.* The government also argued that the defendants' activities were subject to the open fields doctrine and therefore not protected by the Fourth Amendment. *Id.* The Court similarly dismissed this argument and focused on the physical intrusion upon the defendant's vehicle. *Id.* at 953.
358. *Id.* at 952.
359. United States v. Jones, 132 S. Ct. 945, 953 (2012).
360. *Id.*
361. *Id.* at 953-57 (Sotomayor, J., concurring); *Id.* at 957-64 (Alito, J., concurring).
362. *Id.* at 954 (Sotomayor, J., concurring).

GPS capabilities.[363] With such technology, the majority's trespass analysis would be inapplicable.[364] Justice Sotomayor expressed concern over the capability of the *Katz* test to protect the privacy interests that GPS tracking can infringe upon.[365] Even though GPS surveillance only relays an individual's movements along public roads, this information can lead to the discovery of intimate and private information concerning that individual.[366] In comparison to other surveillance methods, GPS tracking information can be recorded for long periods of time, is cheaper and more efficient, and can be accomplished without an individual being alerted.[367] Justice Sotomayor noted that awareness that the government has the ability to track such personal information could chill expression and the capabilities of GPS technology should be taken into account when considering whether society has a reasonable expectation of privacy from such surveillance under the *Katz* test.[368]

Justice Sotomayor also argued that the third party doctrine might need to be reconsidered in recognition of the highly digitalized aspects of daily life.[369] With most business transactions now taking place online, individuals are inevitably submitting private information such as phone numbers, website visits, e-mail address, and sensitive product information.[370] Justice Sotomayor expressed concerns over whether such private information would be protected from the warrantless gathering of such information because with the exposure of such information to third parties, Fourth Amendment protection ceases.[371]

Justice Alito agreed that the warrantless, long-term monitoring of a defendant's movements by the use of a GPS device constitutes a search under the Fourth Amendment.[372] However, Justice Alito argued that the proper analysis was under a reasonable expectation of privacy inquiry and not under a physical trespass inquiry.[373] Justice Alito dis-

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363. *Id.*

364. *Id.*

365. United States v. Jones, 132 S. Ct. 945, 955-56 (2012) (Sotomayor, J., concurring).

366. *Id.* (noting that through the observation of an individual's movements, private details such as an individual's religious beliefs, appointments with a psychiatrist, political meetings or associations, and other such revealing personal information can be discovered).

367. *Id.*

368. *Id.* at 956 (Sotomayor, J., concurring).

369. *Id.* at 957 (Sotomayor, J., concurring). The third party doctrine under the Fourth Amendment provides no protection to information or activities knowingly exposed to third parties or the general public. Katz v. United States, 389 U.S. 347, 351 (1967).

370. United States v. Jones, 132 S. Ct. 945, 956 (2012) (Sotomayor, J., concurring) (stating that for example, individuals expose information regarding books and medication that they purchase over the internet).

371. *Id.* at 956-57 (Sotomayor, J., concurring).

372. *Id.* at 957-58 (Alito, J., concurring).

373. *Id.*

missed that there was any interference with the defendant's property interests in the vehicle because if there was interference with the operation of the defendant's vehicle, the defendant would have been made aware of the installment of the GPS.[374] Additionally, Justice Alito argued that previous cases had established that an individual's property right was only one factor in determining whether legitimate privacy interests exist.[375] Therefore, any physical trespass upon the defendant from the GPS device should only be one factor in considering whether the GPS installation and monitoring violated the defendant's expectation of privacy under the Fourth Amendment.[376]

Similar to Justice Sotomayor's concurrence, Justice Alito argued that the majority's approach is insufficient protection against warrantless government surveillance involving technologically advanced devices, which require no physical intrusion.[377] Justice Alito emphasized that the most invasive aspect of the GPS device is not any physical interference with the vehicle, but the fact that the GPS could monitor an individual for long periods of time.[378] However, Justice Alito concedes that even an analysis under the *Katz* test does not provide adequate protection in light of advancing technology.[379] With the pervasive use of smartphones with GPS abilities or the increasing use of tracking programs in vehicles, what an individual can expect to be private diminishes.[380] Justice Alito also noted that previously due to costs and difficulty, law enforcement could not practically observe and collect the amount of information that new devices such as a GPS now permit.[381] Justice Alito concluded by suggesting that legislation might provide the greatest protection and would be in a better situation to gauge society's changing perceptions.[382]

While a beeper has a limited range of information that it can convey, the Court drew a distinction as to where this information can be

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374. *Id.* Justice Alito noted that being able to install and monitor the defendant's movements with a GPS without altering the defendant to the presence of the device is part of what makes this device successful. *Id.*

375. *Id.* at 957-60 (Alito, J., concurring).

376. United States v. Jones, 132 S. Ct. 945, 957-58 (2012) (Alito, J., concurring).

377. *Id.* at 961 (Alito, J., concurring). Justice Alito questions whether the outcome of the case had been different if law enforcement, without a warrant, monitored the defendant's movements through the use a stolen vehicle detection program already installed in the car. Such a use would require no physical installation or intrusion upon the defendant. *Id.*

378. *Id.*

379. *Id.* at 963 (Alito, J., concurring).

380. *Id.* Justice Alito noted that smartphones with GPS tracking provide the phone user's location and movements to the phone provider. Additionally, social tools on phones allow users to find other users. *Id.* Highway tolls can also provide precise records of an individual's movements. *Id.*

381. *Id.* at 964 (Alito, J., concurring).

382. United States v. Jones, 132 S. Ct. 945, 964 (2012) (Alito, J., concurring).

obtained. Law enforcement may monitor an individual's movements conveyed in public areas without a warrant, but a warrant is required to monitor any beeper information relating to the interior of an individual's home.[383] When analyzing the more advanced GPS device, the Court did not consider the content of the information gathered but rather focused on the installation of the device.[384]

5. *Law Enforcement's Best Friend: Dog Sniffs and Other Non-Electronic Sense Augmentation*

The Supreme Court has considered various surveillance methods that have not employed electronic devices but still provide sense-augmenting aid to law enforcement.[385] Without the presence of an electronic surveillance device, the Court places a greater emphasis on the scope of the information gathered and the level of sense augmentation that the method of surveillance entails.[386] A search that is initially reasonable can become an unreasonable search under the Fourth Amendment through an overly broad scope and an impermissible level of intensity.[387]

In *United States v. Place*, the Supreme Court held that a warrantless dog sniff conducted by a well-trained narcotics dog does not violate the Fourth Amendment.[388] The Court emphasized that although the dog sniff discloses information about the contents of sealed luggage, a dog sniff conducted by a narcotics dog is limited in scope.[389] The dog sniff exposes only contraband items as opposed to the exposure of personal items that would occur if an officer opened the bag and searched through it.[390] This limited exposure does not subject an individual to the same embarrassment or inconvenience of more physically intrusive methods.[391] Justice Brennan argued in his concurrence that use of the

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383. United States v. Karo, 468 U.S. 708, 715-18 (1984).

384. *Jones*, 132 S. Ct. at 948.

385. *See generally* United States v. Place, 462 U.S. 696, 696 (1983) (warrantless dog sniff of luggage); Illinois v. Caballes, 543 U.S. 405, 417 (2005) (warrantless dog sniff during a lawful traffic stop); California v. Greenwood, 486 U.S. 35, 37 (1988) (warrantless search of defendant's garbage).

386. *Place*, 462 U.S. at 696 (discussing that a dog sniff is limited to revealing contraband items); Bond v. United States, 529 U.S. 334, 334 (2000) (holding that a tactile observation of luggage impermissible due to intensive scope).

387. Terry v. Ohio, 392 U.S. 1, 18 (1967).

388. *Place*, 462 U.S. at 696.

389. *Id.* at 707.

390. *Id.* (stating that an individual has no protectable interest in contraband items such as weapons).

391. United States v. Place, 462 U.S. 696, 707 (1983) (calling the method of using a dog sniff "sui generis" in that no other investigative procedure is as limited in the scope and manner of the information obtained).

narcotics dog constituted sense augmentation.[392] Dog sniffs reveal information that officers could not obtain through the use of their own senses.[393] Justice Brennan argued that dog sniffs present an intrusion upon an individual similar to an intrusion by an electronic device.[394]

In *Illinois v. Caballes*, the Supreme Court expanded the application of *Place* and held that a dog sniff conducted during a lawful traffic stop does not violate the Fourth Amendment when the dog sniff only reveals the location of a contraband item.[395] In *Caballes*, the defendant was stopped for speeding on an interstate highway and the state police drug unit arrived at the scene with a narcotics dog.[396] The officer walked the narcotics dog around the defendant's car and the dog alerted the officer to the trunk of the car.[397] Based on the dog's alert, the officers searched the trunk and discovered drugs.[398] The Court again emphasized that a dog sniff is limited in scope by discovering only contraband items to which an individual has no legitimate interest in possessing.[399] Therefore, the Court extended *Place* to lawful traffic stops and held that the use of a well-trained narcotics dog to expose only contraband items does not implicate legitimate privacy interests.[400]

Justice Souter's dissent questioned both the majority holding and the previous *Place* decision that dog sniffs are not searches.[401] Justice Souter categorized the dog sniff as sense augmentation, giving officers information about the contents of a private area that human senses could not similarly obtain.[402] Additionally, Justice Souter argued that the scope of information discovered by a dog sniff is not always limited to contraband items.[403] There can be errors in dog sniffs and, as such, the dog sniff might disclose intimate details about an individual without revealing any contraband items.[404] Justice Souter compared the use of a dog sniff to the thermal imaging device in *Kyllo*.[405] While the thermal imaging device reveals intimate details of the home, a flawed dog

