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COMMENTS

IN THE WAKE OF KYLLO V. UNITED STATES: THE FUTURE OF THERMAL IMAGING CAMERAS

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You have always been suspicious of your neighbor. He keeps to himself and always has the blinds closed. There are strange cars and even stranger people frequenting his house at all hours of the night. During the winter, snow seems to melt on his roof in particular areas while your roof remains covered. You notified the police about the activity, but after careful surveillance, they do not have enough information to get a search warrant. Until they are able to search the home, you must suffer through the anxiety of not knowing if your neighbor's activities will affect your life. But there is hope and it is called the thermal imaging camera.

I. FIGHTING THE BATTLE ON A NEW FRONT

Marijuana growers seek refuge from the watchful eye of law enforcement by moving the operations inside.¹ Marijuana may grow in larger quantities outside,² but growers can use technology³

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1. Drug Enforcement Administration (DEA), Marijuana, at http://www.dea.gov/concern/marijuana.htm [hereinafter Marijuana] (reporting that the marijuana growing moved indoors after the beginning of the DEA's Domestic Cannabis Eradication and Suppression Program in 1979) (last visited Sept. 18, 2001). The program had a hand in forcing drug growers to use more secure locations for their growing operations. Id.

2. See id. (implying that indoor marijuana growers do not have the same amount of space as those who grow their plants in open fields). According to the DEA, the average number of marijuana plants cultivated by indoor growers is in 1998 was eighty-nine. Id.

3. Id. The DEA reported that marijuana cultivators use various
to ensure crops grown indoors are healthy and secure from the public eye.4

However, law enforcement officials continue to strike back at technology-driven marijuana growers by using their own brand of technology: thermal imaging cameras or Forward Looking Infrared Devices (FLIR).5 These devices detect heat escaping from buildings by converting the heat into a visible image.6 FLIR's help law enforcement officials secure search warrants to seize illegal marijuana operations7 by measuring hot spots generated within buildings.8

Many citizens fear a government willing to use technology to monitor the movements and actions of the population, and a police force that indiscriminately uses thermal imaging cameras to peer through the walls of their home to monitor the intimate activities within.9 However, that technology aids law enforcement in technologies to aid their growing operations including: specialized fertilizers; plant hormones; genetic engineering; and specially constructed greenhouses. Id.

4. Id. Indoor cultivation provides for a more controlled growing environment that allows for growers to engage in yearlong operations. Id.


7. See Marijuana, supra note 1 (noting the DEA's records indicate that law enforcement agencies seized 2,616 indoor marijuana growing operations in 1998).


9. See generally Campisi, supra note 5.
battling problems that plague society, such as illegal drug cultivation. The question is, should police be permitted the use of technology to pursue criminals who seek refuge in their homes? The answer rests upon the constitutional limitations of the use of technological devices such as thermal imaging cameras by law enforcement officials in light of Fourth Amendment "search" jurisprudence.10

This Comment examines the ramifications of the United States Supreme Court's decision in Kyllo v. United States11 and the future of thermal imaging technology within the scope of the Fourth Amendment. Part II examines the technology behind thermal imaging cameras, its uses, and its capabilities.12 An overview of the Katz test13 and subsequent Fourth Amendment search cases14 provides a basis for examining the actions of law enforcement officials. A review of various court decisions regarding thermal imaging provides a framework for questioning the constitutionality of thermal imaging.15 Finally, an

10. The Fourth Amendment declares that:
   The right of the people to be secure in their persons, houses, papers and
   effects, against unreasonable searches and seizures, shall not be
   violated, and no Warrants shall issue, but upon probable cause,
   supported by Oath or affirmation, and particularly describing the place
   to be searched, and the persons or things to be seized.
U.S. CONST. amend. IV.
12. See infra Part II.A (giving a detailed description of thermal imaging technology).
13. Katz v. United States, 389 U.S. 347, 361 (1967) (Harlan, J., concurring) (stating that whether a search falls under Fourth Amendment protection rests upon the existence of both a subjective expectation of privacy and society's acceptance of that expectation as reasonable).
14. See, e.g., California v. Greenwood 486 U.S. 35, 40-41 (1988) (holding that because there was no subjective expectation of privacy concerning curbside garbage, looking through that garbage did not constitute a search under the Fourth Amendment); Dow Chem. Co., v. United States, 476 U.S. 227, 238-39 (1986) (holding that aerial surveillance photographs taken by planes flying at high altitudes did not constitute searches under the Fourth Amendment because the photographs would not reveal intimate details that would raise constitutional concerns of privacy); California v. Ciraolo, 476 U.S. 207, 213-14 (1986) (holding that surveillance from an airplane flying 1,000 feet over property, revealing illegal drug cultivation, was not a violation of the Fourth Amendment because the plants were in "plain view"); United States v. Place, 462 U.S. 696, 710 (1983) (holding that canine sniffs for drugs do not fall within the protection of the Fourth Amendment because the mere detection of contraband is not a search).
15. For opinions where the use of thermal imaging cameras did not fall within the protection of the Fourth Amendment see generally United States v. Kyllo, 190 F.3d 1041 (9th Cir. 1999), rev'd, 533 U.S. 35 (2001); United States v. Robinson, 62 F.3d 1325 (11th Cir. 1995); United Stated v. Ishmael, 48 F.3d 850 (5th Cir. 1995); United States v. Myers, 46 F.3d 668 (7th Cir. 1995); United States v. Ford, 34 F.3d 992 (11th Cir. 1994); United States v. Pinson, 24 F.3d 1056 (8th Cir. 1994); United States v. DePew, 992 F. Supp. 1209 (D.
examination of the *Kyllo* decision,\(^\text{16}\) and its dissent,\(^\text{17}\) provides a glimpse into the future of the jurisprudence in this area.

Part III analyzes the current state of thermal imaging technology\(^\text{18}\) and the cases that formed the consensus majority opinion prior to the Supreme Court's ruling in *Kyllo*.\(^\text{19}\) This Comment concludes that current thermal imaging technology that reads "off-the-wall"\(^\text{20}\) heat is a non-intrusive form of surveillance. Relying on that conclusion, this Comment asserts that, following the rule in *Katz v. United States*,\(^\text{21}\) there can be no expectation of privacy concerning heat escaping from the home.\(^\text{22}\) Finally, due to U.S. government's policy in the war on drugs, this Comment asserts that public policy requires courts to give law enforcement leeway in prosecuting those who violate the nation’s laws against the growing and distribution of drugs.\(^\text{23}\) Courts should defer to the public policy of authorizing the use of only those cameras that do not reveal details concerning the private activities within the home.

Finally, Part IV of this Comment suggests that the Supreme

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\(^\text{17}\) *Id.* at 41 (Stevens, J., dissenting).

\(^\text{18}\) See infra Part II.A (discussing the technology of thermal imaging technology).

