



3-1-1997

## Thermal Imaging Technology: Should Its Warrantless Use By Police Be Allowed in Residential Searches?

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Mark J. Kwasowski, *Thermal Imaging Technology: Should Its Warrantless Use By Police Be Allowed in Residential Searches?*, 3 Tex. Wesleyan L. Rev. 393 (1997).

Available at: <https://doi.org/10.37419/TWLR.V3.I2.4>

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# THERMAL IMAGING TECHNOLOGY: SHOULD ITS WARRANTLESS USE BY POLICE BE ALLOWED IN RESIDENTIAL SEARCHES?

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## INTRODUCTION

Thermal-energy detection is one of the latest technological tools in the government's arsenal used to identify and eliminate illegal indoor cultivation of marijuana.<sup>1</sup> Indoor cultivation has become prevalent because law enforcement officials cannot detect the growing mari-

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1. See Daniel J. Polatsek, *Thermal Imaging and the Fourth Amendment: Pushing the Katz Test Towards Terminal Velocity*, 13 J. MARSHALL J. COMPUTER & INFO. L. 453, 453 (1995).

juana plants using traditional means of detection.<sup>2</sup> Indoor cultivation is also highly lucrative since as many as four crops can be harvested annually<sup>3</sup> from a nominal investment in seeds, water, and artificial lighting. The artificial lighting used in the cultivation process, however, generates thermal energy that either escapes or is vented to the outside.<sup>4</sup> Such thermal energy can be detected by a thermal energy detection instrument, known as Forward Looking Infrared Radar ("FLIR").<sup>5</sup> FLIR senses differences in surface temperatures and can record its findings on videotape.<sup>6</sup>

Using FLIR generated visual images, law enforcement officials may infer that an individual is cultivating marijuana plants indoors. These inferences, when combined with other evidence, may then lead police to discover illegal gardening operations.<sup>7</sup> But, the warrantless use of FLIR thermal imagery to locate indoor marijuana cultivation has been challenged in the courts on Fourth Amendment<sup>8</sup> grounds.<sup>9</sup> A threshold issue in these cases is whether scanning a person's residence with a thermal imager constitutes a search under the Fourth Amendment.<sup>10</sup>

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2. See Mindy G. Wilson, *The Prewarrant Use of Thermal Imagery: Has This Technological Advance in the War Against Drugs Come at the Expense of Fourth Amendment Protections Against Unreasonable Searches?*, 83 KY. L.J. 891, 892 (1995).

3. See *id.*

4. See Bradley J. Plaschke, *United States v. Deaner: Thermal Imagery, the Latest Assault on the Fourth Amendment Right to Privacy*, 12 J. MARSHALL J. COMPUTER & INFO. L. 607, 608 n.5 (1994) (citing Telephone Interview with Col. Carlos Aniglioh, President, Thermal Technologies, Inc. (Feb. 12, 1993)).

5. See Polatsek, *supra* note 1, at 453.

6. See *id.* at 453-54. See also *United States v. Robinson*, 62 F.3d 1325, 1327 n.2 (11th Cir. 1995), *cert. denied*, 116 S. Ct. 1848 (1996). The *Robinson* court stated, "FLIR thermal imaging is a process whereby differences in heat emissions are measured and reflected on a videotape. Heat concentration is indicated on a videotape on a spectrum of light to dark, with bright white showing intense heat." *Id.*

7. See *Robinson*, 62 F.3d at 1327 n.2.

8. The Fourth Amendment to the United States Constitution provides:

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.

9. See, e.g., *infra* notes 11-13.

10. There is a "basic notion that in the hierarchy of Fourth Amendment values, the privacy and sanctity of the *home* rank very high." JEROLD H. ISRAEL ET AL., *CRIMINAL PROCEDURE AND THE CONSTITUTION: LEADING SUPREME COURT CASES AND INTRODUCTORY TEXT* 146 (1996 ed.) (emphasis added). The Supreme Court has stated, "At the risk of belaboring the obvious, private residences are places in which the individual normally expects privacy free of governmental intrusion *not authorized by a warrant*, and that expectation is plainly one that society is prepared to recognize as justifiable." *United States v. Karo*, 468 U.S. 705, 714 (1984) (emphasis added). Moreover, an individual's heightened expectation of privacy extends to the *curtilage* of his residence. See *United States v. Dunn*, 480 U.S. 292, 300 (1987). "At common law, the curtilage is the area to which extends the intimate activity associated with the sanctity of a man's home and privacies of life. The protection afforded the curtilage is essentially a protection of families and personal privacy in an area intimately linked to

Although the Supreme Court has not ruled on this matter, the Fifth,<sup>11</sup> Seventh,<sup>12</sup> Eighth,<sup>13</sup> and Eleventh Circuits have found the use of FLIR does not violate the Fourth Amendment's protection against unreasonable searches.<sup>14</sup>

However, the federal district courts, as well as state courts, are not always reaching similar conclusions regarding the constitutionality of FLIR imaging.<sup>15</sup> Furthermore, a decision by the Tenth Circuit, although subsequently vacated, found the use of FLIR a search and hence, absent a warrant or probable cause, unconstitutional.<sup>16</sup> Never-

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a home, both physically and psychologically, where privacy expectations are most heightened." *California v. Circaolo*, 476 U.S. 207, 212-13 (1986) (citation omitted). The Supreme Court urged the use of four factors to determine whether an area was within a home's curtilage: (1) the area's proximity to the home, (2) whether the area was within an enclosure surrounding the home, (3) the nature and use of the area, and (4) the visibility of the area to casual observers. *See Dunn*, 480 U.S. at 302. In *Dunn*, police officers, without a search warrant, crossed several fences on the defendant's property to get close enough to the defendant's barn to shine a light in its window and observe what they determined was a drug laboratory. *See id.* at 297-98. The Court held the area searched, which was approximately sixty yards from the defendant's home, was *not* within the curtilage of the home and therefore the defendant could have no reasonable expectation of privacy protected by the Fourth Amendment. *See id.* at 305.

11. *See United States v. Ishmael*, 48 F.3d 850 (5th Cir.), *cert. denied*, 116 S. Ct. 74, and *cert. denied*, 116 S. Ct. 75 (1995). The Fifth Circuit Court of Appeals, however, limited its holding to FLIR usage in an open field. *See id.* at 853. Open fields are areas that police may search without a warrant. *See Oliver v. United States*, 466 U.S. 170 (1984) (affirming a distinction between open fields and a home's curtilage for Fourth Amendment purposes); *United States v. Pace*, 955 F.2d 270 (5th Cir. 1992) (holding a barn fifty to sixty feet from a residence was in an open field rather than within a residence's curtilage). *See also* BLACK'S LAW DICTIONARY 1091 (6th ed. 1990). In *Ishmael*, police officers used FLIR technology to canvass the perimeter of a steel building housing an illegal gardening operation located approximately two to three hundred feet from the owner's secluded residence. *See id.* at 857. *Ishmael* contended, and the trial court held, that the government's intrusion, although not within the curtilage of his residence, nevertheless violated his reasonable expectation of privacy "that [his] effects, associated with the secreted metal building and the business being conducted there, were safe from Governmental surveillance." *Id.* at 852 (quoting *United States v. Ishmael*, 843 F. Supp. 205, 211 (E.D. Tex. 1994)). The circuit court, however, reaffirmed its holding in *United States v. Pace*, 955 F.2d 270 (5th Cir. 1992) that "there is no *business curtilage* surrounding a barn lying within an open field," and thus, governmental officials were permitted to surveil *Ishmael's* steel building because it stood in an open field like the barn in *Pace*. *See Ishmael*, 48 F.3d at 856-57 (quoting *Pace*, 955 F.2d at 276). Furthermore, the *Ishmael* court held that a FLIR instrument is non-intrusive and "does not intrude in any way into the privacy and sanctity of a home." *Id.* at 857 (quoting *United States v. Myers*, 46 F.3d 668, 669 (7th Cir.), *cert. denied*, 116 S. Ct. 213 (1995)).