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392. *Id.* at 719-20 (Brennan, J., concurring).
393. *Id.*
394. *Id.*
395. Illinois v. Caballes, 543 U.S. 405, 417 (2005).
396. *Id.* at 406.
397. *Id.*
398. *Id.*
399. *Id.* at 408.
400. *Id.* at 409.
401. Illinois v. Caballes, 543 U.S. 405, 411 (2005) (Souter, J., dissenting).
402. *Id.* at 413 (Souter, J., dissenting).
403. United States v. Place, 462 U.S. 696, 719-20 (1983) (Brennan, J., concurring).
404. *Caballes*, 543 U.S. at 412 (Souter, J., dissenting) (citing to the possibility of dog handler errors and the natural limitations of the dogs themselves).
405. *Id.* at 413 (Souter, J., dissenting).

sniff will reveal intimate, private contents of an individual's luggage or vehicle.[406]

In *California v. Greenwood*, the Supreme Court held that the warrantless search and seizure of garbage bags left on the defendant's curb for trash collection is not a violation of the Fourth Amendment.[407] Officers received a tip that the defendant was selling narcotics out of his home and asked the neighborhood's regular garbage collector to give police the defendant's garbage bags.[408] Officers then searched the defendant's garbage in the bags and discovered evidence indicative of narcotics use.[409] The Court held that the defendant knowingly exposed his garbage to the trash collector and therefore could not have a reasonable expectation of privacy in the contents of his garbage bags.[410] By placing his garbage on the curb in front of his home, the defendant exposed his garbage to the public and officers are not required to turn away from evidence of criminal activity that could be observed by members of the general public.[411]

Justice Brennan argued in his dissent that the defendant exhibited a subjective expectation of privacy.[412] The defendant placed his garbage in sealed opaque bags instead of clear plastic bags in an attempt to conceal the contents of the garbage bags.[413] Additionally, Justice Brennan argued that society is prepared to recognize a legitimate privacy interest in the contents of an individual's garbage.[414] An individual's garbage can contain revealing information about financial, recreational, health, political, and other intimate details of an individual's life.[415] Therefore, most members of society expect a level of privacy in their trash from warrantless government intrusions.[416] Finally, Justice Brennan argued that the defendant had no other option but to leave his trash out on the curb for the garbage collector and therefore did not knowingly expose his garbage.[417]

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406. *Id.*

407. California v. Greenwood, 486 U.S. 35, 37 (1988).

408. *Id.* (police instructed the trash collector to isolate the defendant's garbage so other neighborhood residents' garbage was not mixed up with the defendant's garbage).

409. *Id.* at 38.

410. *Id.* at 39.

411. *Id.* (stating that the garbage was subject to animals, children, scavengers, and other members of the public who wish to open the bags and search through the defendant's trash).

412. *Id.* at 46 (Brennan, J., dissenting).

413. California v. Greenwood, 486 U.S. 35, 46 (1988) (Brennan, J., dissenting).

414. *Id.*

415. *Id.*

416. *Id.* (arguing that the contents of an individual's garbage contain information relating to the intimacies of private life which the Fourth Amendment was designed to protect).

417. *Id.* (discussing that the defendant could not simply leave the trash inside his home and was required by a city ordinance to leave his trash at his curb).

In *Bond v. United States*, the Supreme Court held that a law enforcement officer's tactile observation[418] of a bus passenger's luggage violated the Fourth Amendment.[419] The defendant was a passenger on a Greyhound bus headed to Arkansas.[420] The bus stopped at a checkpoint in Texas where a border patrol agent entered the bus to verify the immigration status of the passengers.[421] After verifying the immigration status of the bus passengers, the border patrol agent then proceeded to squeeze the passengers' luggage placed in the overhead storage compartments.[422] When the agent squeezed the defendant's canvas bag, the agent felt a "brick-like" object and asked the defendant's permission to open the bag.[423] The defendant permitted the agent to open the bag and discovered methamphetamine.[424] The defendant moved to suppress the evidence, arguing that the agent had illegally searched his bag.[425] The government argued that the defendant knowingly exposed his bag when he placed it in the overhead compartment and could not have any reasonable expectation that his bag would not be physically manipulated.[426] The Court dismissed this argument and conceded that, while travelers expect some form of touching and handling of luggage during the course of travel, the agent's physical manipulation of the defendant's bag exceeded this expectation.[427] Although the agent did not conduct an invasive search upon the defendant's person, the agent engaged in a "probing tactile examination" of his luggage, which individuals typically use to carry personal items.[428] Under the *Katz* test, the defendant manifested an expectation of privacy in the contents of his bag by using a green, opaque bag and putting the bag in the overhead compartment directly above his bus seat.[429] This subjective expectation of privacy is one that society is prepared to recognize as reasonable since bus passengers expect other passengers to bump or move their luggage as an incident of travel but do not expect other passengers or bus employees to squeeze their bags in an exploratory manner as the agent did.[430]

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418. Bond v. United States, 529 U.S. 334, 337 (2000) (categorizing the agent's physical manipulation of the defendant's bag as tactile observation and cites a "stop and frisk" as another example of tactile observation).

419. *Id.* at 335.

420. *Id.*

421. *Id.*

422. *Id.*

423. *Id.* at 336.

424. Bond v. United States, 529 U.S. 334, 336 (2000) (the government did not argue that the defendant's consent validated the search or should have been a basis for admitting the evidence).

425. *Id.*

426. *Id.* at 337.

427. *Id.* at 338-39.

428. *Id.* at 337-38.

429. *Id.* at 338.

430. Bond v. United States, 529 U.S. 334, 338-39 (2000).

From a spike mike[431] to a GPS[432], the Supreme Court has reviewed the use of a wide array of government investigative tools under the Fourth Amendment.[433] The key inquiry in these cases is whether or not law enforcement must first obtain a warrant before using these devices to gain information about an individual.[434] The outcomes have differed based on several common principles.[435] This Comment will now look at these principles as applied to the governmental use of drones, ultimately determining if and when law enforcement must obtain a warrant.

ANALYSIS

PART III: GOVERNMENTAL DRONE USE V. THE FOURTH AMENDMENT

The Fourth Amendment protects "the right of the people to be secure in their persons, houses, papers, and effects against unreasonable searches and seizures."[436] If government activity is deemed a "search" under the Fourth Amendment, then that activity requires the use of a warrant.[437] Analysis under the Fourth Amendment began solely as a determination focused on the presence of a physical trespass upon the individual by law enforcement and has evolved into serving as the privacy safeguard of the Constitution.[438] The Supreme Court has faced several Fourth Amendment challenges to the warrantless use of several government-employed surveillance tools.[439] When faced with these challenges, the Court must come to a determination that adequately pro-

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431. Silverman v. United States, 365 U.S. 505, 506 (1961) (a spike mike is a microphone with a foot long spike attached and allows listening through the use of headphones).

432. *See generally* United States v. Jones, 132 S. Ct. 945 (2012).

433. *See generally* Smith v. Maryland, 442 U.S. 735 (1979) (pen register); United States v. Knotts, 460 U.S. 276 (1983) (beeper); California v. Greenwood, 486 U.S. 35 (1988) (search of defendant's garbage); Illinois v. Caballes, 543 U.S. 405 (2005) (dog sniff); Kyllo v. United States, 533 U.S. 27 (2001) (thermal imaging device).

434. *See generally Greenwood*, 486 U.S. at 35; *Bond*, 529 U.S. at 334; *Knotts*, 460 U.S. at 276 (challenges to warrantless searches).

435. Florida v. Riley, 488 U.S. 445, 445 (1989) (knowingly exposed activities); California v. Ciraolo, 476 U.S. 207, 212 (1986) (knowingly exposed activities); Smith v. Maryland, 442 U.S. 735, 735 (1979) (third-party doctrine); Hester v. United States, 265 U.S. 57, 59 (1924) (open fields doctrine).

436. U.S. CONST. amend. IV.

437. Groh v. Ramirez, 540 U.S. 551, 559 (2004).

438. *Compare* Olmstead v. United States, 277 U.S. 438, 438 (1928) (actual physical invasion of the person or property required for a Fourth Amendment violation) *with* Katz v. United States, 389 U.S. 347, 353 (1967) (the Fourth Amendment "protects people, not places").

439. *Smith*, 442 U.S. at 735 (pen register); *Knotts*, 460 U.S. at 276 (beeper); *Greenwood*, 486 U.S. at 35 (search of defendant's garbage); *Caballes*, 543 U.S. at 405 (dog sniff); *Kyllo*, 533 U.S. at 27 (thermal imaging device).

tects individuals' privacy while not unnecessarily removing a vital investigative tool from law enforcement.

Despite the wide range of differences in the type of information obtained and the technology possessed, the Court has developed several principles when analyzing government surveillance. Part Three of this Comment will discuss these common principles applied to government surveillance as reviewed by the Court and how these principles will be applied to warrantless governmental drone surveillance under the Fourth Amendment.

A. The Legal Standard Applicable to Drone Surveillance

The first determination in Fourth Amendment analysis of governmental drone surveillance is which standard the Supreme Court should apply. Early challenges to electronic surveillance under the Fourth Amendment focused exclusively on the element of physical intrusion into a protected area.[440] Therefore, warrantless wiretaps attached to phone wires on a public street did not constitute a search[441] while a spike mike[442] inserted into a defendant's heating duct violated the Fourth Amendment.[443] The Court shifted away from this physical trespass focus in *Katz*. The two-part *Katz* test asks whether an individual exhibited a subjective, reasonable expectation of privacy that society was objectively prepared to accept as reasonable.[444]

However, the Court's most recent decision on governmental surveillance focused once again on the physical trespass aspect despite involving an electronic surveillance device.[445] Contrary to previous electronic surveillance search challenges, the Court in *Jones* began its analysis with the physical intrusion inquiry instead of the two-part *Katz* test.[446] The *Jones* court determined that the warrantless attachment of a GPS device on the suspect's vehicle was an occupation of the suspect's private property for the purpose of obtaining information.[447] This unlawful physical intrusion constituted an unreasonable search under the Fourth Amendment.[448] The Court stopped its analysis there and did not consider whether, under the *Katz* test, the defendant had a

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440. *Olmstead*, 277 U.S. at 438 (actual physical invasion of the person or property required for a Fourth Amendment violation); *accord* Silverman v. United States, 365 U.S. 505, 512 (1961).