\(^\text{19}\) See cases cited supra note 15 (presenting pre-*Kyllo* opinions discussing the constitutionality of thermal imaging technology).

\(^\text{20}\) *Kyllo*, 533 U.S. at 41 (Stevens, J., dissenting). Justice Stevens stated that "off the wall" surveillance fails to read any heat from inside the home, but rather, reads heat that emanates from the wall. *Id.*


\(^\text{22}\) See, e.g., *Ciraolo*, 476 U.S. at 215 (holding that what a person exposes to the public, even in his home, is not protected by the Fourth Amendment); *Katz*, 389 U.S. at 361 (Harlan, J., concurring) (agreeing that a search falls within the protection of the Fourth Amendment if the individual manifests a subjective expectation of privacy and that society would deem that expectation as reasonable); *Pinson*, 24 F.3d at 1058 (holding that according to the *Katz* test, the defendant failed to have a subjective expectation that heat escaping from his home would remain private and further, that such an expectation would be unreasonable according to societal standards).

Court revisit the holding in *Kyllo*\(^4\) and require a search warrant only for the use of thermal imaging cameras that read "through-the-wall."\(^5\) In addition, the Court should distinguish current thermal imaging technology, which merely reads escaping heat, from undeveloped technology that may reveal details of the private activities within the home.\(^6\) This proposed change provides protection for private activities performed within the home while granting law enforcement officials the tools needed to effectively fight the war on drugs.

II. WO\'T THEY BE ABLE TO SEE MY UNDERPANTS?  EXPLORING THERMAL IMAGING CAMERAS

A. HOW THERMAL IMAGING CAMERAS WORK

A thermal imaging camera is a device that identifies heat emitted from a building.\(^7\) After the device collects the heat emissions,\(^8\) it displays the identified heat energy onto a screen\(^9\) represented by a color on a predetermined scale.\(^10\) These cameras use a "gray scale" to measure the heat.\(^11\) Using this scale, the display screen shows hot objects as white and colder objects as

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24. See *Kyllo*, 533 U.S. at 40 (holding that law enforcement's use of "a device that is not in general public use, to explore the details of the home that would previously have been unknowable without physical intrusion, . . . is a 'search' and presumptively unreasonable without a warrant").

25. Id.

26. See infra Part II.A (discussing the current state of thermal imaging cameras or the Forward Looking Infrared Device (FLIR)).

27. *Field*, 855 F. Supp. at 1519. See also Lisa J. Steele, *Waste Heat and Garbage: The Legalization of Warrantless Infrared Searches*, 29 CRIM. L. BULL. 19, 24 (1993) (discussing the abilities of thermal imaging technology). These heat emissions, also referred to as infrared emissions, combine to form the infrared spectrum. *Id.* The infrared spectrum is made up of "radio waves, microwaves, heat, visible light, ultraviolet light, X-rays, and gamma rays." *Id.* Each part of the infrared spectrum has a different wavelength of the electrical and magnetic fields. *Id.* Thus, the thermal imaging camera is specifically suited to the infrared emissions' part of the spectrum, which under normal conditions, would be invisible to the eye. *Id.*

28. See Steele, supra note 27, at 24 (discussing the process used by FLIR to convert infrared light into a color grid). *Id.* The device's lens focuses infrared light radiated by objects onto a system of mirrors. *Id.* These mirrors, in turn, direct that infrared light onto a detector. *Id.* From there, the detector converts the light into an electric signal that "can be amplified, processed, and stored on videotape or on a screen". *Id.*

29. *Field*, 855 F. Supp. at 1522 (stating that the FLIR's display screen shows objects in less detail than an image on a television).

30. *Id.* According to Captain Paul Russell, a Wisconsin National Guardsman trained in thermal imaging cameras, "all objects radiate some thermal energy" capable of being read. *Id.*

31. *Id.*
various shades of gray or black. However, the terms “hot” and “cold” are somewhat misleading. The camera does not measure actual temperatures. Before the camera is aimed, it is set to a default temperature. The camera then reads objects as “hot” and “cold” as relative to that baseline temperature.

B. Who Uses Thermal Imaging Cameras

The military began using thermal imaging cameras to determine the location of enemy movements during combat. Today, the Drug Enforcement Agency (DEA) and other law enforcement agencies use thermal imaging technology to track illegal drug cultivation. Law enforcement agencies also use

32. See Steele, supra note 27, at 24. Two factors determine the shade of the image. Id. The first is “the amount of heat being radiated from the object.” Id. The second is the “emissivity” or transparency of the object. Id. Various materials allow different amounts of heat to escape just as various window curtains allow different amounts of light to pass through. Id.


34. See Field, 855 F. Supp. at 1522 (stating that thermal imaging cameras do not quantify heat, but merely display the difference between the heat of an object and a set baseline). See also Steele, supra note 27, at 24 (reporting that “in optimal conditions, [thermal imaging cameras] observe temperature differences of 0.2 degrees centigrade”); Infrared Cameras, supra note 33 (advertising several products that feature thermal sensitivity of 0.2 degrees centigrade between objects within the line of sight of the device).

35. See Field, 855 F. Supp. at 1522 (noting that the default is often the current air temperature). Though the default setting applies to most thermal imaging cameras, the camera as issue in Field was the AN-PAS-18 Stinger. Id. at 1521-22.

36. Id. at 1522.

37. United States v. Olson, 21 F.3d 847, 848 n.3 (8th Cir. 1994).

38. Field, 855 F. Supp. at 1522. Many local law enforcement agencies have begun to request funds to purchase thermal imaging cameras to aid in current law enforcement strategies. See Law Enforcement Gear supra note 33 (offering a helpful guide for law enforcement officials writing grants in order “to obtain specialized or high technology surveillance equipment for their respective departments”). The DEA offers grants through the Domestic Cannabis Eradication and Suppression Program for state and local law enforcement to purchase thermal imaging cameras in addition to purchasing some of these cameras on behalf of local agencies. Id. Numerous statutes and public laws authorize the federal government to allocate funds in an effort “to assist State and local agencies to identify, select, develop, modernize, and assist in making purchasing decisions of new technologies for use by law enforcement, courts and correction agencies.” Id. at http://www.x26.com/law_enforcement/contraband.htm.
thermal imaging to locate missing persons or to track suspects in the dark.\textsuperscript{39} Other public servants, such as fire fighters, use thermal imaging cameras to locate people trapped in fires or pinpoint fires that are still smoldering.\textsuperscript{40} Members of the private sector use thermal imaging cameras for a variety of purposes including the detection of power leakages from transformers or overloaded wires by utility and oceanic and geological research.\textsuperscript{41}

While the thermal imaging camera has many uses,\textsuperscript{42} the scope of its technical capabilities in regard to home surveillance remains in question.\textsuperscript{43} What is not in question is the effectiveness of


40. See, e.g., Len Boselovic, \textit{Local Firms’ Products in Demand After Attack}, \textit{PITTSBURG POST-GAZETTE}, Sept. 13, 2001, at B13 (reporting that thermal imaging cameras were used in search and rescue operations at the sites of the terrorist attacks on Sept. 11, 2001); Russell Lissau, \textit{Armed with Technology Devices Making Police, Fire Jobs A Little Easier}, \textit{CHI. DAILY HERALD}, June 3, 2001, at 1 (reporting that fire fighters use FLIR devices to see through smoke to pinpoint fires and missing victims).