12. *See United States v. Myers*, 46 F.3d 668 (7th Cir.), *cert. denied*, 116 S. Ct. 213 (1995).

13. *See United States v. Pinson*, 24 F.3d 1056 (8th Cir. 1994).

14. *See United States v. Robinson*, 62 F.3d 1325 (11th Cir. 1995), *cert. denied*, 116 S. Ct. 1848 (1996); *United States v. Ford*, 34 F.3d 992 (11th Cir. 1994).

15. *See, e.g., United States v. Field*, 855 F. Supp. 1518 (W.D. Wis. 1994); *State v. Young*, 867 P.2d 593 (Wash. 1994).

16. *See United States v. Cusumano*, 67 F.3d 1497, 1510 (10th Cir. 1995), *vacated on reh'g en banc*, 83 F.3d 1247 (10th Cir. 1996).

theless, in an *en banc* decision vacating the earlier ruling, the Tenth Circuit avoided the issue of whether FLIR imaging constitutes a search by finding that probable cause existed for the search of the defendant's home.<sup>17</sup> The second decision neatly avoided the constitutional issue, citing a policy of addressing constitutional questions only when necessary for the resolution of the case.<sup>18</sup> The dissent, mostly consisting of the members of the original panel, urged the court to address the Fourth Amendment issue of whether FLIR imaging constitutes a search and reaffirmed its condemnation of the practice.<sup>19</sup> Hence, the issue of whether the use of FLIR violates the Fourth Amendment prohibition against unreasonable searches remains unresolved.

Given the rapid development of technologies available to law enforcement organizations, it is vital that clear limits be set regarding the scope of FLIR's permissible uses. Currently, many commentators are debating how Fourth Amendment jurisprudence relates to FLIR use.<sup>20</sup>

Part I of this Note examines the Fourth Amendment protection against unreasonable search and seizures, the *Katz* test used to determine whether an individual has a reasonable expectation of privacy in the thing searched, and how advancing technology has blurred the division regarding whether and when an individual has a reasonable expectation of privacy for Fourth Amendment purposes. Part I also reviews certain police surveillance technologies that courts have analogized to FLIR. Part II questions the adequacy of the *Katz* standard for determining whether FLIR imaging constitutes a search, proposes that comparing FLIR to other search devices and methods is inaccurate because FLIR is unique and unlike other modes and devices of police surveillance, and discusses the consequences of law enforcement's unrestricted use of FLIR technology. Finally, this Note con-

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17. See *Cusumano*, 83 F.3d at 1250.

18. See *id.* (quoting *Zobrest v. Catalina Foothills Sch. Dist.*, 509 U.S. 1, 113 (1993)). In *Zobrest*, Justice Blackmun stated:

The obligation to avoid unnecessary adjudication of constitutional questions does not depend upon the parties' litigation strategy, but rather is a self-imposed limitation on the exercise of the Court's jurisdiction that has an importance to the institution that transcends the significance of particular controversies. It is a rule whose aim is to protect not parties but the law and the adjudicatory process.

*Zobrest*, 509 U.S. at 113.

19. See *Cusumano*, 83 F.3d at 1252-53 (McKay, J., dissenting in part and concurring in part and joined by Seymour, C.J., and Henry, J.).

20. Namely, the decision in *Katz v. United States*, 389 U.S. 347 (1967) has been the focal point of many commentators. See, e.g., Polatsek, *supra* note 1; Wilson, *supra* note 2; Plaschke, *supra* note 4; Scott J. Smith, Note, *Thermal Surveillance and the Extraordinary Device Exception: Redefining the Scope of the Katz Analysis*, 30 VAL. U. L. REV. 1071 (1996). James Francis Barna, Note *Reforming the Katz Fourth Amendment "Reasonable Expectation of Privacy" Test: The Case of Infrared Surveillance of Homes*, 49 WASH. U. J. URB. & CONTEMP. L. 247 (1996).

tends that courts should not allow law enforcement agencies to use FLIR to search residences because it violates the Fourth Amendment.

I. THE FOURTH AMENDMENT PROVIDES PROTECTION FROM  
UNREASONABLE SEARCHES AND SEIZURES OF PERSONS,  
HOUSES, PAPERS, AND EFFECTS

The Fourth Amendment provides protection from unreasonable searches and seizures of persons, houses, papers, and effects.<sup>21</sup> The Fourth Amendment also provides that warrants shall not be issued without probable cause.<sup>22</sup> Initially, the United States Supreme Court interpreted Fourth Amendment protection to require law enforcement officials to physically trespass on an individual's property before the Court would find a constitutional violation.<sup>23</sup> However, by the late 1960s, technology gave law enforcement the ability to access an individual's private information without the need to physically trespass.<sup>24</sup> Since that time, courts have been asked to determine how and when law enforcement's use of such technologies intrudes upon an individual's Fourth Amendment protection against unreasonable searches and seizures.

A. *The Katz Test: Determining What Is a Search Based on a Reasonable Expectation of Privacy Standard*

In interpreting the Fourth Amendment, the United States Supreme Court in *Katz v. United States*<sup>25</sup> held that warrantless searches are *per se* unreasonable.<sup>26</sup> However, the *Katz* Court also explained, "What a person knowingly exposes to the public, even in his home or office is

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21. See U.S. CONST. amend. IV.

22. See *id.*

23. See *Olmstead v. United States*, 277 U.S. 438 (1928); see also *Katz*, 389 U.S. at 352.

24. See *Silverman v. United States*, 365 U.S. 505, 511 (1961); *United States v. Katz*, 389 U.S. 347 (1967).

25. 389 U.S. 347 (1967).

26. See *id.* However, there are several categories of warrantless searches that courts hold do not violate the Fourth Amendment's guarantee against unreasonable searches. See, e.g., *Schneekloth v. Bustamonte*, 412 U.S. 218, 248 (1973) (upholding warrantless search based on voluntary and intelligent consent); *Warden, Maryland Penitentiary v. Hayden*, 387 U.S. 294, 298-99 (1967) (upholding warrantless search where delay would endanger lives of police or others); *Carroll v. United States*, 267 U.S. 132, 153-57 (1925) (upholding warrantless search of vehicles illegally transporting contraband upon a showing of probable cause). In addition, *Katz* established that a successful Fourth Amendment attack on a warrantless search must involve a defendant's showing of both a subjective and an objective expectation of privacy in the area searched. See *Katz*, 389 U.S. at 361 (Harlan, J., concurring). First, the defendant must exhibit an actual expectation of privacy to satisfy the subjective component, and second, the privacy expectation must be one that society recognizes as reasonable, which, if proved, satisfies the objective component. See *id.* at 361.

not a subject of Fourth Amendment protection.”<sup>27</sup> In so holding, the Court articulated a two-prong test to determine whether a search occurred by ascertaining whether an individual has a constitutionally protected expectation of privacy in items or places belonging to or possessed by the individual.<sup>28</sup>

The first prong of the *Katz* test asks whether the defendant possessed a subjective expectation of privacy.<sup>29</sup> The *Katz* Court explained that an item might be constitutionally protected if an individual seeks to preserve it as private and has a subjective expectation of privacy “even in an area accessible to the public.”<sup>30</sup> The subjective expectation of privacy can generally be proved through evidence that the defendant took actions to preserve as *private* the object of the search.<sup>31</sup>

The second prong of the *Katz* test asks whether society would deem the individual’s expectation reasonable.<sup>32</sup> Thus, the pertinent question is “whether the police surveillance ‘violated the privacy upon which [the defendant] justifiably relied.’”<sup>33</sup>

While courts have followed the reasoning of the Supreme Court in *Katz*, technology has advanced and the degree of invasive procedures used by police in surveillance has likewise advanced. Thus, it has become more difficult for courts to determine if and when the police, using these new technologies, violate an individual’s Fourth Amendment rights against unreasonable searches. This is most certainly the case with FLIR imaging, which is a highly invasive and advanced tech-

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27. *Rios v. United States*, 364 U.S. 253 (1960); *Ex parte Jackson*, 96 U.S. 727, 733 (1877) (citations omitted).