441. *Olmstead*, 277 U.S. at 438.

442. *Silverman*, 365 U.S. at 505 (a spike mike is a microphone with a foot long spike attached and allows listening through the use of headphones).

443. *Id.*

444. *Katz*, 389 U.S. at 347.

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

446. *Id.* at 949.

447. *Id.* at 948-50.

448. *Id.*

reasonable expectation of privacy in his vehicular movements along public roads.[449]

Drones possess the ability to quickly be deployed without having to physically attach a device onto a suspect's property.[450] Therefore, analysis of drone surveillance would be under the two-part *Katz* test, asking whether an individual has a reasonable expectation of privacy that society is willing to protect.[451] The case law concerning government surveillance analyzed under the *Katz* test presents several general principles that will be applicable to governmental drone use. These principles are broken into general two categories: location and information.

B. Drones Everywhere? Drones v. Open Fields, Curtilage, and the FAA

A key component in Fourth Amendment challenges to government observation is determining the type of area where the observation occurred. As with previous devices, drone use that occurs within a protected area will require a warrant.[452] Despite the importance of this designation, the analysis has not been distinct or uniform.[453]

1. *Drones and the Open Fields Doctrine*

Applying the express language of the Fourth Amendment, protection to the people in their "persons, houses, papers, and effects," the Supreme Court has held that this protection does not extend to the open fields.[454] The open fields doctrine stands for the idea that an individual cannot reasonably expect privacy protection for activities conducted outside the home in open fields.[455] The open fields doctrine protects warrantless police observations conducted in an open fields area as if the observations were made in a public place.[456] The open fields

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449. *Id.* at 952-57 (it was the government's argument that the defendant did not have any reasonable expectation of privacy in both the under body of the vehicle where the GPS was attached and in the information revealed by the GPS of the defendant's movements along public streets).

450. For example, the Honeywell T-Hawk Micro Air Vehicle (MAV) is able to be carried in a backpack and immediately deployed at any time, in area type of location. Glenn W. Goodman, Jr., *UAVs Hover and Stare*, DEFENSE TECHNOLOGY INTERNATIONAL (July/August 2006).

451. Katz v. United States, 389 U.S. 347, 361 (1967) (Harlan, J., dissenting).

452. Kyllo v. United States, 533 U.S. 27, 27 (2001) (holding that warrantless use of thermal imaging device aimed at the home violates the Fourth Amendment); Oliver v. United States, 466 U.S. 170, 170 (1984) (holding that warrantless search of defendant's fields permitted under the open fields doctrine).

453. *Oliver*, 466 U.S. at 175 (commenting on the confusion that the open fields doctrine has created in both state and federal courts).

454. *Id.*

455. *Id.* at 176.

456. Dow Chem. Co. v. United States, 476 U.S. 227, 303 (1986).

doctrine has been used to validate warrantless observations of businesses[457] and movements along public streets.[458]

The Court has consistently held that an individual has the highest level of protection under the Fourth Amendment in his home.[459] In *Kyllo*, the Court affirmed the strong protection that the Fourth Amendment affords an individual's home.[460] Acting on a tip that defendant was growing marijuana in his house, officers obtained a thermal imaging device and pointed it at the defendant's home.[461] The Court held that using a "sense-enhancing device" that is not available to the general public to obtain intimate details of an individual's home constitutes a presumptively unreasonable search.[462] The Court emphasized that any physical intrusion into the home even by a "fraction of an inch" constitutes an unreasonable search.[463] It was immaterial that the thermal imaging device only showed the level of heat radiating from the defendant's home because when activities inside the home are at issue, the quality or quantity of information obtained is immaterial.[464]

Warrantless use of drones to obtain information about activities occurring within an individual's home will be presumptively unreasonable and therefore unconstitutional under the Fourth Amendment.[465] Drones employ infrared technology, coupled with high-resolution camera technology and live video feeds, and the infrared information far exceeds that of the thermal imaging device in *Kyllo*.[466] There is no doubt that a drone can provide invasive and detailed information about the intimate activities occurring within an individual's home.[467] The Court in *Kyllo* noted that the thermal imaging device was "not available to the general public."[468] Drones are currently available to the general public

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457. *Id.* at 227 (holding that aerial surveillance of the Dow Chemical complex is not a search as businesses generally do not enjoy the same level of privacy expectation as individuals).

458. Knotts v. United States, 460 U.S. 276, 280 (1983) (surveillance of an automobile along public streets and highways give no reasonable expectation of privacy).

459. Kyllo v. United States, 533 U.S. 27, 37 (2001).

460. *Id.* at 27.

461. *Id.* at 30 (officers hoped to detect a higher radiation of heat due to lamps needed to grow marijuana).

462. *Id.* at 37.

463. *Id.*

464. *Id.*

465. Kyllo v. United States, 533 U.S. 27, 37 (2001) (holding that a warrantless search of an individual's home is presumptively unreasonable).

466. *Contra id.* at 29-30 (a thermal imaging device detects radiation that objects or people emit and relays this information into images based on differing colors. The color black shows little to no warmth while white denotes hot areas); s*ee Qube Overview*, *supra* note 64 (drones such as the Qube employ a computer tablet to transmit live video of the images from a high-resolution color camera and a thermal camera).

467. Small drones such as AeroVironment's Qube are equipped with a high-resolution color camera and a thermal camera. *Qube Overview*, *supra* note 64.

468. *Kyllo*, 533 U.S. at 37.

to purchase[469] and with the integration of drones into national airspace they will become more available and commonly used. However, the key component in *Kyllo* was not the availability of the device but rather that information about the activities of the defendant's home was obtained.[470] Even though public and private drone use will become prevalent, an individual still has a reasonable expectation of privacy in the activities occurring within his home.

The advanced technology of drones will require law enforcement to obtain a warrant when used in commercial areas or open fields containing buildings. The Court in *Dow Chemical Co*. held that the outside areas of Dow's commercial complex fell under the open fields doctrine and did not constitute curtilage for aerial surveillance purposes.[471] This was in part because the photographs of the outside of the buildings and equipment are not the intimate activities that the Fourth Amendment protects.[472] However, the Court noted that had the surveillance equipment been able to penetrate walls or listen in on conversations, the aerial surveillance of Dow's complex might have required the use of a warrant.[473] If a drone carrying infrared cameras or audio and video recorders conducted the same aerial surveillance over the Dow complex it would change the dynamic of the information obtained.[474] Just as the device in *Kyllo* did, a drone with infrared technology could monitor individuals' movements inside the enclosed buildings in the Dow complex.[475] Such surveillance would violate Dow's rights under the Fourth Amendment.[476]

The case law involving the open fields doctrine illustrates how closely the line between the protected curtilage area and the unprotected open fields area can be. For example, in *Dunn*, officers crossed several fences to reach the defendant's barn and once standing under the barn's overhang, they used a flashlight to discover the inner contents of the barn.[477] The defendant challenged the discovery of evidence inside

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469. The Parrot AR. Drone can be purchased on Amazon.com for $299.00. *Parrot AR Drone 2.0*, *supra* note 49.

470. *Kyllo*, 533 U.S. at 37.

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

472. *Id.*

473. The Court stated that Dow had a legitimate expectation of privacy within the interior of the enclosed buildings that society is prepared to protect. *Id.* at 238-39.

474. Draganfly's DraganFlyer X4 possesses thermal infrared cameras and an onboard DVR. *DraganFlyer X4 Features*, *supra* note 51.

475. The thermal imaging device in *Kyllo* detected radiation that objects or people emit and relayed this information into images based on differing colors. Kyllo v. United States, 533 U.S. 27, 29-30 (2001).

476. The Court stated that Dow had a legitimate expectation of privacy within the interior of the enclosed buildings that society is prepared to protect. *Dow Chem. Co.*, 476 U.S. at 236.

477. United States v. Dunn, 480 U.S. 294, 297 (1987).

the barn as a warrantless search of the curtilage of his home.[478] While the Court stated that the barn itself was curtilage of the defendant's home, it held the officers to be in open fields despite the officers standing under the barn's overhang.[479] The Court focused on the type of activities that occurred within the barn and the barn's relationship to the defendant's home.[480] Similarly, in *Dow Chemical Co.*, the Court recognized that commercial buildings themselves can constitute protected curtilage structures but not the outside, exposed areas within the manufacturing complex.[481]

The designation of curtilage areas is important because not only the designation as curtilage affords some Fourth Amendment protection, but also this lack of a clear definition leaves law enforcement to make an "on-the-spot" judgment themselves after having already entered the property.[482] Due to the increased level of information that can be gathered, law enforcement observations of areas thought to be curtilage present a higher level of intrusion with drones than if officers mistakenly made warrantless visual observations of the area.[483] Warrantless drone surveillance of open fields areas will be permitted under the Fourth Amendment but law enforcement runs the risk of committing serious privacy right infringements when a misjudgment between curtilage and open fields occur.

2. *I Spy with My Robot Eye: Aerial Drone Surveillance*

The Supreme Court has generally upheld challenges under the Fourth Amendment to governmental aerial surveillance.[484] There are several common principles in these cases that will be important to an analysis of governmental drone surveillance.

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478. *Id.* at 298.