41. See \textit{Infrared Cameras}, supra note 33 (listing uses of thermal imaging technology by non-government agencies). Utility companies use thermal imaging cameras to detect power leakages or overloaded wires. Steele, supra note 27, at 25. Thermal imaging cameras are also used by oceanographers and geologists for research. \textit{Id.}

Thermal imaging cameras range in price, costing roughly $18,000 to $25,000 per device. See Lissau, supra note 40, at 1 (reporting current prices for thermal imaging cameras used by State and local law enforcement). Current models of thermal imaging cameras are extremely lightweight and portable. See \textit{Field}, 855 F. Supp. at 1522 (noting that the model of FLIR used was approximately eighteen inches long, weighed five pounds and could be operated through a car’s cigarette lighter); see also \textit{Infrared Cameras}, supra note 33 (listing thermal imaging cameras which are small and portable). Some models are durable enough to attach to helicopters for aerial surveillance. See \textit{Field}, 855 F. Supp. at 1522 (noting that the model of FLIR used was approximately eighteen inches long, weighed five pounds and could be operated through a car’s cigarette lighter); see also \textit{Infrared Cameras}, supra note 33 (listing thermal imaging cameras which are small and portable).

42. See supra notes 5, at 38-39 and accompanying text (discussing the many uses of thermal imaging cameras).

43. See cases cited supra note 15 (citing split circuit and state court opinions as to the constitutionality of using thermal imaging cameras without a search warrant). Various courts held that thermal imaging is outside the scope of Fourth Amendment protection because thermal imaging is only capable of reading heat escaping off a wall. \textit{Id.} See also Mesenbrink & Van Dover, supra note 39, at 33 (addressing the myths of thermal imaging cameras by reaffirming the notion that the devices only “see” heat as it radiates off an
thermal imaging cameras in uncovering indoor marijuana growing operations.\textsuperscript{44} Detection of such operations is successful because indoor growing operations require heat lamps that emit a high level of heat.\textsuperscript{45} Law enforcement agencies typically use thermal imaging cameras when there is suspicion of illegal growing but not enough evidence to secure a search warrant for the premises.\textsuperscript{46} The surveillance, however, must occur at night because solar heat interferes with the readings.\textsuperscript{47} After targeting a building,\textsuperscript{48} the operator of the thermal imaging camera looks for “hot spots” that differ in temperature from the rest of the building suggesting the presence of heat-generating activities.\textsuperscript{49}

C. Further Mutations of Fourth Amendment Case Law: From \textit{Katz} to \textit{Kyllo}

The decision in \textit{Katz}, holding that a wire-tap on the outside of a phone booth was unconstitutional, set the standard to determine whether a surveillance falls under the Fourth Amendment.\textsuperscript{50}

\textsuperscript{44} See cases cited supra note 15 (listing cases where the use of thermal imaging devices helped law enforcement uncover indoor marijuana operations).

\textsuperscript{45} See \textit{Pinson}, 24 F.3d at 1057 (commenting that the high intensity lamps used to grow the marijuana generates approximately 150 degrees of heat). However, some of this heat must be vented because marijuana's optimal growth temperature is between sixty-eight and seventy-two degrees. \textit{Id}. at 1057-58. The venting of the excess heat allows thermal imaging cameras to pick up such illegal activities. \textit{Id}.

\textsuperscript{46} See, e.g., \textit{Myers}, 46 F.3d at 668 (stating that the warrant was based on thermal imaging results, a suspicious purchase, and numerous inquiries into the procedure for marijuana cultivation); \textit{DePew}, 992 F. Supp. at 1210-11 (stating that thermal imaging was performed based on electricity records obtained on defendant's residence which revealed an abnormally high usage of power, consistent with usage from high intensity lamps used in marijuana cultivation).

\textsuperscript{47} See \textit{Field}, 855 F. Supp. at 1522 (noting that the camera must be used when solar heat dissipated from the target).

\textsuperscript{48} See \textit{id}. (noting that the operator must target the building with an unobstructed line of sight which should be between 20 and 200 meters from the target).

\textsuperscript{49} See \textit{Myers}, 46 F.3d at 668 (noting that the thermal scan revealed hot spots consistent with high intensity lamps); \textit{Pinson}, 24 F.3d at 1057 (noting that the roof and skylight emitted large levels of heat compared to the rest of the defendant's residence).

\textsuperscript{50} See \textit{Katz}, 389 U.S. at 347 (holding that the placement of a wire-tapping
Justice Harlan's concurrence in *Katz* established the standard that determines whether a police action violates the Fourth Amendment. The *Katz* test requires courts to determine: (1) whether the individual subjected to the surveillance displayed an actual subjective expectation of privacy; and (2) whether society would deem that expectation reasonable.

Courts have steadfastly applied the *Katz* test to determine the validity of police surveillances within the context of the Fourth Amendment. Cases applying the *Katz* test formed the basic framework from which later courts determined the constitutionality of thermal imaging surveillance. The Supreme Court held in *United States v. Place* that a law enforcement official's use of drug sniffing dogs failed to constitute a search under the Fourth Amendment because the investigation method was non-intrusive. In *California v. Greenwood*, the Supreme Court held that rummaging through the defendant's curbside garbage did not constitute a search because there was neither a subjective nor objective expectation of privacy. Finally, in *Dow Chemical Co. v. United States*, the Supreme Court held that aerial surveillance photographs taken at low altitudes were permissible without a warrant because such searches did not reveal intimate details that violated the constitutional protection of privacy.

Prior to the Supreme Court's decision in *Kyllo*, courts were
split on whether the use of a thermal imaging cameras constituted a search under the Fourth Amendment. The pre-*Kyllo* majority held that thermal imaging cameras were limited in use and unable to interpret activities within the home. However, the minority view, which the Supreme Court adopted in *Kyllo*, considered thermal imaging cameras capable of revealing intimate activities such as sexual intercourse, use of a shower or bath, or even cooking or baking foods.

In *Kyllo*, the Supreme Court finally addressed the constitutionality of thermal imaging cameras. In a 5-4 decision, the majority opinion, authored by Justice Scalia, found that thermal imaging cameras were capable of showing intimate details within the home. As a result, the Court held that law enforcement's use of technology not in general public use, to reveal information that would be unattainable without physical intrusion into the home, constituted a search and required a warrant.