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

29. *See id.* 389 U.S. at 351 (citing *Lewis v. United States*, 385 U.S. 206, 210 (1966); *United States v. Lee*, 274 U.S. 559, 563 (1927)).

30. *See United States v. Ishmael*, 48 F.3d 850, 854 & n.3 (5th Cir.), *cert. denied*, 116 S. Ct. 74, and *cert. denied* 116 S. Ct. 75 (1995) (citing *Florida v. Riley*, 488 U.S. 445, 450 (1989)).

31. Evidence of a subjective expectation of privacy can be shown in a number of ways. *See United States v. Cusumano*, 67 F.3d 1497, 1503 (10th Cir. 1995), *vacated on reh’g en banc*, 83 F.3d 1247 (10th Cir. 1996) (by blocked windows); *California v. Ciraolo*, 476 U.S. 207, 209 (1986) (tall fences); *Florida v. Riley*, 488 U.S. 445, 448 (1989) (enclosures such as a greenhouse). Additionally, a dweller need not take every precaution against detection in order to exhibit a subjective expectation of privacy. *See United States v. Ishmael*, 48 F.3d 850, 854-55 (5th Cir.), *cert. denied*, 116 S. Ct. 74, and *cert. denied*, 116 S. Ct. 75 (1995). The second *Katz* question, what privacy expectation society is willing to accept as reasonable, is not as easily answered as the subjective prong. *See, e.g., Riley*, 488 U.S. at 449-52; *Ciraolo*, 476 U.S. at 212-13; *Ishmael*, 48 F.3d at 855-56.

32. *See Katz*, 389 U.S. at 361. *See also Dow v. United States*, 476 U.S. 227, 251 (1986) (Powell, J., Brennan, J., Marshall, J., and Blackmun, J., concurring in part, dissenting in part). (“*Katz* measures Fourth Amendment rights by reference to the privacy interests that a free society recognizes as reasonable not by reference to the method of surveillance used in the particular case.”).

33. *Riley*, 488 U.S. at 456 (Brennan, J., Marshall, J., and Stevens, J., dissenting) (citing *Katz*, 389 U.S. at 353) (alteration in original).

nological tool. Currently, FLIR can distinguish variations in heat as minute as 0.5 degrees Fahrenheit.<sup>34</sup> Hence, FLIR offers a new level of intrusiveness that goes well beyond that of traditional surveillance methods. Nevertheless, thermal imagery is currently being used by police departments to obtain information about individuals' activities inside residences and in the absence of a warrant. While it is understandable that courts have yet to come to a consensus, based on the *Katz* test, regarding whether and when the use of FLIR constitutes a search, some definite limits must be established to protect individuals' Fourth Amendment rights.

### B. Cases Upholding Warrantless Searches by Finding No Reasonable Expectation of Privacy

Law enforcement agencies use a wide range of technologies and methodologies in their surveillance activities, including narcotics dogs,<sup>35</sup> aerial observation,<sup>36</sup> pen registers,<sup>37</sup> sound amplifiers,<sup>38</sup> radio scanners,<sup>39</sup> X-ray scans, magnetometers,<sup>40</sup> electronic beepers,<sup>41</sup> as well as FLIR technology.<sup>42</sup> The following survey of caselaw analyzing surveillance devices may prove helpful in understanding how other devices and technologies differ from FLIR. Courts supporting the use of FLIR technology have justified its use by analogizing FLIR to less intrusive surveillance methods, such as electronic beeper monitoring,

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34. See *United States v. Ishmael*, 843 F. Supp. 205, 213 (E.D. Tex. 1994), *rev'd*, 48 F.3d 850 (5th Cir. 1995), *cert. denied*, 116 S. Ct. 74, and *cert. denied*, 116 S. Ct. 75 (1995). See also Michael A. DeVito & Stuart M. Flamen, Note, "FLIR"ing With Danger: A Fourth Amendment Analysis of Infrared Imaging, 110 ST. JOHN'S J. LEGAL COMMENT 651, 672 n.46 (1995).

35. See, e.g., *United States v. Solis*, 536 F.2d 880 (9th Cir. 1976).

36. See, e.g., *Florida v. Riley*, 488 U.S. 445 (1989).

37. See, e.g., *Smith v. Maryland*, 442 U.S. 735 (1979). In *Smith*, the Court recognized that a pen register is a record of telephone calls made from a specific telephone but held that the petitioner had no legitimate expectation of privacy in the phone numbers he dialed, thus law enforcement's recordation of the numbers dialed did not constitute a search. See *id.* at 744-45. The Court commented that the telephone company maintains records of numbers called and the petitioner assumed the risk that the company would forward that information to the police. See *id.* Thus, the Court reasoned the use of automated records is the modern day counterpart to the operator who used to personally connect and complete calls, and since there was no expectation of privacy in numbers called then, there should be none today. See *id.*

38. See, e.g., *United States v. Cusumano*, 67 F.3d 1497, 1505 (10th Cir. 1995), *vacated on reh'g en banc*, 83 F.3d 1247 (10th Cir. 1996).

39. See, e.g., *State v. Smith*, 438 N.W.2d 571, 577 (Wis. 1989) (holding that there was no reasonable expectation of privacy in the use of a cordless phone because an FCC warning to that effect was in the owners manual).

40. See *Plaschke*, *supra* note 4, at 617 ("The use of sophisticated . . . devices such as magnetometers and X-ray scans have been uniformly held to constitute a search within the meaning of the Fourth Amendment.").

41. See, e.g., *United States v. Karo*, 468 U.S. 705 (1984); *United States v. Knotts*, 460 U.S. 276 (1984).

42. See *infra* Part I.B.4.



narcotics dogs, and aerial observations. When considered in depth, however, these analogies fail.

### 1. Electronic Beeper

An electronic beeper is a device that emits a radio frequency signal that can be detected by an appropriate radio receiver. By monitoring the strength and direction of the signal from the beeper, the operator can deduce information regarding the device's location relative to the detector. Police have used this technology to trace the movements of automobiles and containers of chemicals used in the manufacture of illegal drugs.<sup>43</sup> In *United States v. Knotts*,<sup>44</sup> the police, using a beeper, were able to monitor a container's location as it was transported. The Supreme Court held that warrantless placement of a beeper in a container to ascertain the container's ultimate location by monitoring the beeper's signals did not invade any legitimate expectation of privacy of the container's possessor and therefore was not a search under the Fourth Amendment.<sup>45</sup> The Court reasoned that the beeper revealed no more information than could have been discerned with the naked eye, because monitoring the beeper amounted to simply following a car on a public roadway.<sup>46</sup> Further, the Court noted that a person traveling in a car on public roads has no reasonable expectation of privacy in his movements.<sup>47</sup> Moreover, the Court concluded that in monitoring the beeper to follow the container's movements, the police used the beeper to merely enhance their natural sensory faculties and such enhancement is not prohibited by the Fourth Amendment.<sup>48</sup>

### 2. Canine Sniff

While dogs are not considered technology in the same sense as electronic devices, use of their olfactory sensitivity is an amplification of the human olfactory sense and has been used to extend law enforcement's ability to detect odors that would require closer proximity or greater concentrations for a person to detect. Police use of canines was sanctioned in *United States v. Place*,<sup>49</sup> where the Court found the

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43. See *United States v. Karo*, 468 U.S. 705 (1984); *United States v. Knotts*, 460 U.S. 276 (1984).