479. *Id.* at 306 (Brennan, J., dissenting). Justice Brennan emphasized the closeness to the barn with which the officers had stood to make their observations, the protective measures defendant took to obscure observation of the barn and its contents, and the overall intrusiveness of the officers upon defendant's property. *Id.* The dissent specifically emphasized that officers had climbed over a wooden fence enclosing the barn and then walked under the barn's overhang, standing immediately close to the protective fish netting and shined their flashlight inside the barn. *Id.*

480. *Id.* at 301. The Court stated that the typical activities being held in the barn were functional farming activities as opposed to intimate activities, the barn was sixty (60) yards from the defendant's home, and separate fences enclosing the barn from the home exhibited a separation between the barn and the residence. *Id.*

481. Dow Chem. Co. v. United States, 476 U.S. 227, 236 (1986).

482. Oliver v. United States, 466 U.S. 170, 184 (1984) (Marshall, J., dissenting).

483. For example, the Qube can operate for forty minutes, has a range of one kilometer, infrared technology, and can transmit real-time video back to the operator. *Qube Overview*, *supra* note 64.

484. *See generally* Florida v. Riley, 488 U.S. 445 (1989); *see also* California v. Ciraolo, 476 U.S. 207, 212 (1986); *see also Dow Chem. Co.*, 476 U.S. at 227.

First, the Court has emphasized the importance of the aerial surveillance taking place within legal, navigable airspace.[485] The Court has consistently held that an individual has no reasonable expectation of privacy from observation of outdoor activities against members of the general public or law enforcement from legal, navigable airspace.[486] In *Riley*, the Court denied the defendant's challenge to police helicopter surveillance of his greenhouse because helicopters are not subject to the lower limits of navigable airspace that apply to other aircraft. In this instance, at an altitude of 400 feet, the officer was within legal airspace.[487] The Court has extended this principle to activities occurring within the curtilage of the home when such activities are exposed to navigable airspace.[488]

If the Court continues to link compliance with FAA regulations to permissible governmental aerial surveillance, the use of drones for aerial surveillance will likewise be permissible. The FAA Modernization and Reform Act of 2012 mandates the permissible operation of unmanned aircraft by law enforcement that weigh less than 4.4 pounds.[489] As Justice O'Connor argued in her dissent to *Riley*, reliance on FAA guidelines in determining whether Fourth Amendment privacy interests have been violated is misplaced.[490] The stated mission of the FAA is to ensure safety in national airspace but is silent on protecting the privacy of individuals.[491] FAA guidelines are designed to determine which types of aircraft can fly at a certain altitude for purposes of safe aircraft operation, aircraft noise reduction, and other similar aerial concerns.[492] Determination of future FAA guidelines concerning drones will be based on the best way to integrate drones safely into the National Airspace System.[493] These FAA considerations have nothing to do with the privacy concerns of individuals under the Fourth Amendment.

The Supreme Court draws the correlation between FAA guidelines and reasonable expectations of privacy through the third party doctrine

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485. *Ciraolo*, 476 U.S. at 213; *Riley*, 488 U.S. at 450.

486. *Ciraolo*, 476 U.S. at 212.

487. *Riley*, 488 U.S. at 450.

488. *Id.*

489. *FAA Makes Progress with UAS Integration*, *supra* note 84. The Act mandates authorization of "government public safety" operation of an unmanned aircraft that weighs under 4.4 pounds and meets the following restrictions: the aircraft must be flown within the sightline of the operator, the aircraft can only be flown less than 400 feet from the ground, the aircraft can only be flown during daylight, and the flight must take place more than five miles from an airport. *Id.*

490. *Riley*, 488 U.S. at 452 (O'Connor, J., concurring).

491. *Mission*, *supra* note 69.

492. *Safety: The Foundation of Everything We Do*, FEDERAL AVIATION ADMINISTRATION (Feb. 1, 2013), http://www.faa.gov/about/safety_efficiency/.

493. *Fact Sheet – Unmanned Aircraft Systems*, Federal Aviation Administration (Feb. 9, 2013), http://ww w.faa.gov/news/fact_sheets/news_story.cfm?newsId=14153.

concept by denying Fourth Amendment protection to what individuals willingly expose to third parties..[494] The Court held in both *Ciraolo* and *Riley* that since the law enforcement surveillance occurred from altitudes that private, commercial, or government aircraft legally fly within, an individual can have no reasonable expectation of privacy to activities exposed to these aircrafts.[495] The widespread commercial and governmental use of fixed-wing planes and helicopters is such that the defendants should have been put on notice that their activities would be subject to observation.[496] As FAA guidelines regarding domestic drone use take effect and drone use becomes widespread, individuals will be put on notice that activities occurring outside the home will be fair game to observation by both private and public drones.

Second, the Court has refused to make a distinction between the different types of aircraft employed for the surveillance.[497] In *Riley*, officers employed the use of a helicopter, while in *Ciraolo* officers used a fixed-wing airplane.[498] Under FAA regulations, a plane may not fly under 500 feet while a helicopter may, giving a helicopter the ability for closer observations.[499] However, the Court rejected any distinction between the two aircraft as long as each was within permitted navigable airspace.[500]

While the refusal to make Fourth Amendment analysis based on the type of aircraft leads to a uniform application, it fails to take into account the differences in the aircrafts' technology and ability. With GPS abilities, video and audio recorders, and sophisticated cameras, drone technology exceeds that of the aircraft in *Riley* and *Ciraolo*.[501] A blanket rule governing drone surveillance equally with helicopter and plane surveillance will not adequately protect Fourth Amendment rights. Smaller drones are able to maneuver around corners and generally get closer to individuals than larger aircraft like planes and helicopters. Additionally, both helicopters and planes are loud which prohibits them from getting close without individuals being alerted to their presence. While a setback of many drones is their noise level,[502] developing technology promises an extremely low level of noise.[503] Addition-

494. Florida v. Riley, 488 U.S. 445, 450-51 (1989).
495. *Id.* at 450; California v. Ciraolo, 476 U.S. 207, 212-13 (1986).
496. *Riley*, 488 U.S. at 450-51.
497. *Id.* at 450.
498. *Id.* at 451.
499. *Id.* at 450.
500. *Id.*
501. Draganfly's DraganFlyer X4 possesses thermal infrared cameras and an onboard DVR. *DraganFlyer X4 Features*, *supra* note 51.
502. Several law enforcement agencies have stated that the noise level of drones will generally prohibit surreptitious drone surveillance. Rayfield, *supra* note 102.
503. Robert Beckhusen, *Super-Silent Owl Drone Will Spy on You Without You Ever Noticing*, WIRED (July 19, 2012), http://www.wired.com/dangerroom/2012/07/owl/.

ally, some smaller drones have a "hover and stare" capability that allows for long-term, persistent surveillance of a single area with much less chance of being noticed than a helicopter hovering above.[504] These technological advances make drone use far more invasive and efficient than other aircraft and drones should not be analyzed under the same standard.

Third, the Court emphasized that the observations made in these cases were naked-eye observations by the officers.[505] The Court reinforced the principle that officers are not required to "shield their eyes" when passing a home on public thoroughfares.[506] Challenges that the observations were made of the defendants' protected curtilage areas were denied.[507] Officers were making the same observations that any member of the public could have made had they been in the same navigable airspace.[508]

The concept that officers should not "shield their eyes" while flying in navigable airspace will permit warrantless governmental drone surveillance.[509] Law enforcement will be essentially using drones as their eyes, receiving the images that the drones capture as relayed back to them via a computer screen.[510] The officers are not making "naked-eye" observations from navigable airspace of activities but rather are solely using sense-augmenting technology to observe activities that are not perceivable with human visual surveillance.[511] However, if the sense-augmenting device is readily available to the public, law enforcement is still making observations that any member of the public is able to make.[512] With the integration of private drones into national airspace, any member of the public with access to a drone then has the legal right to fly a drone at the designated altitude. Law enforcement's use of

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504. For example, the Honeywell T-Hawk Micro Air Vehicle (MAV). Goodman, Jr., *supra* note 450.

505. Florida v. Riley, 488 U.S. 445, 450 (1989); California v. Ciraolo, 476 U.S. 207, 213-14 (1986).

506. United States v. Dunn, 480 U.S. 294, 304 (1987).

507. *Riley*, 488 U.S. at 450; *Ciraolo*, 476 U.S. at 214.

508. *Riley*, 488 U.S. at 450; *Ciraolo*, 476 U.S. at 214.

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

510. The Parrot AR. drone links with an iPhone, iPod, and iPad to relay images and video back to the operator. *Parrot AR Drone 2.0*, *supra* note 49.

511. California v. Ciraolo, 476 U.S. 207, 214 (1986) (the observations by the officers were found to be readily discernible as marijuana to the naked eye).

512. *Id.* at 213 (stating that it was unlikely that "Justice Harlan considered an aircraft within the category of future "electronic" developments that could stealthily intrude upon an individual's privacy." Further, the Court emphasized that commercial and private flights in the public airspace were routine enough for it to be unreasonable for an expectation of privacy of defendant's marijuana plants from the officer's naked-eye observations at an altitude of 1,000 feet); Kyllo v. United States, 533 U.S. 27, 34-35 (2001) (emphasizing that the "sense-enhancing technology" used by the officers was not in "general public use").

a drone to conduct warrantless aerial surveillance in navigable airspace will be permissible, subject to certain restrictions.[513]

C. Scope, Sharing, and Augmentation: The Information Gathered By Drones

The Supreme Court has analyzed a multitude of surveillance devices employed by law enforcement under the Fourth Amendment.[514] A key consideration in this analysis been the scope of information that the device is capable of conveying about an individual to law enforcement.[515] The scope of information is magnified when a sense-augmenting device such as a thermal imager or beeper is involved. A drone augments the senses through sophisticated imaging,[516] GPS tracking[517], audio and video recording[518], and other technology.[519] Further, a drone presents the ability for long-term surveillance, which could render the scope of information collected unreasonable.[520]

Another common principle in the Court's Fourth Amendment analysis of differing surveillance devices is the application of the third party doctrine. Under the *Katz* test, an individual must manifest a subjective expectation of privacy that society is objectively recognizes as reasonable.[521] The Court consistently holds that an individual loses any

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513. *Kyllo*, 533 U.S. at 37 (stating that in regards to an individual's home, "all details are intimate details, because the entire area is held safe from prying government eyes"). In accordance with the *Kyllo* ruling, warrantless drone observation of an individual's home will not be permitted. *Id*. at 31 (stating that "with few exceptions," warrantless search of an individual's is unreasonable).