The dissent, authored by Justice Stevens, regarded the capabilities of thermal imaging technology differently. Applying
the *Katz* test, 69 Justice Stevens argued that surveillance with the device failed to constitute a protected search because similar results could occur by mere use of the human senses. 70 The Court’s sharply divided decision demonstrates a need for further examination of the issue of thermal imaging cameras and its scope within the Fourth Amendment.

### III. Analyzing Thermal Imaging Cameras and The Fourth Amendment: The Fate of Law Enforcements’ Use of Technology Hangs in the Balance

After *Kyllo*, a number of courts were left to suppress evidence taken from warranted searches based on information gathered with thermal imaging cameras. 71 However, the Supreme Court failed to adequately consider the rationale that led to the majority view of the constitutionality of thermal imaging searches prior to *Kyllo*. 72 The pre-*Kyllo* majority analogized thermal imaging results to surveillance that fell within the constitutional test of *Katz*. 73 Analyzing the current capabilities of thermal imaging cameras 74 from the perspective of *Katz*, 75 other defining Fourth Amendment

However, the dissent stated that when thermal imaging technology reached the point where it invaded privacy within the home, it agreed with the majority’s rule. See id. at 44 (stating that the protection against physical invasion of a home should apply to its functional equivalent, but no functional equivalent existed in this case) (emphasis added).

69. See supra notes 50-52 and accompanying text (discussing the *Katz* test).

70. *Kyllo*, 533 U.S. at 43-44 (Stevens, J., dissenting). The court analogized thermal reading to a passerby’s perception of snow melting from the roof of a building. *Id.*

71. See Acker v. United States, 533 U.S. 913 (2001) (vacating judgment and remanding to the Seventh Circuit in light of *Kyllo*); United States v. 15324 County Highway E, Richland Cent., 219 F.3d 602 (7th Cir. 2000) (reversing and remanding because conviction for marijuana cultivation was based on information gathered by a thermal imaging search).

72. See cases cited supra note 15 (listing the pre-*Kyllo* majority cases).

73. See cases cited supra notes 13 and 15 (discussing the holding of the pre-*Kyllo* majority cases and the theories of constitutionality applying the *Katz* test).

74. See supra Part II.A (discussing the current state of thermal imaging technology).

75. *Katz*, 389 U.S. at 361 (Harlan, J., concurring). *Katz* continues as the test for determining whether surveillance by law enforcement officials violates the Fourth Amendment, however, the standard remains subject to criticism. See Smith, supra note 5, at 1103-11 (setting forth the proposition that in cases that deal with new and advanced technological search devices, the court should abandon *Katz* and utilize a different test). The replacement test, the “extraordinary device exception,” would focus on community acceptance of the technological device in determining whether law enforcement officials violated the Fourth Amendment. *Id.* at 1112-13. Further, the test would require judges to consider other factors in their analysis, such as the level and sophistication of the technology, the commercial availability of the device, the extent of use in “nongovernmental” sectors, and the length of the devices
Amendment cases,\textsuperscript{76} and the pre-\textit{Kyllo} majority cases,\textsuperscript{77} the use of thermal imaging cameras by law enforcement officials does not violate the expectation of privacy rooted in the Fourth Amendment.\textsuperscript{78}

Current thermal imaging technology should be permissible under the Fourth Amendment because it is: (1) reasonably non-intrusive;\textsuperscript{79} (2) analogous to a theory of discarded garbage;\textsuperscript{80} and (3) analogous to a canine sniff.\textsuperscript{81}

\textbf{A. Don't Worry, This Won't Hurt A Bit: Thermal Imaging Cameras as Non-Intrusive Technology}

Prior to \textit{Kyllo}, most courts viewed thermal imaging technology as a non-intrusive method of surveillance that could be used without violating the Fourth Amendment.\textsuperscript{82} The rationale for this decision stemmed from an analogy of thermal imaging searches to the search performed by law enforcement in \textit{Dow Chemical Co.}.\textsuperscript{83}

In \textit{Dow Chemical Co.},\textsuperscript{84} the Environmental Protection Agency

\begin{thebibliography}{99}
\bibitem{76} See cases cited \textsuperscript{supra} note 14 (discussing Fourth Amendment cases involving the constitutionality of certain types of surveillance).
\bibitem{77} See cases cited \textsuperscript{supra} note 15 (discussing the pre-\textit{Kyllo} majority cases).
\bibitem{78} U.S. CONST. amend. IV.
\bibitem{79} The Supreme Court previously asserted that certain types of surveillance were non-intrusive. See, \textit{e.g.}, \textit{Dow Chemical Co.}, 476 U.S. at 239 (holding that surveillance performed in an airplane with a camera at low altitudes were not intruding on any particular right of privacy); \textit{Ciraolo}, 476 U.S. at 213 (stating that objects that were under surveillance from a plane at varying altitudes were in “plain view” and thus did not qualify as intrusive). Some courts have analogized \textit{Dow Chemical Co.} and \textit{Ciraolo} to cases involving thermal imaging surveillance. See generally \textit{Ishmael}, 48 F.3d 850; \textit{Ford}, 34 F.3d 992.
\bibitem{80} See \textit{Greenwood}, 486 U.S. at 43-44 (holding that no subjective privacy expectation exists in garbage after placement by the curb for pick-up). Many U.S. courts of appeals have used \textit{Greenwood} to compare heat escaping from a home to garbage discarded from a household. See generally \textit{Myers}, 46 F.3d 668; \textit{Ford}, 34 F.3d 992; \textit{Pinson}, 24 F.3d 1056; \textit{Penny-Feeney}, 773 F. Supp. 220, 226. This analogy became known as the “waste heat” theory. \textit{Pinson}, 24 F.3d at 1058.
\bibitem{81} See \textit{Place}, 462 U.S. at 707 (holding that canine sniffs do not violate the Fourth Amendment because the method is so minimally intrusive that no reasonable expectation of privacy would be recognized). Subsequent courts picked up this analogy in regards to thermal imaging searches. See generally \textit{Kyllo}, 190 F.3d 1041; \textit{Pinson}, 24 F.3d at 1058.
\bibitem{82} See \textit{Ishmael}, 48 F.3d 855-57 (holding that the thermal imaging camera was not an intrusive search, similar to the aerial cameras used in \textit{Dow Chem. Co.}); \textit{Ford}, 34 F.3d 996 (holding that use of a thermal imaging camera was not an intrusive search).
\bibitem{83} \textit{Ishmael}, 48 F.3d at 855-56; \textit{Ford}, 34 F.3d at 996-97.
\bibitem{84} See \textit{Dow Chem. Co.}, 476 U.S. at 239 (holding that use of an aerial camera was not a Fourth Amendment search).
\end{thebibliography}
(EPA) sent airplanes over a Dow chemical manufacturing facility at various altitudes to photograph the facility’s operations using a sophisticated aerial photography camera. Dow claimed that the photographs constituted a search under the Fourth Amendment and objected to the method of the surveillance. The Court recognized the implications of another Fourth Amendment surveillance case, California v. Ciraolo. In Ciraolo, the Supreme Court held that naked-eye surveillance, even from an airplane flying at altitudes as low as 1,000 feet, did not violate the Fourth Amendment because the objects of the surveillance were in the “plain view” of the public. Likewise, the Supreme Court in Dow Chem. Co. found the surveillance by the EPA to be non-intrusive because the camera used “was not . . . some unique sensory device that . . . could penetrate the walls of buildings and record conversations in Dow’s plants, offices, or laboratories, but rather a conventional, albeit precise, commercial camera commonly used in mapmaking.”