44. 460 U.S. 276 (1983). In *Knotts*, a company selling chloroform to the defendant consented to the installation of a beeper inside a five-gallon container subsequently sold to the defendant. See *id.* at 278. The police monitored the beeper and followed the car carrying the container, "maintaining contact by using both visual surveillance and a monitor which received the signals sent from the beeper." *Id.* Ultimately, the police followed the vehicle to a secluded cabin, which the police kept under surveillance for three days while they secured a search warrant. See *id.* at 279. The subsequent search revealed a "fully operable, clandestine drug laboratory in the cabin." *Id.*

45. See *id.* at 285.

46. See *id.*

47. See *id.* at 281.

48. See *id.* at 282.

49. 462 U.S. 696 (1983).

use of a police dog to sniff luggage was not a search and thereby not prohibited by the Fourth Amendment.<sup>50</sup> In *Place*, law enforcement agents working at an airport, "seized" luggage from a passenger so that it might be exposed to a specially trained drug-sniffing dog.<sup>51</sup> The Court found the use of police dogs was not a search within the meaning of the Fourth Amendment.<sup>52</sup> Lower courts, following this rationale, have upheld the use of narcotics dogs to detect odors emanating from semi-trailers parked in a public lot<sup>53</sup> and mobile homes.<sup>54</sup>

### 3. Visible Light Observations

#### a. Naked Eye Observations

The plain view doctrine<sup>55</sup> has been combined with various forms of technology to broaden law enforcement's ability to gather information. For instance, in *California v. Ciraolo*,<sup>56</sup> the Supreme Court expanded application of the plain view doctrine to aerial naked-eye observation. In *Ciraolo*, police flew over the defendant's home at one thousand feet and observed marijuana plants growing in a back yard shielded from view from ground level by a six-foot fence.<sup>57</sup> The Court acknowledged that the occupant had manifested a subjective expectation of privacy in the contents of his back yard by erecting the fence.<sup>58</sup> However, the Court found that this expectation, was not one that society would deem reasonable because the curtilage<sup>59</sup> of a home is not protected from inspection involving no physical invasion.<sup>60</sup> Further, reasoning that private and commercial flights are now commonplace, the Court determined that naked eye observations, by police, from legal platforms, do not constitute searches and thus do not require a warrant.<sup>61</sup> The Court stated that "[t]he Fourth Amendment protection of the home has never been extended to require law enforcement officers to shield their eyes when passing by a home on public thoroughfares."<sup>62</sup>

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50. *See id.* at 707.

51. *See id.* at 699.

52. *See id.* at 707.

53. *See United States v. Solis*, 536 F.2d 880 (9th Cir. 1976).

54. *See id.*

55. Under the plain view doctrine, "if police are lawfully in a position from which they view an object, and its incriminating character is immediately apparent, and if the officers have a lawful right of access to the object, they may seize it without a warrant." *Minnesota v. Dickerson*, 508 U.S. 366, 375 (1993) (citing *Horton v. California*, 496 U.S. 128, 136-37 (1990); *Texas v. Brown*, 460 U.S. 730, 739 (1983) (plurality opinion)).

56. 476 U.S. 207 (1986).

57. *See id.* at 209.

58. *See id.* at 211.

59. *See supra* note 10.

60. *See id.* at 213-14.

61. *See id.* at 215.

62. *Id.* at 213.

The Court followed the same logic in *Florida v. Riley*.<sup>63</sup> From a helicopter four hundred feet overhead, police observed marijuana plants growing in the respondent's greenhouse through missing roof panels.<sup>64</sup> The Court held this was not a search in violation of the Fourth Amendment, because the respondent could not reasonably expect the contents of his greenhouse to be immune from aerial observation when the roof of his greenhouse was left partially open.<sup>65</sup> The Court reasoned that helicopters at that altitude are not uncommon and the aircraft did not interfere with the use of the home or curtilage.<sup>66</sup> The Court further determined that in observing greenhouse contents through a hole in the roof from a helicopter at four hundred feet, police did no more than what any citizen could have legally done.<sup>67</sup> According to the Court, areas within the curtilage of the home that could be observed from a legally positioned aircraft are not constitutionally protected.<sup>68</sup>

#### b. Aerial Photography at Visible Wavelengths

On the same day it issued the *Ciraolo* decision, the Supreme Court handed down its decision in *Dow v. United States*.<sup>69</sup> *Dow* involved a government agency inspecting a chemical plant using high-resolution visible light aerial photography. Because the area photographed was within an "industrial curtilage," the Court denied Dow's assertion that it had an expectation of privacy.<sup>70</sup> In distinguishing this case from surveillance of residences, the Court stated the government has greater latitude in conducting warrantless inspections of commercial property because of a lowered expectation of privacy.<sup>71</sup> Significantly, however, in rendering its decision regarding standard visible light aerial photography surveillance, the Court hinted at how it might rule in a case

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63. 488 U.S. 445 (1989).

64. *See id.* at 448.

65. *See id.* at 450.

66. *See id.* at 451-52.

67. *See id.* at 451.

68. Interestingly, some courts have ruled that using binoculars and telescopes during surveillance of residences is not allowed without a warrant. *See, e.g., United States v. Kim*, 415 F. Supp. 1252 (D. Haw. 1976) (stating "[agents] have no right to peer into people's windows with special equipment not generally in use").

69. 476 U.S. 227 (1986) (explaining that the Environmental Protection Agency ("EPA") sanctioned a flight to take aerial photographs of the Dow facility to assess compliance, whereby Dow asserted the photography constituted an unlawful warrantless search because Dow had a reasonable expectation of privacy within its industrial curtilage).

70. The court found no analogy between the open areas of the complex and the curtilage of a home; rather, the Court found the open areas of the plant were more comparable to an open field. *Id.* at 239. Thus, photographing an industrial plant from navigable airspace is not a prohibited search. *Id.* The Court conceded, however, that Dow did have an expectation of privacy within its covered buildings that society would deem reasonable. *Id.* at 236.

71. *See id.* at 237-38 (citing *Donovan v. Dewey*, 452 U.S. 594, 598-99 (1981)).

involving other types of technology, perhaps FLIR. The Court opined that warrantless surveillance of *private* property with high technology equipment might violate the Fourth Amendment.<sup>72</sup>

#### 4. FLIR

As previously stated, thermal imagery is a highly advanced technology. Thermal imagery measures reflected or emitted infrared light in much the same manner that a camera captures visible light.<sup>73</sup> The device is passive and emits no beam or rays.<sup>74</sup> The resulting image is displayed in shades of gray with white representing the hottest objects in the field of view, and the cooler objects appearing darker.<sup>75</sup> The device is capable of detecting minute variations in heat allowing police to detect most activities occurring within.<sup>76</sup> Nevertheless, some courts are holding that FLIR imaging does not constitute a search within the meaning of the Fourth Amendment.<sup>77</sup>

The reasoning in *United States v. Penny-Feeney*<sup>78</sup> is the basis for most court decisions that support warrantless FLIR investigations.<sup>79</sup> In *Penny-Feeney*, a Hawaiian vice officer obtained a warrant to search the home, based on information that included a FLIR videotape of the defendants' home.<sup>80</sup> In its analysis, the *Penny-Feeney* court analogized FLIR to several constitutionally sanctioned types of surveillance devices and techniques.<sup>81</sup>

First, the district court analyzed the FLIR instrument to other "extra-sensory, non-intrusive equipment," such as beepers and dogs used by police to investigate people and objects, that the Supreme Court has held do not constitute an impermissible Fourth Amendment search.<sup>82</sup> Second, the court examined the nature of the heat moni-

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72. The court stated,

It may well be . . . that surveillance of private property by using highly sophisticated equipment not generally available to the public . . . might be constitutionally proscribed absent a warrant. . . . The mere fact that human vision is enhanced somewhat, at least to the degree here [more detailed than naked eye observations, but limited to building and equipment outlines], does not give rise to constitutional problems. . . . An electronic device to penetrate walls or windows . . . would raise very different and far more serious questions . . . .