514. *See generally* Olmstead v. United States, 277 U.S. 438 (1928) (warrantless wiretapping of defendant's phone); Silverman v. United States, 365 U.S. 505 (1961) (warrantless use of a spike mike); Smith v. Maryland, 442 U.S. 735 (1979) (warrantless use of a pen register); *Kyllo*, 533 U.S. at 27 (warrantless use of thermal imaging device); United States v. Jones, 132 S.Ct. 945 (2012) (warrantless use of GPS device).

515. United States v. Place, 462 U.S. 696 (1983) (dog sniff limited to presence of contraband); *Smith*, 442 U.S. at 735 (scope of pen register limited to telephone numbers).

516. *DraganFlyer X4 Features, supra* note 51.

517. *DraganFlyer X8 Features; GPS*, DRAGANFLY INNOVATIONS, INC., http://www.draganfly.com/uavhelicopter/draganflyerx8/features/gps.php?zoom_highlight=GPS (last visited Dec. 21, 2013).

518. *Parrot AR Drone 2.0, Director Mode*, PARROT, http://ardrone2.parrot.com/apps/director-mode/ (last visited Dec. 21, 2013); *DraganFlyer X4 Features; Wireless Video System*, DRAGANFLY INNOVATIONS, INC., http://www.draganfly.com/uav-helicopter/draganflyerx4/features/wirelessvideosystem.php (last visited Dec. 21, 2013).

519. Draganfly's "DraganFlyer X4" possesses thermal infrared cameras and an onboard DVR. *DraganFlyer X4 Features*, *supra* note 51.

520. A Predator B drone can operate for up to thirty hours. *Predator B UAS*, *supra* note 12.

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

reasonable expectation of privacy to what he exposes to third parties.[522] Objectively, there is no reasonable expectation of privacy in public activities or information.[523] With an increase in the sharing of information and personal activities, the perception of what society deems as reasonable may change. However, despite activities being exposed to drones flying around navigable airspace, it still might not be society's expectation for those activities to be subject to warrantless government observation.

1. *Staying within the Lines: The Scope of Sense Augmentation Devices*

A reasonable search under the Fourth Amendment can become an unreasonable search due to an impermissible intensity or an overly broad and intrusive scope.[524] To be permissible under the Fourth Amendment, the scope of the search must be narrowly targeted and justifiable to the specific circumstance, which made the initiation of the search reasonable.[525] Closely related to the scope of information is the augmentation level of the device or investigative tool that gives officers access to information not ascertainable by the human senses. For example, the use of a narcotics dog augments an officer's visual observation capabilities and can lead to the discovery of contraband items in sealed containers or vehicles.[526] The Supreme Court has yet to face a device like a drone that has the capability to augment multiple senses, and this sophistication gives the drone a broad scope of information that it can collect.

In *Smith*, the Court held that the warrantless use of a pen register[527] did not constitute a search under the Fourth Amendment due to the device's limited scope of only obtaining the phone numbers that an individual dials.[528] A pen register is unable to listen in on or record communications; therefore, it cannot give information on the contents of an individual's private communications.[529] Similarly, the Court upheld the warrantless use of a narcotics dog to sniff an individual's luggage and vehicle.[530] The dog sniff is limited in that the only items that the dog sniff will reveal are contraband items that an individual has no

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522. *Id.* at 351; Florida v. Riley, 488 U.S. 445, 445 (1989); California v. Ciraolo, 476 U.S. 207, 212 (1986).

523. Smith v. Maryland, 442 U.S. 735, 743-44 (1979).

524. Terry v. Ohio, 392 U.S. 1, 18 (1967).

525. *Id.*

526. United States v. Place, 462 U.S. 696, 707 (1983).

527. *Smith*, 442 U.S. at 736 (a pen register is a device that records on paper all the phone numbers dialed on a specific phone).

528. Smith v. Maryland, 442 U.S. 735, 741-42 (1979).

529. *Id.* at 741.

530. *Place*, 462 U.S. at 707; s*ee also* Illinois v. Caballes, 543 U.S. 405, 408 (2005).

legitimate interest in possessing.[531] The warrantless search of an individual's garbage was held to be permissible under the Fourth Amendment due largely to the search being limited to objects that the defendant voluntarily exposed to the public.[532]

Conversely, the Court has found Fourth Amendment violations in situations with a limited scope of information gathered but that exhibit an overly intense and intrusive investigative manner.[533] In *Bond*, the Court found an impermissible tactile observation when the officer physically squeezed the defendant's luggage in an effort to locate drugs.[534] The officer did not open the individual's luggage but was limited to the tactile observation of the outside of the bag.[535] However, the warrantless tactile observation of the defendant's luggage violated the Fourth Amendment due to the broad scope of the search giving the agent accessibility to the defendant's personal property.[536] Unlike a narcotics dog sniff, the officer's tactile examination is not limited to contraband items and the officer is examining an individual's personal items in his luggage.[537] While a passenger traveling on a bus can expect a certain amount of bumping or moving of his luggage by other passengers or bus employees, the officer's "probing tactile examination" of the defendant's bag was found to overly intrusive.[538]

However, even though a device or technique has a limited scope, this does not mean that protected information will not be revealed. Justice Brennan dissented in *Greenwood* and argued that the scope of a garbage search is not limited to items knowingly exposed to the public.[539] Even though an individual is willingly parting with the items in his garbage, he does not necessarily wish or expect that the private information contained in the garbage will become public.[540] Justice Brennan argued that one's garbage can reveal private details about an individual's life such as financial, health, political, and recreational information that the Fourth Amendment protects from warrantless intrusion.[541] Similarly, Justice Souter's dissent in *Caballes* discounted the limited scope of a narcotics dog sniff.[542] Narcotic dogs are not "infallible"

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531. *Place,* 462 U.S. at 707; s*ee also Caballes*, 543 U.S. at 408.

532. California v. Greenwood, 486 U.S. 35, 39 (1988).

533. Bond v. United States, 529 U.S. 334, 334 (2000) (impermissible physical manipulation of luggage); United States v. Karo, 468 U.S. 708, 715 (1984) (impermissible monitoring of beeper when beeper located in defendant's home).

534. *Bond*, 529 U.S. at 334.

535. *Id.*

536. *Id.* at 337-38.

537. *Id.* at 338-39.

538. *Id.*

539. California v. Greenwood, 486 U.S. 35, 46 (1988) (Brennan, J., dissenting).

540. *Id.*

541. *Id.* at 50-52 (Brennan, J., dissenting).

542. Illinois v. Caballes, 543 U.S. 405, 412 (2005) (Souter, J., dissenting).

and a dog sniff might reveal intimate details about an individual instead of contraband items.[543] In *Jones*, Justice Sotomayor emphasized that a location-tracking device such as a GPS can reveal intimate information about an individual.[544] While a GPS can be limited to gathering information about an individual's movements along public roads these movements can lead to the discovery of intimate activities such as political associations and religious beliefs.[545]

Similar to GPS monitoring, using a drone for mass surveillance will reveal intimate information about an individual. While beepers are limited to providing law enforcement with locations based on radio transmissions,[546] drones employ GPS tracking technology and can provide law enforcement with precise, accurate suspect locations coupled with real-time video.[547] For example, if a large drone is positioned above a city to monitor civilian activities along public areas, this monitoring will also reveal trips to church, health clinic, doctor, and other similar sensitive information. As Justice Sotomayor noted in *Jones*, knowledge of such activities being monitored can have a chilling effect on public expression and associations.[548] Using a drone for wide-scale surveillance of large public areas creates an overly broad scope that violates the Fourth Amendment. Much like the tactile examination in *Bond* was unable to limit the scope to only touching contraband items, there is no feasible way for a drone to only monitor illegal activities in large urban areas.

When using a drone for short-term monitoring or information gathering purposes, it will be hard for law enforcement to adhere to a limited scope. For example, if an officer is using a drone for warrantless aerial surveillance over an individual's backyard or even empty fields the drone search must be limited to these unprotected areas. If the drone is over an individual's backyard and takes thermal images of the inside of an individual's home or picks up an individual's conversation not only is this evidence inadmissible but the individual's privacy rights under the Fourth Amendment have been violated.[549] The question that needs to be determined is whether or not the information a drone can gather is able to be adequately limited.

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543. *Id.*

544. United States v. Jones, 132 S. Ct. 945, 955-56 (2012) (Sotomayor, J., concurring).

545. *Id.*

546. United States v. Karo, 468 U.S. 708, 715-18 (1984).

547. For example, the Qube can transmit a live video of the images it observes with a high-resolution color camera and a thermal camera. *Qube Overview, supra* note 64,

548. *Jones*, 132 S. Ct. at 956 (Sotomayor, J., concurring).

549. Evidence collected with an invalid warrant or by an unreasonable search is generally excluded. Terry v. Ohio, 392 U.S. 1, 12 (1968).