The Eleventh Circuit applied the holding of Dow Chemical Co. in United States v. Ford, ruling that the use of thermal imaging posed little threat to the privacy of individuals because it revealed very few details regarding activities that take place in the home. The Eleventh Circuit found it particularly important that the thermal imaging camera used could not penetrate walls or

85. Id. at 229. The EPA used the photographs as part of a second inspection of the Dow plant. Id. The EPA had previously performed an on-site inspection but was denied a second inspection. Id. Therefore, they hired a commercial aerial photographer to take pictures of the facility, all of which was done without Dow’s knowledge or consent. Id. at 229-30.

86. Id. at 230. Dow felt that it had demonstrated a subjective expectation of privacy by enclosing certain operations from ground level surveillance. Id. However, Dow left many critical operations open to surveillance from above. Id.

87. Id. at 234-35.

88. Id.

89. Ciraolo, 476 U.S. at 215. The Court held that objects exposed to the public are no longer protected by the Fourth Amendment. Id. Further, the Court found that surveillance from an airplane was “physically nonintrusive.” Id. at 213.


91. Ford, 34 F.3d at 992. In Ford, Florida law enforcement officials used a thermal imaging camera to identify heat escaping from the defendant, Jerry Ford’s trailer. Id. at 993. Law enforcement official found Ford growing over 400 plants in the trailer using sophisticated hydroponic technology. Id. In an attempt to conceal the light and heat generated by his growing lamps, Ford boarded up the windows to his trailer and installed a blower to vent the excess heat. Id.

92. Id. at 996-97. The court found that the camera used in this surveillance was of such “low resolution as to render it incapable of revealing the intimacy of detail and activity protected by the Fourth Amendment.” Id.
reveal human activity within the structure. Following Ford, courts reasoned that the information obtained by thermal imaging cameras does not violate the interests for which the Fourth Amendment was created, “namely, the intimacy, personal autonomy and privacy associated with a home . . . .”


Prior to Kyllo, the courts developed a method of examining the results of thermal imaging scans used by law enforcement officials. They determined that thermal imaging cameras did not show activities that occurred within the home, but instead showed how much heat was discarded from the building. The Supreme Court’s decision in Greenwood provided many courts with the necessary analogy to introduce thermal imaging cameras as a constitutionally permitted form of surveillance.

In Greenwood, the Court addressed the constitutionality of a law enforcement official’s act of rummaging through garbage that had been set on the curb for disposal. The Court held that police could look through an individual’s garbage without securing a warrant because it is common knowledge that garbage left for curbside pick-up is readily accessible by the public. The Court

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93. Id.

94. See cases cited supra note 15 (discussing pre-Kyllo majority cases that found search warrants unnecessary when law enforcement officials used thermal imaging technology).

95. Pinson, 34 F.3d at 1059.

96. See cases cited supra note 80 (discussing the waste heat theory as merely one way of analyzing the constitutionality of law enforcement’s use of thermal imaging technology without obtaining a search warrant).

97. Penny-Feeney, 773 F. Supp. at 223. The court in Penny-Feeney was one of the first courts to call the heat escaping a home “abandoned heat.” Id. at 225.

98. Many courts have held that the heat emanating from a home is “waste heat” and, like discarded garbage, no longer holds an expectation of privacy. Myers, 46 F.3d at 670; Ford, 34 F.3d at 997; Pinson, 24 F.3d at 1058; Penny-Feeney, 773 F. Supp. at 226.

99. Greenwood, 486 U.S. at 37. Police suspected the defendant, Greenwood, of trafficking narcotics based on tips from informants and complaints by neighbors regarding late-night traffic in front of the defendant’s residence. Id. The officer in charge of the investigation asked the neighborhood garbage man to separate the defendant’s garbage from the other collections so she could evaluate the defendant’s trash. Id. After sorting through the defendant’s garbage, the officer found evidence of narcotic use within the defendant’s household. Id. at 37-38. The officer used this, in combination with other evidence, to secure a warrant for the defendant’s residence. Id.

100. Id. at 40. The court found that by placing garbage on the curb, the disposer of such garbage leaves it to the access of “animals, children, scavengers, snoops, and other members of the public.” Id. at 40. Furthermore, the Court found that the purpose of placing garbage on the curb is to “convey [the garbage] to a third party.” Id.
found that no subjective expectation of privacy existed in curbside garbage because the individual waived any expectation when public inspection became foreseeable.\textsuperscript{101} Further, the Court held that even if an individual holds a subjective expectation of privacy regarding discarded garbage, society would not deem it an objectively reasonable expectation.\textsuperscript{102} Greenwood gave credence to Ciraolo by allowing courts to include discarded waste as an object that can be searched without a warrant because it is within the "plain view" of law enforcement.\textsuperscript{103}

Subsequently, courts used Greenwood to draw an analogy regarding the emissions picked up by thermal imaging cameras during surveillance.\textsuperscript{104} Courts viewed the heat escaping from the home as discarded energy, similar to garbage left by the curb or smoke arising from a chimney.\textsuperscript{105} The Katz test\textsuperscript{106} has been applied in these thermal imaging cases. Many courts refuse to recognize a subjective expectation of privacy because indoor marijuana cultivators freely discharge the excess heat generated by their growing lamps.\textsuperscript{107}