*Id.* at 238-39 (footnote omitted).

73. See Polatsek, *supra* note 1, at 453.

74. See *United States v. Field*, 855 F. Supp. 1518, 1522 (W.D. Wis. 1994).

75. See *United States v. Ishmael*, 48 F.3d 850, 851-52 (5th Cir. 1995).

76. See *supra* note 34.

77. See *supra* notes 11-14.

78. 773 F. Supp. 220 (D. Haw. 1991), *aff'd sub nom. on other grounds*, *United States v. Feeney*, 984 F.2d 1053 (9th Cir. 1993).

79. See Polatsek, *supra* note 1, at 459.

80. See *Penny-Feeney*, 773 F. Supp. at 224.

81. See *id.* at 226-28.

82. *Id.* at 226 (citing *United States v. Knotts*, 460 U.S. 276 (1983) (placing a beeper in a container to track movements of a vehicle held not a search); *United States v.*

tored by FLIR and found the heat to be “an incidental byproduct of various energy sources used to help cultivate marijuana” that the defendants did not “assert dominion over.”<sup>83</sup> Furthermore, based on the defendants’ actions to eliminate the heat from the premises, the court classified the heat as “heat waste” or “abandoned heat.”<sup>84</sup> Because the defendants sought to vent the heat, the court found the defendants did not manifest either a subjective or an objective expectation of privacy as required by the Supreme Court in *Katz*.<sup>85</sup> The *Penny-Feeney* court reasoned that there was no subjective expectation of privacy in the heat waste because the defendants purposefully vented the heat outside the garage, thereby exposing it to the public.<sup>86</sup> Moreover, analogizing the vented heat to garbage in plastic bags placed outside a home, the court, following *California v. Greenwood*,<sup>87</sup> suggested that society would not accept a privacy expectation in the heat waste as objectively reasonable.<sup>88</sup>

Reiterating the non-intrusive nature of FLIR imaging, the court analogized its use to that of “specially trained marijuana sniffing dogs,”<sup>89</sup> which the court in *United States v. Solis*<sup>90</sup> held to be reasonable and therefore not prohibited under the Fourth Amendment.<sup>91</sup> Moreover, the court said that Penny-Feeney should have expected the heat to emanate from the garage and thus could not expect it to be

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Place, 462 U.S. 696 (1983) (using a dog to sniff luggage at an airport held not a search); *Smith v. Maryland*, 442 U.S. 735 (1979) (establishing that a “pen register” with the phone company is not a search)).

83. *Penny-Feeney*, 773 F. Supp. at 225.

84. *Id.*

85. *See id.* at 228. *See also supra* Part I.A. (discussing the *Katz* two-prong test). Evidence of a subjective expectation of privacy can be shown in a number of ways. *See United States v. Cusumano*, 67 F.3d 1497, 1503 (10th Cir. 1995), *vacated on reh’g en banc*, 83 F.3d 1247 (10th Cir. 1996) (blocked windows); *California v. Ciraolo*, 476 U.S. 207, 209 (1986) (tall fences); *Florida v. Riley*, 488 U.S. 445, 448 (1989) (enclosures such as a greenhouse). Additionally, a dweller need not take every precaution against detection in order to exhibit a subjective expectation of privacy. *See United States v. Ishmael*, 48 F.3d 850, 854-55 (5th Cir.), *cert. denied*, 116 S. Ct. 74, *and cert. denied*, 116 S. Ct. 75 (1995). The second prong of the *Katz* test, what privacy expectation society is willing to accept as reasonable, is not as easily answered as the subjective prong. *See, e.g., Riley*, 488 U.S. at 449-52; *Ciraolo*, 476 U.S. at 212-13; *Ishmael*, 48 F.3d at 855-56.

86. *See Penny-Feeney*, 773 F. Supp. at 226. “[T]he heat waste vented outside of the Penny-Feeney home may be analogized to the garbage placed outside of the respondent’s home in [*California v. Greenwood*] . . .” *Id.* In *Greenwood*, the Supreme Court reasoned “that society is not prepared to accept as objectively reasonable an expectation of privacy in plastic garbage bags left outside the home.” *California v. Greenwood*, 486 U.S. 35, 40 (1987).

87. 486 U.S. 35, 40 (1987).

88. *See Penny-Feeney*, 773 F. Supp. at 226; *see also supra* Part I.A.

89. *Id.* at 226-27.

90. 536 F.2d 880 (9th Cir. 1976) (holding that utilizing dogs to detect contraband is inoffensive and similar to other police use of dogs, like search and rescue missions and guard duty, and thus was not an unreasonable use).

91. *See id.* at 882.

private, just as the defendant in *Solis* should have expected marijuana odor to emanate from his trailer.<sup>92</sup> Furthermore, the court noted that both emanations “constitute a physical fact indicative of possible crime [and are] not protected communications” that give rise to Fourth Amendment considerations.<sup>93</sup>

In *United States v. Ford*,<sup>94</sup> the Eleventh Circuit Court of Appeals addressed for the first time whether use of FLIR to investigate a mobile home was a search subject to Fourth Amendment constraints.<sup>95</sup> In *Ford*, Florida law enforcement officers, late at night, covertly entered Ford’s leased property where he kept a mobile home.<sup>96</sup> The officers hid in thick foliage to surveil the mobile home using a thermal imager.<sup>97</sup> Although Ford had boarded the mobile home’s windows, locked the property gate, and situated the mobile home a quarter of a mile from the gate to prevent outsiders from observing his illegal marijuana operation, the court called attention to holes in the mobile home’s floor through which excess heat was vented to justify its holding that Ford had no subjective expectation of privacy triggering Fourth Amendment protection.<sup>98</sup> The court also justified its holding by asserting that FLIR imaging is non-intrusive, stating, “the thermal imagery . . . appears to be of such low resolution as to render it incapable of revealing the intimacy of detail and activity protected by the Fourth Amendment.”<sup>99</sup> In particular, the court held that the information obtained by a FLIR imager was not personal or sensitive and did not reveal any specific activities inside Ford’s mobile home.<sup>100</sup> For these reasons, and using *Greenwood*’s curbside garbage analogy,<sup>101</sup> the court determined that Ford did not have an *objectively* reasonable expectation of privacy in the heat vented outdoors.<sup>102</sup> Thus, the court found that Ford failed the subjective and objective prongs of the *Katz* test by actively venting the heat.<sup>103</sup>

The following year, in *United States v. Robinson*,<sup>104</sup> the Eleventh Circuit revisited the issue and again found warrantless FLIR surveillance constitutionally permissible.<sup>105</sup> In *Robinson*, an Alabama narcotics agent directed a helicopter crew to conduct a thermal

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92. See *Penny-Feeney*, 773 F. Supp. at 227.

93. *Id.*

94. 34 F.3d 992 (11th Cir. 1994).

95. See *id.* at 993.

96. See *id.*

97. See *id.*

98. See *id.*

99. *Id.* at 996.

100. See *id.* at 997.

101. See *supra* text accompanying note 85.

102. See *Ford*, 34 F.3d at 997.

103. See *id.* at 995-96.

104. 62 F.3d 1325 (11th Cir. 1995), *cert. denied*, 116 S. Ct. 1848 (1996).