When reviewing the use of sense augmentation tools, the Court has held that such tools cannot be used to obtain information that is not discoverable through naked-eye surveillance.[550] Law enforcement's visual observation capabilities are being augmented by use of the device to give officers information regarding the inside of an individual's home or other protected structure. This is an unreasonably broad scope of information. Thus in *Kyllo*, the Court held that the use of a thermal imaging device to obtain information regarding the inner activities of the defendant's home violated the Fourth Amendment.[551] The officers would have had to enter the defendant's home to obtain such information without the thermal imaging device.[552] Since warrantless searches of an individual's home are unconstitutional, the officers could not have obtained the information that defendant was growing marijuana in his home without the use of the thermal imaging device.[553]

Conversely, in *Knotts* the Court upheld the warrantless monitoring of the defendant on public roads through the use of a beeper placed inside a container.[554] The Court held that the use of the beeper revealed no information that the officers could not have obtained had they relied solely on visual observation of the defendant driving on public roadways.[555] Distinguishing *Knotts*, the Court in *Karo* held that warrantless monitoring of a beeper that revealed information pertaining to activities occurring inside the home violates the Fourth Amendment.[556] Officers used both visual and beeper surveillance to trace the defendant's movements along public roadways to the defendant's residence.[557] However, when the defendant left the residence the officers continued to monitor the beeper signals to confirm that the container was still inside the house and not in the defendant's vehicle.[558] This information was not subject to visual observation and would have required the officers to enter the residence.[559]

Warrantless drone surveillance to track a suspect is comparable to the warrantless uses of a beeper and GPS. However, a key distinction between beeper surveillance and GPS or drone surveillance is the ability to maintain long-term, persistent surveillance that exceeds the capabilities of law enforcement using solely visual surveillance.[560] In

550. Kyllo v. United States, 533 U.S. 27, 37 (2001); *Karo,* 468 U.S. at 715.
551. *Kyllo,* 533 U.S. at 37.
552. *Id.*
553. *Id.*
554. United States v. Knotts, 460 U.S. 276, 277 (1983).
555. *Id.* at 281-82.
556. United States v. Karo, 468 U.S. 708, 715-18 (1984).
557. *Id.*
558. *Id.*
559. *Id.*
560. *Predator B UAS, supra* note 12. A Predator B drone can operate for up to thirty hours. *Id.* Justice Alito noted that previously due to costs and difficulty, law enforcement

Knotts, the officers had lost sight of the defendant's vehicle while following him and had to rely solely on the beeper signal to follow the defendant to his cabin.[561] The Court stated that had the officers not lost visual contact with the defendant's vehicle, he was still traveling on public roadways and therefore his movements were obtainable through visual observation.[562] Despite the officers not being physically able to visually observe the defendant's movements along the street, since they would have been able to see him, the *Knotts* Court upheld the beeper information.[563] Although the Court in *Jones* found the warrantless installation and monitoring of a GPS device to violate the Fourth Amendment, the Court based that decision on a finding of a physical trespass.[564] The Court did not address situations of warrantless, long-term monitoring of an individual's movements along public roads by a device that does not physically interfere with the individual. Under *Knotts*, the warrantless use of drones to monitor an individual along public roadways does not violate the Fourth Amendment. Even if drones permit law enforcement to monitor an individual for days, weeks, or months, if the individual's movements are exposed to visual observation then the government can observe them.

The common principle among these cases is that law enforcement needs to obtain a warrant to use sense-augmenting devices to gather information that is not observable through visual surveillance or is of the home.[565] In both *Karo* and *Kyllo*, the information obtained by officers was not overly intimate or detailed information but since the information would have required a warrantless entry into the defendants' homes, it violated the Fourth Amendment.[566] Under this principle, the sheriff in North Dakota using a drone with infrared camera capabilities to fly over the ranchers' home violates the holding in *Kyllo*. It is a presumptively unreasonable search for law enforcement to use a sense-enhancing device to obtain information not available without physical entry into the home.[567] The sheriff could not have determined where in the house the members of the family were, what they were doing, and whether or not they were armed without entry into the home.

2. *Careful What You Share: The Third Party Doctrine and Knowing*

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could not practically observe and collect the amount of information that new devices such as a GPS now permit. United States v. Jones, 132 S. Ct. 945, 964 (2012) (Alito, J., concurring).

561. United States v. Knotts, 460 U.S. 276, 282-83 (1983).
562. *Id.* at 284-85.
563. *Id.*
564. United States v. Jones, 132 S.Ct. 945, 948 (2012).
565. Kyllo v. United States, 533 U.S. 27, 37 (2001).
566. United States v. Karo, 468 U.S. at 715-18; *Kyllo*, 533 U.S. at 37.
567. *Kyllo*, 533 U.S. at 37.

Exposure under the Katz Test

The Supreme Court has consistently held that what an individual knowingly exposes to the public, even in his own home, is not subject to Fourth Amendment protection.[568] Protection under the *Katz* test requires a subjective and objective expectation of privacy.[569] There can be no expectation of privacy in information or activities exposed to third parties.[570] With the thought of drones flying around in national airspace looming, the inquiry is whether there are any adequate protective measures that will manifest a legitimate expectation of privacy in outdoor activities.

In *Smith*, the Supreme Court expressly stated that there is no legitimate expectation of privacy in information voluntarily conveyed to third parties.[571] Officers used a pen register[572] to obtain the phone numbers that the defendant dialed from his home phone.[573] The Court held that an individual has no reasonable expectation in phone numbers he dials because that information is knowingly and willingly conveyed to the phone company.[574] In *Greenwood*, the Court upheld the warrantless search and seizure of the defendant's garbage put on the street curb.[575] Similarly, the Court held that individuals do not enjoy a reasonable expectation of privacy in garbage that they knowingly and willingly expose to a third party, the garbage collector.[576]

In these cases, the Court held that the defendants knowingly exposed information and affects to third parties when there were no other methods the defendants could have used. Unless individuals do not want to use a telephone, the telephone numbers dialed will be automatically relayed to the phone company. In *Greenwood*, not only did the defendant have to take his garbage out for hygiene purposes, he was required by a city ordinance to put his garbage on the curb.[577] Additionally, an individual might expect exposure of a phone number to the phone company or garbage to the garbage collector but not necessarily to warrantless police investigation. However, the Court held in

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568. Katz v. United States, 389 U.S. 347, 351 (1967); California v. Greenwood, 486 U.S. 35, 39 (1988); Smith v. Maryland, 442 U.S. 735, 744 (1979).

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

570. *Id.* at 351; *Greenwood*, 486 U.S. at 41.

571. *Smith*, 442 U.S. at 743-44.

572. *Id.* at 736, fn. 1 (a pen register is a device that records on paper all the phone numbers dialed on a specific phone).

573. *Id.* at 737.

574. Smith v. Maryland, 442 U.S. 735, 737 (1979).

575. California v. Greenwood, 486 U.S. 38, 37 (1988).

576. *Id.* at 41.

577. *Id.* at 55 (Brennan, J., dissenting).

both instances that individuals must reasonably expect that this information will be exposed to police investigation.[578]

Another flaw in the third party doctrine as applied to Fourth Amendment privacy challenges is the broad application to all information "knowingly exposed." Even though an individual knowingly disposes of his garbage or travels along public streets, he does not expect that all information surrounding these events will be exposed. Justice Brennan noted in his *Greenwood* dissent that personal items revealing intimate details of an individual's life are disposed of along with garbage and society recognizes a reasonable expectation of privacy in such items.[579] Justice Sotomayor in her concurrence in *Jones* noted that in light of changing technology, the third party doctrine might not be applicable.[580] Justice Sotomayor emphasized that while information is willingly submitted during online business transactions, individuals are not necessarily knowingly exposing this information to all online third parties that are acquiring their information.[581]

Measures taken to manifest a reasonable expectation of privacy in outdoor activities have been consistently dismissed in aerial surveillance and open fields cases.[582] In *Dow Chem. Co.*, *Ciraolo,* and *Riley*, adequate measures had been taken to obscure ground-level observations but the Court dismissed any correlation to aerial observations.[583] *Ciraolo* and *Riley* even involved aerial surveillance of the defendants' backyards, areas protected under the Fourth Amendment.[584] In *Riley*, the defendant contained his activities inside a greenhouse with opaque panels, surrounded by shrubs and his mobile home.[585] However, the Court dismissed these efforts to block observations into the greenhouse because there were several missing panels that allowed observations from navigable airspace.[586]

In his dissent in *Ciraolo*, Justice Powell stated that "few build roofs over their backyards,"[587] and in *Riley*, Justice O'Connor emphasized the impossibility to block every possible view of a backyard.[588] With the integration of drones into navigable airspace, individuals will

578. *Id.* at 39; *Smith*, 442 U.S. at 742-43.
579. *Greenwood*, 486 U.S. at 46 (Brennan, J., dissenting).
580. United States v. Jones, 132 S. Ct. 945, 957 (2012) (Sotomayor, J., concurring).
581. *Id.* at 956 (Sotomayor, J., concurring).
582. California v. Ciraolo, 476 U.S. 207, 212 (1986); Oliver v. United States, 466 U.S. 170, 182 (1984); United States v. Dunn, 480 U.S. 294, 302; Dow Chem. Co. v. United States, 476 U.S. 227, 240-41(1986) (Powell, J., dissenting).
583. *Ciraolo*, 476 U.S. at 212; *Dow Chem. Co.*, 476 U.S. at 236; Florida v. Riley, 488 U.S. 445, 450 (1989).
584. *Riley*, 488 U.S. at 450; *Ciraolo*, 476 U.S. at 212.
585. *Riley*, 488 U.S. at 447.
586. *Id.* at 450.
587. *Ciraolo*, 476 U.S. at 224 (Powell, J., dissenting).
588. *Riley*, 488 U.S. at 450-54 (O'Connor, J., concurring).

likewise be knowingly exposing outdoor activities to flying drones. It is uncertain whether there are any measures that the Supreme Court would determine to be adequate to manifest a legitimate privacy interest against warrantless government drone aerial surveillance.