\begin{itemize}
\item \textsuperscript{101} Id. at 41. The Court relied on the Katz test in making this determination. Id.
\item \textsuperscript{102} Greenwood, 486 U.S. at 41.
\item \textsuperscript{103} See id. (holding that police cannot be expected to ignore "evidence of criminal activity that could have been observed by any member of the public").
\item \textsuperscript{104} See cases cited \textsuperscript{supra} note 80 (discussing the constitutionality of thermal imaging technology under the waste heat theory).
\item \textsuperscript{105} See Myers, 46 F.3d at 670 (holding that the use of a thermal imaging camera does not violate the Fourth Amendment).
\item \textsuperscript{106} Katz, 389 U.S. at 361 (Harlan, J., concurring).
\item \textsuperscript{107} Myers, 46 F.3d at 669. Law enforcement officials suspected defendant, Dale Myers, of growing marijuana in his residence. Id. at 668. After setting up a thermal imaging camera to detect heat discharge, the officers picked up several areas of heat excess heat in the structure. Id. at 669. The defendant, in order to discharge the heat generated by the growing lamps in his home, vented the heat from a vent on the roof. Id. See also Ford, 34 F.3d at 996-97 (stating that the high intensity of the defendant's heat lamps tipped-off law enforcement officials to the presence of his illegal marijuana growing operation); Pinson, 24 F.3d at 1058-59 (holding that defendant freely allowed heat from high intensity marijuana growing lamps to escape from his trailer). Law enforcement officials performed a thermal imaging scan of the defendant's home in a helicopter flyover. Id. at 1057. This thermal imaging scan showed large hot spots emanating from a third floor window and the roof of the structure. Id. The defendant needed to get rid of the excess heat generated by the growing lamps in order to preserve the proper growing temperature for his marijuana plants. Id. at 1058. See also Penny-Feeney, 773 F. Supp. at 226 (holding that thermal imaging is not a search within the meaning of the Fourth Amendment). Police scanned the defendant's house using a thermal imaging camera mounted on a helicopter. Id. at 223. During that scan, police observed certain areas of immense heat coming from the defendant's residence and garage. Id. at 223-24. Officers also noted that one particular area in the garage seemed to be a discharge point for the heat. Id. This discharge point was consistent with a report from an informant who described the defendant's growing operation, including a number of fans that
Further analysis of the application of *Katz* illustrates the unwillingness of these courts to find any expectation of privacy that society would consider objectively reasonable under the Fourth Amendment. The pre-**Kyllo** majority found waste products that were intentionally or inevitably exposed to the public undeserving of the protection of the Fourth Amendment. These pre-**Kyllo** courts viewed waste heat from a home similar to a waste product that was intentionally or inevitably placed in front of the public. Marijuana growers purposely discharge excess heat from their growing facilities in order to achieve a proper temperature to facilitate growth. Therefore, because marijuana growers intentionally release this heat to the public's senses, like discarded garbage, there can be no expectation of privacy.

The current state of thermal imaging technology is analogous to curbside garbage. A law enforcement officer aiming a thermal imaging camera at a building is similar to an officer sorting through someone’s curbside garbage. Both officers are merely examining waste emanating from a home. However, while an officer sorting through garbage uses his hands and other physical senses, the officer looking for waste heat uses the thermal imaging camera. In both scenarios, the law enforcement official was looking at something that was either intentionally or inevitably revealed to the public. The Supreme Court's decision in **Ford** illustrates that the use of a sensory enhancing device in surveillance does not make it unconstitutional. Further, because

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108. See cases cited *supra* note 80 (discussing cases where the courts deemed expectations of privacy unreasonable).
110. See cases cited *supra* note 80 (noting cases where courts found expectations of privacy to be unreasonable).
111. *Id*.
112. See *Pinson*, 24 F.3d at 1057-58 (stating that optimal growth of marijuana occurs between sixty-eight and seventy-two degrees Fahrenheit). Failure to vent the excess heat generated by the growing lamps would likely cause damage to the marijuana crop. *Id*. Thus, venting is necessary to the proper indoor growth of marijuana. *Id*.
113. See cases cited *supra* note 80 (noting instances where courts found expectations of privacy to be unreasonable).
114. See **Greenwood**, 486 U.S. at 39-40 (holding that police surveillance without a search warrant included rummaging through garbage left out on the curb).
115. See cases cited *supra* notes 15 and 80 (discussing cases that analyzed the constitutionality of using thermal imaging cameras without a warrant).
116. **Greenwood**, 486 U.S. at 37; see cases cited *supra* note 80 and accompanying text (analogizing curbside trash to heat escaped from one's home).
117. See **Ford**, 34 F.3d at 997 (holding that the use of a thermal imaging camera's extra-sensory capabilities does not violate the *Katz* test); see also
the thermal imaging technology currently used by law enforcement only reads heat escaping from a structure, there is little fear that any private activities in the home will be exposed.18

C. Watch Out Fido, There's A New Sheriff in Town: Thermal Imaging Analogized to Canine Sniffs

Pre-Kyllo courts analogized thermal imaging surveillances to canine sniffs when holding that the surveillances did not require a warrant.19 In Place, the Supreme Court examined the constitutionality of allowing law enforcement officials the use a positive response from a dog trained to recognize narcotics as the basis of reasonable suspicion in detaining an individual's luggage.20 The Court held that a sniff by a well trained narcotic detection dog does not constitute a Fourth Amendment search because the search does not require the contents of the luggage to be exposed to public view.21 The Court noted that a canine sniff is a non-intrusive method of searching that only reveals the presence of absence of narcotics.22 The information from a canine sniff is extremely limited, providing only information to the presence of narcotics.23 Thus, privacy remains intact because all non-contraband items in the luggage remain hidden from public view and the owner is "not subjected to the embarrassment and inconvenience entailed in less discriminate and more intrusive

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18. See sources cited supra note 43 and accompanying text (discussing why current thermal imaging should not require a search warrant).
19. See Place, 462 U.S. at 707 (holding that warrantless canine sniffs do not violate the Fourth Amendment).
20. Id. at 697-98. Based upon suspicious behavior, law enforcement officers in Miami International Airport approached the defendant, Raymond Place, as he was en route to New York City. Id. at 698. Authorities asked the defendant for identification and at that time Place consented to the officers searching his luggage. Id. The officers declined to search the bags, but did decide call the DEA to report the encounter. Id. Two DEA agents watched the defendant upon his arrival in New York City, and after further suspicious activity, asked the defendant to consent to a search of his luggage to which he refused. Id. at 698-99. Agents then confiscated the bags and subjected them to a canine sniff resulting in a positive indication for narcotics. Id. at 699. However, the agents waited three days before obtaining a search warrant, and for that extended period of seizure of the defendant's property, the Court upheld the reversal of the Place's conviction. Id. at 699-700.
21. Place, 462 U.S. at 707.
22. Id. In regards to the nature of canine sniffs, the Court pointed out that "[w]e are aware of no other investigative procedure that is so limited both in the manner in which the information is obtained and in the content of the information revealed by the procedure." Id.
23. Id.
A few of the pre-Kyllo courts analogized Place to rationalize thermal imaging surveillances. These courts compared the heat escaping from a structure to the odor of drugs escaping the container in which they lie. Similar to a dog trained in picking up the escaping scent of narcotics, a thermal imaging camera reads the heat escaping from a building. Like canine sniffs, thermal imaging cameras ensure that privacy is not violated because the camera does not reveal intimate details of the activities within the home. These courts refused the argument that society would consider heat discharged from the home worthy of protection under the Fourth Amendment.