105. See *id.*

examination of Robinson's home and to compare the emanating heat with that of surrounding homes and objects.<sup>106</sup>

The *Robinson* court first addressed whether the two-prong *Katz* test was met by asking: (1) whether Robinson had a subjective expectation of privacy in the heat generated by his indoor marijuana cultivation and (2) if so, whether the expectation was one society would accept as objectively reasonable.<sup>107</sup> The court determined that although "Robinson attempted to conceal his marijuana growing operation by conducting it inside his home, the record [did] not indicate that he affirmatively took any action to prevent the resulting heat from being emitted into the atmosphere above his house."<sup>108</sup> Consequently, the court interpreted this lack of action to conceal emitted heat as an abdication of any subjective expectation of privacy.<sup>109</sup> Furthermore, the court determined that the objective prong of the *Katz* test could not be met because the thermal imaging examination revealed no intimate details connected with Robinson's home.<sup>110</sup> The court said, "[T]he FLIR surveillance revealed only that Robinson's house emitted significantly more heat than others in the neighborhood of similar size. No revelation of intimate, even definitive, detail within the house was detectable; there was merely a gross, nondescript bright image indicating the heat emitted from the residence."<sup>111</sup> Thus, the court held that because of this lack of intrusion, society would not accept the use of the Fourth Amendment to shield illegal activity in the home when non-invasive surveillance methods are used for detection.<sup>112</sup>

Finally, the *Robinson* court analogized the use of a thermal imager to the now common warrantless utilization of dogs to locate contraband.<sup>113</sup> In particular, the court quoted an Eighth Circuit opinion finding that heat emanating from indoor growing operations and detected by FLIR is similar to odors that can be detected by trained dogs.<sup>114</sup> The court held that both FLIR and the canine-sniff are passive and non-intrusive means of police surveillance that do not threaten the "intimacy, personal autonomy and privacy associated with a home."<sup>115</sup> In sum, the court held that the "FLIR surveillance

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106. *See id.* at 1327.

107. *See id.* at 1328-29.

108. *Robinson*, 62 F.3d at 1328-29.

109. *See id.* at 1329.

110. *See id.*

111. *See id.* at 1329-30.

112. *See id.* at 1330.

113. *See id.*

114. *See id.* (citing *United States v. Pinson*, 24 F.3d 1056, 1058-59 (8th Cir. 1994)). *See also* *United States v. Myers*, 46 F.3d 668, 670 (7th Cir.), *cert. denied*, 116 S. Ct. 213 (1995); *United States v. Ford*, 34 F.3d 992, 997 (11th Cir. 1994).

115. *Robinson*, 62 F.3d at 1330 (quoting *Pinson*, 24 F.3d at 1059).

of Robinson's home was not an unreasonable search violative of the Fourth Amendment."<sup>116</sup>

In *United States v. Pinson*,<sup>117</sup> the Eighth Circuit Court of Appeals likewise analogized FLIR imaging to a canine-sniff and then bolstered its approval of law enforcement's use of FLIR technology by comparing Pinson's abandoned heat or heat waste to "bagged garbage left for collection outside a private residence."<sup>118</sup> The *Pinson* court, following *Greenwood*, determined that Pinson had no legitimate expectation of privacy "in the inculpatory items that [he] discarded," for example, the heat vented from his house.<sup>119</sup> The court held detection of the abandoned heat was not intrusive because FLIR images reveal no intimate details of the home, and thus, "there was no intrusion upon the privacy of the individuals within."<sup>120</sup>

The Court of Appeals for the Seventh Circuit joined the Eighth and Eleventh Circuits, holding that thermal image scanning is not a search within the confines of the Fourth Amendment. In *United States v. Myers*,<sup>121</sup> the court concentrated on the emanated heat as the object of the investigation.<sup>122</sup> The court found that Myers made no attempt to conceal the emitted heat and, like the *Robinson* court, held that this inaction equated to Myers lacking a subjective expectation of privacy. The court, however, failed to address any attempts Myers made at concealing the illegal operation itself in determining whether the subjective prong of the *Katz* test was satisfied.<sup>123</sup>

## II. WARRANTLESS FLIR IMAGING OF RESIDENCES SHOULD BE PROHIBITED

### A. *The Katz Test May Be Inadequate To Determine When the Use of New Technologies Constitutes a Search*

In light of rapid technological developments, the adequacy of the *Katz* test in protecting Fourth Amendment rights has been questioned,<sup>124</sup> and for good reason. As discussed previously,<sup>125</sup> in determining what constitutes a search for Fourth Amendment purposes, under the first prong of *Katz*, the defendant must establish that he had a subjective expectation of privacy in the thing searched. The subjective expectation of privacy can generally be established through evidence that the defendant took actions to preserve as private the object

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116. *Id.*

117. 24 F.3d 1056 (8th Cir. 1994).

118. *Id.* at 1058 (citing *California v. Greenwood*, 486 U.S. 35, 43 (1988)).

119. *Id.* (quoting *Greenwood*, 486 U.S. at 41).

120. *Id.* at 1059.

121. 46 F.3d 668, 670 (7th Cir.), *cert. denied*, 116 S. Ct. 213 (1995).

122. *See id.* at 669.

123. *See id.*

124. *See generally* Polatsek, *supra* note 1, at 453.

125. *See supra* Part I.A.



of the search.<sup>126</sup> Key in the analysis is identification of the object of the search.

When a thermal imager scans a residence, the object of the scan is the residence; the scanner happens to use emitted heat radiation as its source of information. When police use FLIR to scan a residence, the government's interest is not in the heat itself, but rather, in the specific activities taking place within the residence. Hence, the argument that "waste heat" is the object of the search is illogical because any observation could be deemed to not be a search by simply asserting that the object of the search was the visible light photons escaping, cast off, or "abandoned" by a particular subject.<sup>127</sup>

Courts addressing FLIR's constitutionality have failed to account for the fact that heat naturally dissipates and society in general may be unaware of the government's ability to monitor escaping heat. Hence, it remains unclear how a person could evidence a privacy interest in heat. Since FLIR measures heat variations, a relatively hotter home will always signal authorities that activities inside are generating heat. This is irrespective of a homeowner's attempt to conceal that fact. Thus, the government could always contend that an individual fails the first prong of the *Katz* test, regardless of whether the heat is forcibly vented or naturally dissipates from the home.

The second prong of the *Katz* test asks whether society would deem the defendant's subjective expectation of privacy reasonable.<sup>128</sup> The Court has reiterated this tenet, stating, "*Katz* measures Fourth Amendment rights by reference to the privacy interests that a free society recognizes as reasonable . . ." <sup>129</sup> The pertinent question then becomes whether police surveillance "violated the privacy upon which [defendant] justifiably relied."<sup>130</sup>

Pursuant to *Katz*, whether society accepts an expectation of privacy as reasonable is key. Reasonableness must take into account the nature of what is being monitored and the degree to which a law enforcement officer can make inferences about the contents and activities of the object. Herein lies the problem. First, it is difficult to ascertain whether the defendant has, or whether society will recognize as reasonable, an expectation of privacy in a thing previously not monitored, such as heat emissions, for the sole reason that no technol-

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126. See *supra* note 84.

127. See *United States v. Cusumano*, 67 F.3d 1497, 1508 (10th Cir. 1995), *vacated on reh'g en banc*, 83 F.3d 1247 (10th Cir. 1996). The court, in attacking the *Greenwood* garbage analogy stated, "we have never heard the process of sight described in terms of abandoned photons." *Id.*

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

129. *Dow v. United States*, 476 U.S. 227, 251 (1986) (Powell, J., Brennan, J., Marshall, J., and Blackmun, J., concurring in part, dissenting in part).

130. *Florida v. Riley*, 488 U.S. 445, 456 (1989) (Brennan, J., Marshall, J., Stevens, J., dissenting) (citing *Katz v. United States*, 389 U.S. 347, 353 (1967)) (alteration in original).

ogy was available or capable of performing such monitoring in the past. Indeed, it could be easily argued that because such a thing could not previously be monitored, that a person would naturally and reasonably have an expectation of privacy in the thing. Not surprisingly, in most FLIR cases, homeowners have either taken no steps to evidence a privacy interest in the escaping heat or have taken affirmative steps to ventilate the heat.