PART IV: ADEQUATE MEASURES TO PROTECT PRIVACY INTERESTS AGAINST DRONE SURVEILLANCE

After examining the extensive precedent of Fourth Amendment challenges to governmental surveillance, there are several types of drone uses that will be permitted. First, warrantless drone use to obtain information about activities inside the home violates the Fourth Amendment. The use of a sense-augmenting device to obtain information about the intimate activities of the home is presumptively unreasonable.[589] A drone is augmenting the senses by providing long-term surveillance with video, detailed images, and tracking technology that exceeds human capabilities.[590] The home is the locus of our most intimate activities and the Fourth Amendment adequately protects this privacy.[591] Any use of drones to discern a suspect's activities within the house will require a warrant.

Second, warrantless drone surveillance of commercial buildings or business offices will violate the Fourth Amendment. The Fourth Amendment protects business offices and commercial buildings but that protection is less than the home.[592] With infrared technology, drones will be able to decipher activities occurring within commercial buildings. Just like infrared surveillance of the inside of a private home, infrared images of a commercial building will equally violate the Fourth Amendment.[593]

Third, using drones in exigent circumstances or to survey uninhabited areas does not violate the Fourth Amendment. The exigent circumstances exception to the Fourth Amendment permits warrantless searches where law enforcement cannot reasonably obtain a warrant

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589. Kyllo v. United States, 533 U.S. 27, 37 (2001).

590. Draganfly's DraganFlyer X4 possesses thermal infrared cameras and an onboard DVR. *Government Applications, supra* note 23. The Qube can operate for forty minutes, has a range of one kilometer, infrared technology, and can transmit real-time video back to the operator. *Qube Overview, supra* note 64.

591. The highest level of protection under the Fourth Amendment is in the home. Oliver v. United States, 466 U.S. 170, 178 (1984).

592. Rakas v. Illinois, 439 U.S. 128, 148 (1978).

593. The Court in *Dow Chemical Co.* noted that had the photographs of Dow's complex been taken with a device that could penetrate walls or listen to conversations, the aerial surveillance might require a warrant. Dow Chemical Co. v. United States, 476 U.S. 227, 238-39 (1986).

but swift action is required.[594] Using a drone in a hostage situation or to detect potentially armed suspects is likely to fall under the exigent circumstances exception to the Fourth Amendment. In the North Dakota situation, the sheriff had actual knowledge of the suspects being armed and used the drone to detect where on the property they were located.[595] However, this use might not fall under an exigent circumstance because the Sheriff engaged in prolonged monitoring of the defendants, rather than using the drone at the scene.[596] Additionally, warrantless drone use in missing person cases such as the McStay family case will be permitted so long as the areas are uninhabited.[597]

There are several areas of prior Fourth Amendment analysis that leave warrantless government drone use uncertain. In order to properly protect privacy interests and permit law enforcement the use of an important tool, several changes must be made in the current Fourth Amendment analysis.

A. Governmental Drone Use Requires Changing the Aerial Surveillance Standard

The current standard permitting warrantless governmental aerial surveillance from FAA-mandated navigable airspace should not be applicable to governmental drone surveillance.[598] Under the current standard, what a person knowingly exposes to aircraft legally in FAA approved airspace is not subject to Fourth Amendment protection.[599] In *Florida v. Riley*, Justice O'Connor's concurrence proposed an inquiry focused on whether the aircraft is traveling at an altitude that the general public regularly travels and not whether the aircraft is at an FAA permitted altitude.[600] Thus, if the general public regularly flies at a certain altitude then an individual can have no reasonable expectation of privacy to activities that are discernible from such an altitude.[601]

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594. An example would to prevent the destruction of evidence or serious harm. Kentucky v. King, 131 S. Ct. 1849, 1858 (2011).

595. Dillow, *supra* note 10.

596. Bennett, *supra* note 11.

597. The drone in the McStay missing persons case was used to search forty miles of an isolated highway. Friedman, *supra* note 6. Presumably, an isolated area would be considered "open fields" which receives no protection under the 4th Amendment. *See* Oliver v. United States, 466 U.S. 170, 181 (1984).

598. California v. Ciraolo, 476 U.S. 207, 213-14 (1986) (holding there is no reasonable expectation of privacy against police observations from a plane in legal navigable airspace); Florida v. Riley, 488 U.S. 445, 450-51 (1989) (holding there is no reasonable expectation of privacy against police observations from a helicopter in legal navigable airspace).

599. *Riley*, 488 U.S. at 450; *Ciraolo*, 476 U.S. at 212-13.

600. *Riley*, 488 U.S. at 451 (O'Connor, J., concurring).

601. *Id.*

The analysis of whether warrantless governmental aerial drone surveillance violates the Fourth Amendment should be focused on the inquiry proposed by Justice O'Connor in her *Riley* concurrence.[602] An aircraft-based standard better reflects the privacy expectations of society rather than abiding by FAA regulations. The *Katz* test asks whether an individual manifests a reasonable expectation of privacy that society is prepared to recognize as legitimate.[603] The mission of the FAA is to ensure safety in national airspace and not to protect the privacy of individuals.[604]

Different aircraft have different technological abilities and using a standard that recognizes a distinction between types of aircraft will best protect privacy against drone use. For example, the law enforcement helicopter used in *Riley* was flying at an altitude of 400 feet whereas the plane in *Ciraolo* was flying at an altitude of 1,000 feet.[605] The FAA regulations allow helicopters to fly at a lower altitude than an airplane.[606] Justice O'Connor argued that the public generally does not fly a helicopter at an altitude of 400 feet and the general public does not readily have access to such an expensive vehicle.[607] Flying a plane at an altitude of 1,000 feet or a helicopter at 400 feet permits limited visual observation whereas flying a drone below 400 feet broadens the scope of observation. Lower flying drones present a much greater intrusion into an individual's privacy; therefore, the inquiry into permissible warrantless law enforcement drone surveillance should be an analysis on a different basis rather than the current correlation with FAA regulations. Even without an infrared camera or advanced optics, simply being able to fly the drone at a lower altitude than either a plane or helicopter gives law enforcement closer, clearer observations.

With the impending integration of drones into domestic airspace, the general public and government agencies will have access to drones. Future FAA regulations could permit small drones to fly at a much lower altitude than both planes and helicopters.[608] By following FAA regulations, law enforcement will be making the same observations that any member of the public with a drone can equally make. Permitting a Fourth Amendment analysis on the basis of whether the drone is in permissible navigable airspace leaves society open to the possibility

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602. *Id.*

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

604. *Mission, supra* note 69.

605. Florida v. Riley, 488 U.S. 445, 451 (1989); California v. Ciraolo, 476 U.S. 207, 207 (1986).

606. *Riley*, 488 U.S. at 451 (stating that FAA regulations prohibit fixed-wing aircraft below 500 feet whereas helicopters are permitted below that level).

607. *Id.* at 454.

608. For example, the Qube only has a maximum altitude of 500 feet. *Qube Overview*, *supra* note 64.

that all actions, conversations, and activities will be subject to a drone hovering 200 feet above.

Shifting the Fourth Amendment analysis to an aircraft-based inquiry will also change the evaluation of the appropriate protective measures society must take to manifest a legitimate expectation of privacy. Since the use of drones does not require a physical trespass, challenges to warrantless drone surveillance under the Fourth Amendment will be made under the two-part *Katz* test.[609] The *Katz* test requires both a subjective and objective manifestation of a reasonable expectation of privacy.[610] An analysis that focuses on the type of aircraft will change the Court's view of protective measures. As Justice O'Connor observed in her *Riley* concurrence, it is unclear what protective measures an individual can take to shield against aerial observations of private activities.[611] Society's expectations of what is being exposed to naked-eye observations from a helicopter flying at 400 feet may be different than what society expects will be exposed to a drone flying above at 400 feet. However, using a standard based on FAA regulations evaluates society's expectations as if both aircraft were the same.

Generally, individuals enjoy outdoor activities in their backyards, but if they are required to take extreme protective measures against low flying drone surveillance (such as erecting a roof-like structure), these activities may become compromised. Surely, the Framers did not intend individuals to be wary about celebrating the Fourth of July in their backyards for fear of who could be watching. Focusing on the type of aircraft being used will allow a proper consideration of what subjective and objective privacy concerns a drone presents rather than using a comparable standard to helicopters and planes. Focusing on FAA regulations simply does not take into account the necessary privacy interests that warrantless drone surveillance threatens.

1. *Sharing is Good? Updating the Third Party Doctrine*

Under the Fourth Amendment, the third party doctrine strips protection from information exposed to third parties.[612] Similarly, there is no Fourth Amendment protection to activities that are knowingly exposed to third parties or to the general public.[613] However, this principle is inadequate to protect privacy needs when faced with advanced technology.

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609. Katz v. United States, 389 U.S. 347, 361 (1967) (Harlan, J., concurring).
610. *Id.* at 347.
611. Florida v. Riley, 488 U.S. 445, 454 (1989) (O'Connor, J., concurring).
612. Smith v. Maryland, 442 U.S. 735, 744 (1979).
613. *Katz*, 389 U.S. at 351.

The Supreme Court has applied the third party doctrine to the warrantless use of beepers to monitor individuals' movements along public roads.[614] When an individual is traveling along a public street, his movement is exposed to observation by other drivers and the general public. However, the scope of information that a beeper can give is limited to the defendant's movements.[615] In *Karo*, officers stepped outside the accepted scope by using the beeper to monitor movements inside the defendant's residence.[616] Information obtained about the defendant's intimate, protected activities inside the home rendered the search unreasonable.[617] However, even when limited to information gathered about public movements, persistent surveillance can reveal intimate information.[618]

In *Jones*, the Court reviewed the warrantless use of a more advanced tracking device: the GPS.[619] While the Court held that a GPS installation requires a warrant under a physical trespass theory, the Court did not resolve the question for devices that require no attachment to property.[620] The majority in *Jones* did not comment on the fact that the defendant was tracked by GPS for twenty-eight days or the over 2,000 pages of data collected on the defendant's movements. Some of the 2,000 pages of data could have provided intimate details of the defendant's life that the defendant did not "knowingly expose." While society recognizes that observations will be made of movements along public streets,[621] a GPS device or a drone can accumulate large amounts of information on long periods of these movements.[622] Similar to an examination of an individual's garbage, 2,000 pages of an individual's movements along public streets can be far more revealing and comprehensive of one's intimate activities than would be reasonably expected to be conveyed by traveling along public streets.[623] As Justice Sotomayor stated in her concurrence, under the third party doctrine de-

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614. United States v. Knotts, 460 U.S. 276, 276 (1983); United States v. Karo, 468 U.S. 708, 708 (1984).