IV. TWEAKING KYLLO: WHY LAW ENFORCEMENT SHOULD KEEP THERMAL IMAGING CAMERAS AS A WARRANTLESS WEAPON AGAINST THE WAR ON DRUGS

The Supreme Court's decision in Kyllo has effectively restricted law enforcement in fighting the war on drugs. Officials may use thermal imaging cameras, but they must first secure a warrant based on probable cause. Furthermore, questions arise as to whether law enforcement officials will regain the use of thermal imaging cameras as a warrantless weapon once they are in "general public use." Without further clarification from the Court, chances are that even if thermal imaging cameras

124. Id.
125. Kyllo, 190 F.3d at 1046; Pinson, 24 F.3d 1058.
126. See Kyllo, 190 F.3d at 1046 (finding that the thermal imaging camera indicated that waste heat was escaping from the home, similar to a drug sniffing dog indicating the presence of drugs); see also Pinson, 24 F.3d at 1059 (holding that the thermal imaging scan used to secure the search warrant did not violate the defendant's Fourth Amendment rights to privacy within the home).
127. Id. at 1058.
128. Id. at 1058-59.
129. See Kyllo, 190 F.3d at 1046; Pinson, 24 F.3d at 1059 (explaining why society would not consider heat emanating from the home worthy of Fourth Amendment protection).
131. Kyllo, 533 U.S. at 40.
132. Id. Justice Scalia, writing for the majority, stated that "[w]here, as here, the Government uses a device that is not in the general public use, to explore details of the home that would previously have been unknowable without physical intrusion, the surveillance is a 'search' and presumptively unreasonable without a warrant." Id. Unfortunately, Scalia failed to shed any light on what must occur before the thermal imaging camera can become a device of general public use. Nor did he give any examples of devices that are analogous to this situation.
become a device commonly used by the public, law enforcement will not be able to use the them without a search warrant. With these concerns in mind, the Supreme Court should reexamine Kyllo and review further the reasoning of the pre-Kyllo majority.

Current thermal imaging technology used by law enforcement only reads heat being emitted from a home's walls. The camera only picks up that heat which passes through the walls of the targeted structure. Further, the camera cannot read beyond the exterior of the structure because the exterior wall is the first object read by the camera. Thus, if the technology of the thermal imaging camera cannot provide intimate details regarding the activities taking place within the home, the interests to be furthered by the Fourth Amendment—namely intimacy, personal autonomy, and privacy associated with the home—are not disturbed. Therefore, thermal imaging can continue to serve as a useful tool to law enforcement agencies while respecting the privacy of individuals within the home.

However, the Court in Kyllo limited this important warrantless weapon in fighting the war on drugs by eliminating the use of all thermal imaging cameras without the use of a search warrant. With a little modification to the holding, the Court could effectively protect against the invasion of privacy within the home while still providing law enforcement the tools they need to fight the war on drugs.

The Supreme Court can eliminate the problems caused by the Kyllo holding by (1) reanalyzing all current thermal imaging

133. See Colbridge, supra note 130, at 30-31 (commenting that law enforcement will likely never get the thermal imaging camera back as a warrantless search tool). There are two reasons why law enforcement officials may never be able to use thermal imaging cameras without a search warrant. Id. First, the Supreme Court pointed out that “the Fourth Amendment draws a firm line at the entrance to the house.” Id. (citing Kyllo, 533 U.S. at 39.) Colbridge noticed the majority's strong language regarding the sanctity of the home including the statement that “it is unreasonable to assume that governmental intrusions into private areas are permissible because everyone else is doing it.” Colbridge, supra note 130, at 31. Second, private and commercial uses of thermal imaging technologies do not cause the Court the same degree of concern. Id. Though this may seem unfair, the basic premise for holding government actors to a higher standard is because “[t]he Constitution was written to limit the authority of the Government, not private citizens.” Id.

134. See sources cited supra note 43 (finding that thermal imaging cameras only read heat emitted from the structure).

135. Id.

136. See Messenbrink & Van Cover, supra note 39, at 33 (commenting on the limitations of thermal imaging cameras); see also Kyllo 533 U.S. at 41 (Stevens, J., dissenting) (dissenting in part because the case before the Court involved "off-the-wall" surveillance and thus, "observations of the exterior of the home.").

137. Pinson, 24 F.3d at 1059.
technology and classifying it into technology that reads “through-the-wall” and technology that reads “off-the-wall” and narrowing the holding in *Kyllo* to exclude the use of only “through-the-wall” thermal imaging cameras without a search warrant.

First, the Court needs to reanalyze the classification of all thermal imaging camera technology. The Court should place thermal imaging cameras into two distinct categories: (1) “off-the-wall” thermal imaging cameras—thermal imaging cameras unable to penetrate the walls of the home and that only read heat escaping from within the building, and (2) “through-the-wall” thermal imaging cameras—thermal imaging cameras that transcend current technology and read through walls to decipher levels of heat inside the home.

Numerous sources recognize that current thermal imaging technology fits into the “off-the-wall” category. Analyzing “off-the-wall” thermal imaging technology according to the well-settled *Katz* test would not result in a violation of the Fourth

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138. The names given to the categories of thermal imaging cameras used here are based on the characterizations used by Justice Stevens in his dissenting opinion in *Kyllo*, 533 U.S. at 41 (Stevens, J., dissenting). This is not meant to suggest that the Court needs to assume a supervisory role. The Court need only provide law enforcement groups a list of features that would make a device either “through-the-wall” or “off-the-wall” technology.

139. See id. at 50 (stating that the facts in *Kyllo* dealt with heat that escaped into public view and was then picked up by a thermal imaging camera).

140. See id. at 51 (stating that the Court is commendable in its concern for the protection of privacy within the home, but here, they have “failed to heed the tried and true counsel of judicial restraint.”). Justice Stevens stated that the Court, instead of facing the issue of the constitutionality of current thermal imaging technology, created “an all-encompassing rule for the future.” Id.

141. See Messinbrink & Van Dover, supra note 39, at 33 (arguing that current thermal imaging technology is only capable of reading heat emitted from buildings). See also Field, 855 F. Supp. at 1522-23 (repeating the testimony of Captain Paul Russell, who identified current thermal imaging technology as capable of reading heat from escaping a targeted building).