In sum, it currently appears that an individual has no expectation of privacy for the simple reason of advancements in technology. Although courts must recognize the continual advancement of technology, this advancement may erode our right to privacy. However, an individual's "legal right to privacy should reflect thoughtful and purposeful choices rather than simply mirror the current state of the commercial technology industry."<sup>131</sup> Technological advancement is an inappropriate basis for denying an individual Fourth Amendment protection. It does not follow that private activities are without protection, simply because police are capable of viewing these activities from a non-intrusive distance.<sup>132</sup>

In order for the *Katz* test to remain viable, the courts must determine the point where technological advances violate the Fourth Amendment. Without a clear standard, police "could not be certain as to when a warrant is needed."<sup>133</sup> The line should be drawn at what human senses can detect. A human detection limit will allow the *Katz* test to continue to be effective in preserving Fourth Amendment rights. If it is not an enhancement of a naturally occurring human sense, the warrantless use of technology for surveillance should be prohibited. This rule, combined with the special protection afforded the home and curtilage, will serve to preserve Fourth Amendment rights in the face of advancing technology. Thus, if the "natural human sense" limit is incorporated the *Katz* test can remain viable in determining the reasonableness of searches.

#### B. *FLIR Is Distinguishable From Other Types of High-Tech Police Surveillance Devices and Methods*

Thermal imaging is a unique technology, and analogies to naked eye observations, aerial photography, canine sniff, and garbage are invalid. The distinguishing feature of FLIR is the nature of the "energy" or "light" it detects. Infrared light occupies a portion of the electromagnetic spectrum than the unaided human eye cannot detect. Thus, infrared light remains undetected by traditional means of sensory enhancement such as simple magnification or signal amplification.<sup>134</sup>

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131. *Young*, 867 P.2d at 598.

132. *See id.* at 600.

133. *Id.* at 598.

134. *See Plaschke*, *supra* note 4, at 620.

Thermal imagery measures reflected or emitted infrared light.<sup>135</sup> The resulting images are displayed in shades of gray, with white representing the hottest objects and the cooler objects appearing darker.<sup>136</sup> Most importantly, thermal imagers are capable of distinguishing variations as minute as 0.5 degrees Fahrenheit.<sup>137</sup> Thus, the imager displays relative temperatures as opposed to an object's actual temperature.<sup>138</sup> FLIRs are generally operated at night to avoid solar energy interference. Additionally, the FLIR operator must establish a control group for reference.<sup>139</sup>

In *Dow v. United States*,<sup>140</sup> the Supreme Court stated that "surveillance of private property by using highly sophisticated surveillance equipment not generally available to the public . . . might be constitutionally proscribed absent a warrant."<sup>141</sup> Thermal imagers are highly sophisticated and are commercially available at a range of prices,<sup>142</sup> but the cost would *effectively* place them out of the general public's reach. The Court's apprehensive statement in *Dow* applies to FLIR technology, and its warrantless use is therefore constitutionally questionable.<sup>143</sup>

The *Dow* Court stated that "for the use of sophisticated surveillance equipment to be constitutional, it must not reveal intimate details."<sup>144</sup> However, thermal imagers can reveal activities taking place within a residence from both inferences and direct observation. With only a general floor plan and a thermal imager, an operator could identify activities in a typical home such as use of a shower or bathtub, operation of various appliances, or movement of human bodies.<sup>145</sup> Thermal imagers can detect human forms near open windows and behind plywood walls.<sup>146</sup> Thus, the line between mundane and intimate activity

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135. See Polatsek, *supra* note 1, at 453.

136. See *United States v. Ishmael*, 48 F.3d 850, 851-52 (5th Cir.), *cert. denied*, 116 S. Ct. 74, and *cert. denied*, 116 S. Ct. 75 (1995).

137. See *United States v. Ishmael*, 843 F. Supp. 205, 213 (E.D. Tex. 1994), *rev'd*, 48 F.3d 850 (5th Cir.), *cert. denied*, 116 S. Ct. 74, and *cert. denied*, 116 S. Ct. 75 (1995).

138. See *Young*, 867 P.2d at 595.

139. See *Field*, 855 F. Supp. at 1522-23. A control group is necessary for comparison since buildings that are venting abnormal amounts of heat will appear markedly different than surrounding structures. In the case of residences, neighboring homes are generally used for comparison purposes. See *United States v. Penny-Feeney*, 773 F. Supp. 220 (D. Haw. 1991), *aff'd sub nom. on other grounds*, *United States v. Feeney*, 984 F.2d 1053 (9th Cir. 1993).

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

141. *Id.* at 238.

142. Models of varying degrees of sophistication are available with prices ranging from \$15,000 to \$225,000. See Plaschke, *supra* note 4, at 608 n.4.

143. See *Dow*, 476 U.S. at 238.

144. *Id.*; see also *Ishmael*, 48 F.3d at 855 (5th Cir. 1995) (stating "[t]he crucial inquiry, as in any search and seizure analysis, is whether the technology reveals 'intimate details'") (citing *Dow*, 476 U.S. at 238).

145. See *United States v. Cusumano*, 67 F.3d 1497, 1505 n.14 (10th Cir. 1995), *vacated on reh'g en banc*, 83 F.3d 1247 (10th Cir. 1996).

146. See *State v. Young*, 867 P.2d 593, 595 (Wash. 1994).

could be easily crossed. For instance, the court in *United States v. Cusumano* stated, "It would take no great wit to speculate as to the origin of two mild hot spots, commingled, in a bedroom at night."<sup>147</sup> Law enforcement's continued use of FLIR could require courts to determine what is intimate or simply mundane. More appropriately, courts should balance the interests of an individual in protecting his private activities in his home against the State's interest in using FLIR to detect illegal drug operations. Hence, FLIR's capabilities threaten an individual's constitutional guarantee against "unreasonable" searches and any counter-balancing governmental justification should clearly outweigh that protection.

### 1. FLIR Is Distinguishable From the Beeper

In *United States v. Karo*,<sup>148</sup> the Supreme Court reiterated that police beeper-monitoring did not constitute a search if the container holding the beeper was in a vehicle on public roads.<sup>149</sup> However, the Court noted that when a container holding the beeper entered a *private* residence, police could track its movement and receive information about the home's interior that they otherwise could not have obtained by visual observation or without a warrant.<sup>150</sup> Thus, the Court found that monitoring the beeper within a residence would require a warrant.<sup>151</sup> Absent a warrant, the Court held such a search was unconstitutional. The Court further stated the same result would follow where the government employs an electronic device to obtain information that it could not have obtained by observation from outside the curtilage of the house.<sup>152</sup>

In *State v. Young*,<sup>153</sup> the Washington Supreme Court, analyzing the Supreme Court's holdings in *Karo* and *Knotts*, determined that FLIR imaging was "at least as intrusive as the beeper in *Karo*."<sup>154</sup> In a like manner, the *Young* court, drawing on the analogies of other courts, deduced that FLIR technology reveals "information that [police] could not have obtained by observation from outside the curtilage of

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147. *Cusumano*, 67 F.3d at 1504 n.11.

148. 468 U.S. 705 (1984).

149. *See id.* at 721.

150. *See id.* at 715.

151. *See id.*

152. *See id.*

153. 867 P.2d 593, 598 (Wash. 1994). The Washington Supreme Court recognized that since FLIR utilization violated the Washington Constitution's heightened constitutional protection of an individual's home, the court did not need to answer whether FLIR surveillance of the defendant's home violated the Fourth Amendment. *See id.* at 601. However, to provide guidance to "other courts on the subject of sense-enhanced surveillance of a home," the court argued against each of the *Penny-Feeney* court's contentions and analogies and determined that the "infrared surveillance violated the Fourth Amendment." *Id.*

154. *Id.* at 602.

the house."<sup>155</sup> Therefore, FLIR's ability to gather information is at least as intrusive as the beeper.