615. *Knotts*, 460 U.S. at 281-82.

616. *Karo*, 468 U.S. at 715-18.

617. *Id.*

618. United States v. Jones, 132 S. Ct. 945, 956-57 (2012) (Sotomayor, J., concurring).

619. *Id.*at 945.

620. *Id.* at 948.

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

622. *Jones*, 132 S. Ct. at 956-57 (Sotomayor, J., concurring).

623. *Id.* at 955-56 (citing concerns that through the discovery of an individual's movements, private details such as an individual's religious beliefs, appointments with a psychiatrist, political meetings or associations, and other such personal information may be revealed).

vices such as smartphones equipped with GPS could permit such persistent surveillance.[624]

The question then becomes what is modern society's reasonable expectation of the amount of information that is knowingly exposed to the public. A broad principle denying protection to information or activities exposed to third parties does not take into consideration the data gathering capabilities of modern technology. The Supreme Court will have to change the third party doctrine focus to what type of information society reasonably believes is being exposed to third parties.

D. Regulating the Scope of Governmental Drones

A final option to ensure government drone use is limited is through legislation. There are several uncertainties in Fourth Amendment protection over the warrantless governmental use of drones that would be adequately addressed by legislation. There are multiple situations that permit the warrantless use of less invasive law enforcement tools. Permitting the warrantless use of a drone in similar situations would be dangerous when considering the broad scope of information that a drone can collect.

For example, the "automobile exception" of the Fourth Amendment permits the warrantless search of an individual's vehicle when there is probable cause that the vehicle contains contraband.[625] Even with the probable cause requirement, an infrared scan with a drone is far more invasive than a tactile examination of a vehicle. The Supreme Court has held that overly invasive devices or search techniques require a warrant,[626] but it is uncertain what level of intrusiveness would violate the Fourth Amendment. Legislation that clearly defines whether or not a warrant is needed for a drone search of a vehicle aids law enforcement and puts the public on notice of its rights.

Similarly, the open fields doctrine becomes distorted when applied to drones. Protection against unwarranted governmental intrusions into the home is extended to curtilage areas but there is no Fourth Amendment protection to open fields.[627] However, the analysis on the designation between curtilage of the home and open fields has not been consistent.[628] The conflict between curtilage and open fields in using drones is magnified because drones have expansive, detailed views of

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624. United States v. Jones, 132 S. Ct. 945, 956-57 (2012) (Sotomayor, J., concurring).

625. United States v. Ross, 456 U.S. 798, 800 (1982).

626. Bond v. United States, 529 U.S. 334, 334 (2000); Kyllo v. United States, 533 U.S. 27, 27 (2001).

627. United States v. Dunn, 480 U.S. 294, 300 (1987); Hester v. United States, 265 U.S. 57, 59 (1924).

628. Oliver v. United States, 466 U.S. 170, 175 (1984).

areas. Additionally, by sending these images to cell phones, computers, or even to its own DVR, the drone can retain these images for a significant period of time.[629] Officers using drones to determine whether or not a suspect is growing marijuana in a literal open fields area does not require a warrant. However, officers run the risk of infringing privacy rights if the warrantless use of the drone results in obtaining information or images of an individual's curtilage.

While it would be impracticable to develop a strict rule designating protected areas, a broader legislative rule is necessary. For example, a strict rule allowing drone use on any area more than 100 feet from a house is inadequate because individual areas host different activities. Whereas 100 feet from person A's home is an empty field, the same area at person B's property could host a swimming pool. However, a broad rule prohibiting warrantless use of a drone on property that contains any inhabited buildings would best protect the interests of both the public and law enforcement.

Several federal and state legislative guidelines provide for the governmental use of drones. For example, Senator Paul introduced the Preserving Freedom from Unwarranted Surveillance Act of 2012.[630] The Act requires a warrant for all government drone use subject to three exceptions: border patrol, exigent circumstances, and the risk of a terrorist attack.[631] However, broadly prohibiting all warrantless use of governmental drones is unnecessary and fails to adequately balance the needs of privacy protection and law enforcement. Officers should be able to use drones to determine if a suspect is growing marijuana in his uninhabited fields. There are no privacy interests being violated in such a situation involving open fields. As the *Kyllo* Court stated, law enforcement is not prohibited from using sense-augmenting devices as long as no constitutionally protected interests are violated.[632] Additionally, a broad exception for border patrol use does not adequately protect the privacy interests of individuals living along the Mexican or Canadian borders.[633]

Legislative control over governmental drone use is important in regulating the scope of information a drone can collect and the retention of that information. Regulations that forbid infrared surveillance in an urban area or surveillance on a wide-scale basis need to be con-

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629. *Parrot AR Drone 2.0*, *supra* note 49.

630. *Sen. Paul Introduces Bill, supra* note 100.

631. *Id.; Preserving Freedom from Unwarranted Surveillance Act of 2012*, S. 3287, 112th Cong. (2012) (stating that the Act was introduced to Congress on June 12, 2012 but was not enacted).

632. Kyllo v. United States, 533 U.S. 27, 37 (2001).

633. Seventy to seventy-five percent of Canadians live within five miles of the U.S. border and millions of Mexicans live within ten miles of the U.S. border. *Posner on the Privacy Implications*, supra note 94.

sidered. Even if the surveillance technology is limited, widespread surveillance of an individual's movements can reveal intimate activities that the Fourth Amendment protects.

CONCLUSION

On October 12, 1999, ten-year-old Pamela Butler was rollerblading back from buying cookies at the local gas station.[634] Within sight of her three sisters, a white pick-up truck pulled up next to Pamela and a man dragged her into the truck.[635] Pamela's sisters started screaming to other nearby residents as the truck sped away with Pamela inside.[636] A neighbor jumped in his car and followed the truck.[637] However, the kidnapper eluded the neighbor and disappeared with Pamela.[638] On October 14, the kidnapper was captured by police and revealed that he had killed Pamela.[639] Pamela Butler's disheartening story is an example of the type of situation where government drone use can make a great impact. If the neighbor giving chase was able to give police the kidnapper's license plate, vehicle description, and direction of travel with a cell phone, this vital information could have been relayed to a drone.[640] Easily deployable, armed with license plate recognition, infrared, real-time video, and prolonged mobility, a drone adds a powerful aid to law enforcement to future cases like Pamela Butler's.[641]

However, in recognizing that drones provide benefits to law enforcement, there must also be recognition of the privacy concerns they present. The Fourth Amendment protects individuals in their property and person through the prohibition against unreasonable searches and seizures.[642] When faced with warrantless use by law enforcement of electronic surveillance devices, the Supreme Court asks whether an individual exhibited a subjective expectation of privacy that society is objectively prepared to recognize as reasonable.[643]

An examination of Fourth Amendment analysis of these various government surveillance devices reveals a general principle; as technology advances, society's expectation of privacy inevitably diminishes. When Orville Wright successfully completed a twelve-second flight in

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634. Tony Morton, *Girls in the 'Hood*, THE PITCH (Nov. 30, 2000), http://www.pitch.com/kansascity/girls-in-the-hood/Content?oid=2162050.

635. *Id.*

636. *Id.*

637. *Id.*

638. United States v. Nelson, 347 F.3d 701, 705 (2003).

639. *Id.*

640. *Id.*

641. Geiger, *supra* note 38.

642. Elkins v. United States, 364 U.S. 206, 222 (1960) (holding that the Constitution does not forbid all searches and seizures, only those that are unreasonable).

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

1903, a new form of transportation was introduced to the world.[644] This new mode of transportation emerged as a commercial travel, military, and law enforcement tool.[645] With the successful dissemination of the telephone came the ability of law enforcement to listen in on an individual's phone conversations through wiretapping and a broad array of listening devices. The widespread use of law enforcement helicopters and airplanes as a means of public travel has lowered society's privacy expectations in outdoor activities. Advancing vehicular tracking technology has eroded any expectation of privacy in an individual's vehicular movements along public roads. Soon, law enforcement will have a new surveillance device to utilize: the drone.

With new devices emerging that expand the amount of information being shared to the public, the key in determining warrantless governmental drone surveillance will be what society has come to consider reasonable in the modern age.[646] In order to make this determination, the Supreme Court needs to alter the aerial surveillance standard and focus on what type of aerial surveillance vehicle is being used instead of relying on FAA regulations. Further, when applying the two-part *Katz* test to governmental drone surveillance, the Court must take into account the changing perception of society and the amount of data that is inadvertently exposed to third parties as a part of routine life in a digital age. Surveillance that would have been unacceptable before may well be considered reasonable today and absent any legislation, it will be for the Supreme Court to determine whether society considers warrantless government drone use to be reasonable.

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644. Wilbur and Orville Wright built the plane that Orville operated to complete the "first sustained, powered flight" on December 17, 1903. The first usable airplane was subsequently built in 1905. *A Brief History of the FAA*, *supra* note 69.

645. *Id.*

646. For example, the Looxcie hands-free streaming social camera lets an individual stream any activity they want live and post it to a social media site. LOOXCIE, http://looxcie.com/ (last visited Oct. 9, 2013).