142. *Katz*, 389 U.S. at 360-61 (Harlan, J., concurring). Some authors have struggled with applying the *Katz* test to the use of thermal imaging. See Smith, supra note 5, at 1111-16 (noting that the *Katz* test is insufficient for today’s police surveillance technology). Smith believes that there are flaws inherent to the *Katz* test that prevent the courts from successfully applying it to thermal imaging cameras and other advanced technology. Id. at 1112. A new test is proposed for determining whether thermal imaging cameras and other technologies are within the scope of the Fourth Amendment. Id. at 1112-16. The test is called the “extraordinary device exception” and would require courts to make a preliminary inquiry into the device’s ability. Id. at 1112. Courts would then apply the *Katz* test to normal devices and apply the exception “to devices which are ‘extraordinary’ in a certain community.” Id. This application would be reviewed under the strict scrutiny standard and would require courts to look to the Fourth Amendment for guidance. Id. at 1113. First courts would ask whether “[u]nder community standards, is the device common to society, such that its use and existence has become
Amendment. Because the individual allows heat to escape from the building there is no subjective expectation of privacy. Even if there were such an expectation of privacy, society would deem it unreasonable. Further, the technology does not reveal intimate details of the private activities within the home. Thus, the intimacy, personal autonomy, and privacy, guaranteed by the Fourth Amendment, will not be disturbed.

Second, the Court should reconsider its overly broad ban against the use of all thermal imaging cameras. The Court should narrow the holding of Kyllo to require law enforcement officers to secure a search warrant only when using thermal imaging technology that allows for “through-the-wall surveillance” of the building. Narrowing the holding will have a two-fold effect. First, it will allow law enforcement to use the less invasive “off-the-wall” thermal imaging cameras without being required to secure a search warrant. As a result, law enforcement will reacquire an important warrantless weapon in fighting the war on drugs. Second, narrowing the holding of Kyllo will not interfere with the protection of individual privacy in the home from technology that violates the primary purpose of the Fourth Amendment. Thus, removing “through-the-wall” thermal imaging technology from the arsenal of warrantless weapons will protect individual privacy from unconstitutional intrusions on privacy in the home.

The Supreme Court should give special treatment to thermal imaging technology, allowing it to reanalyze the Kyllo rule because, simply stated, public policy requires it to do so. Certainly there are matters of individual privacy in the home at stake; however, there are countervailing policies as important as maintaining privacy in the home, such as maintaining public safety and health.

integrated into the ordinary societal experience.” Id. at 1112-13. Further analysis would occur depending on the courts’ classification of the device. Id. at 1113. If the device is common, it would be subject to strict scrutiny only if it is deemed a search under the Katz test. Id. If the device is uncommon, it would automatically be subject to strict scrutiny under the Fourth Amendment. Id.

143. Pinson, 24 F.3d at 1059.

144. Id.

officers' use of non-invasive weapons such as the thermal imaging camera aid them in bringing drug growers to justice.

Society has recognized a need to control the manufacture, distribution and possession of illegal drugs.\textsuperscript{146} One of the methods to control this problem is by eliminating drug-growing operations.\textsuperscript{147} However, marijuana growers began to move their operations inside buildings in response to the effective elimination of outdoor growing operations by law enforcement officials.\textsuperscript{148} Although there are other tools available to law enforcement officials, the thermal imaging camera provided an excellent weapon in detecting indoor marijuana-growing operations.\textsuperscript{149} Before \textit{Kyllo}, thermal imaging scans, along with informant tips, provided an excellent basis for probable cause, leading to the securing of a search warrant for the premises.\textsuperscript{150}

\textit{Kyllo} detrimentally affects law enforcement officials' ability to eliminate illegal marijuana-growing operations by eliminating non-invasive thermal imaging cameras from the available arsenal of law enforcement officials. Though individual privacy within the home certainly presents itself as a major concern,\textsuperscript{151} law enforcement officials fail to pose a threat to that concern because current thermal imaging cameras do not reveal intimate activities conducted inside the home.\textsuperscript{152} These cameras merely read the amount of heat escaping from a building.\textsuperscript{153} Therefore, the rationale for protecting privacy inside the building is maintained.

The Court should not compromise individual privacy within the home for the sake of stopping the growth, distribution, and sale of illegal drugs. Instead, the Court should allow law enforcement officials the use of technologies that, like thermal imaging cameras, work as an effective investigative tool in

\begin{footnotes}
\item[147] See \textit{Policy}, supra note 145, at 6 (reporting that elimination of national drug growing operations is vital to the success of the war on drugs).
\item[148] See \textit{Marijuana}, supra notes 1-4 and accompanying text (discussing further the rise of indoor marijuana growing operations).
\item[149] See \textit{Colbridge}, supra note 130, at 26 (finding the thermal imaging camera an effective weapon in the war on drugs).
\item[150] See cases cited supra note 15 (listing cases where thermal imaging scans produced search warrants).
\item[151] See cases cited supra note 15 (listing cases that cited a need for privacy in the home as a central issue of the fourth amendment). See also \textit{Kyllo}, 533 U.S. 27 (holding that the concern for privacy in the home trumps law enforcement's need to use thermal imaging cameras without a warrant).
\item[152] See cases cited supra note 15 (noting the cases that created the pre-\textit{Kyllo} majority, finding thermal imaging technology non-intrusive to privacy).
\item[153] See supra Part II.A (explaining the capabilities of thermal imaging cameras).
\end{footnotes}
locating illegal drugs while maintaining privacy in the home. Though law enforcement should not use any technology that reveals intimate details of activities that occur within inside home without first securing a search warrant based on probable cause, this is not the case with current thermal imaging technology. 154

V. CONCLUSION

The issue of thermal imaging cameras called into question the validity of law enforcement's use of new technologies. Did Kyllo close that door on the nose of law enforcement officials? Did the majority handcuff law enforcement's use of a powerful investigative tool in fighting the war on drugs?

Courts have classified thermal imaging technology as a non-invasive method of looking at what an individual placed into public view. 155 Prior courts analogized the thermal imaging scans to a canine-sniff or a police search of discarded curbside garbage. 156 Other courts cite concerns that thermal imaging scans provide law enforcement with a glimpse of the private activities that occur in the home. 157 Certainly, the Court should seek to protect an individual's privacy within the home. However, the Court should also show deference to national drug policy, and allow law enforcement to use tools that aid in fighting the war on drugs. Therefore, the Supreme Court should narrow its holding in Kyllo to limit only thermal imaging cameras that intrude on individual privacy within the home. Thus, by following this concept, they would protect privacy concerns of the Fourth Amendment while allowing law enforcement officials to use a strong weapon in hunting down those who violate national drug policies.

154. See supra Part II.A (explaining the current state of thermal imaging technology, including a discussion on the device's limitations).
155. See cases cited supra note 15 (noting the pre-Kyllo courts that found thermal imaging cameras outside of the scope of the Fourth Amendment).
156. See cases cited supra note 15 (noting the pre-Kyllo courts that found thermal imaging cameras outside of the scope of the Fourth Amendment).
157. See cases cited supra note 15 (noting the pre-Kyllo courts that found the use of thermal imaging cameras was a search that violated the Fourth Amendment).