In contrast, the *Penny-Feeney* court, citing *Knotts*, stated, "Time and again, the United States Supreme Court has held that police utilization of extra-sensory, non-intrusive equipment . . . does not constitute a search for purposes of the Fourth Amendment."<sup>156</sup> Inexplicably, however, the court made no mention of *Karo*, although the Penny-Feeney home was the object of a FLIR investigation.

In contrasting *Karo* and *Knotts*, it is readily apparent how "the Supreme Court has differentiated between the use of sensory enhancement devices in homes from their use on other objects."<sup>157</sup> In *Karo*, the Supreme Court emphasized how inviolate an individual's home should be when determining whether a certain type of investigatory activity should be allowed without a warrant.<sup>158</sup> Additionally, the Court's statements in *Karo* "contain[ ] the Supreme Court's most recent statement on the use of a sensory enhancement surveillance device on a private residence."<sup>159</sup> As the *Young* decision noted, the Supreme Court has determined that the use of surveillance devices, such as a beeper, to gather specific information about the home's interior—information that could not be obtained by naked visual observation—is prohibited under the Fourth Amendment.<sup>160</sup> Just as the proscribed beeper, FLIR technology reveals "information that [police] could not have obtained by observation from outside the curtilage of the house,"<sup>161</sup> and is likewise constitutionally prohibited.

Analogous to electronic beepers that emit radio frequencies, heat or infrared radiation is not within the natural range of human visual sensitivity. Simple magnification is not sufficient to render it visible. Visualization of infrared radiation requires technology that extends the natural range of human vision to wavelengths beyond normal human perception.

In terms of human perception, infrared radiation is similar to radio waves and at the other end of the electromagnetic spectrum, X-rays and gamma rays. However, radio waves are *intentionally* emitted from devices such as microphones, beepers, and cordless telephones in specific patterns for communication purposes. For instance, a cordless phone emits radio waves only when operating.<sup>162</sup> Radio waves are

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155. *Id.*

156. *United States v. Penny-Feeney*, 773 F. Supp. 220, 226 (D. Haw. 1991) (citing *U.S. v. Knotts*, 460 U.S. 276 (1982); *United States v. Place*, 462 U.S. 696 (1983), *aff'd sub nom. on other grounds*, *United States v. Feeney*, 984 F.2d 1053 (9th Cir. 1993); *Smith v. Maryland*, 442 U.S. 735 (1979)).

157. *Young*, 867 P.2d at 601.

158. *See id.*

159. *Id.*

160. *See id.* (citing *Karo*, 468 U.S. at 714).

161. *Id.* at 602.

162. *Cf. State v. Smith*, 438 N.W.2d 571 (Wis. 1989).

emitted in a pattern that can be decoded by anyone with an appropriate receiving device. Because they are purposefully emitted, radio waves are distinguishable from infrared radiation or heat. In contrast to radio waves, heat is the *natural by-product* of energy conversion processes, such as that which occurs in the operation of home appliances and the human metabolism.

Dissipation of heat is a natural process. Like a drop of dye placed in a glass of water, heat would eventually disperse into the environment whether forcibly vented from a building or not. So, unlike electronic devices intentionally emitting radio frequencies, heat emission from a home does not necessarily manifest intent to discard or abandon the heat or otherwise place it in the public domain. Some radiation, such as X-rays, and gamma rays are emitted as part of the natural process of radioactive decay of certain materials. Detecting this type of radiation requires a special device such as a Geiger counter. The government could conceivably detect radioactive material within a residence using such a device, not unlike using a thermal imager to detect heat. However, because of the danger posed to humans, the government tightly regulates radioactive materials. Thus, the public fosters little expectation of privacy in possessing these types of materials in the home. Heat, on the other hand, does not pose such danger, and is not regulated. While there is similarity in the dissipation of heat and other naturally occurring emissions, an individual is likely to possess, and society should recognize as reasonable, an expectation of privacy in an activity generating heat. For these reasons, thermal imagery is not analogous to any other technology or methods used in government surveillance activities.

## 2. FLIR Is Distinguishable From the Canine Sniff

In contrast to thermal imaging, devices such as telescopes and binoculars enhance visible light observations by magnification. These devices merely modify an existing natural human sense. The net effect of such magnification is to enlarge and increase the resolution of an image. Using cameras can improve resolution in a temporal sense as well, producing the effect of slowing down or speeding up real time. It is not an illogical stretch to view the canine-sniff as this type of magnification. Because dogs have eight times the sensitivity of the human nose,<sup>163</sup> using dogs merely allows humans to detect something they could naturally detect if the substance were present in higher concentration or closer in proximity.

Comparing FLIR to trained police dogs is initially found in *Penny-Feeney*.<sup>164</sup> Beginning the comparison, the court sets out the facts in

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163. See *United States v. Solis*, 536 F.2d 880, 881 (9th Cir. 1976).

164. See *United States v. Penny-Feeney*, 773 F. Supp. 220, 226 (D. Haw. 1991), *aff'd sub nom. on other grounds*, *United States v. Feeney*, 984 F.2d 1053 (9th Cir. 1993).

*United States v. Solis*.<sup>165</sup> In *Solis*, agents investigating a trailer home found indications that contraband might be stored inside.<sup>166</sup> Without first obtaining a search warrant, agents used specially trained marijuana sniffing dogs to investigate the trailer.<sup>167</sup> Based on the dogs' positive reactions to the trailer, the agents obtained a search warrant, and discovered large quantities of marijuana.<sup>168</sup> The Ninth Circuit refused to suppress the marijuana evidence and found the use of the dogs was *non-invasive* of the home's curtilage and "reasonably tolerable in our society."<sup>169</sup> The court bolstered its decision by finding that the defendant also lacked a subjective expectation of privacy as demonstrated by his intent to mask the odor.<sup>170</sup> By attempting to mask the odor, the court found that the defendant implicitly acknowledged a belief that the odor would emanate from the trailer and thus would no longer be private.<sup>171</sup> The fact that authorities used an investigative method keyed to the escaping odors did not violate the Fourth Amendment.

In its analogy between FLIR and police dogs, the *Penny-Feeney* court focused on the non-intrusive nature of the canine-sniff and reasoned the use of FLIR is equally non-intrusive.<sup>172</sup> The court stated that using FLIR was not a search of a person, nor did it entail any embarrassment to the defendant; therefore, it was not prohibited.<sup>173</sup> Also critical to the court's comparison was the defendant's subjective expectation of exposure of incriminating evidence. The court found the defendant *knowingly* exposed the heat by installing exhaust fans to ventilate excessive heat.<sup>174</sup> Like the defendant in *Solis*, this knowledge of exposure defeated any argument that Penny-Feeney retained an expectation of privacy in the heat. A similar analysis is embraced in *United States v. Pinson*,<sup>175</sup> and is adopted by a majority of courts sustaining warrantless FLIR usage.

These decisions, however, fail to sufficiently distinguish FLIR from the use of police dogs. Similar to FLIR, a dog senses emanations from the interior of an object and conclusions can then be drawn regarding the object's contents. A critical distinction, however, is the extent of

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165. 536 F.2d 880 (9th Cir. 1976).

166. The officers found talcum powder around the seals of the door, and based on their experience that talcum powder is often used to conceal the odor of narcotics, proceeded with their investigation. *See id.* at 881.

167. *See id.*

168. *See id.* According to agents, the dogs reacted as far as twenty-five feet from the trailer; however, the dogs were used as close as one foot from the home. *See id.*

169. *Id.* at 882.

170. *See id.* at 882-83. *See also supra* note 166.

171. *See id.*

172. *See Penny-Feeney*, 773 F. Supp. at 227.

173. *See id.* The court found that any intrusiveness was so minimal as not to be reasonably protected by society.

174. *See id.*

175. 24 F.3d 1056 (8th Cir. 1994).

information that each device can detect. The dog senses odor, the FLIR heat. A specially trained police dog, while detecting most odors, will only react to a narrow range of smells associated with illegal narcotics. The dog provides very limited information about the contents of a dwelling or a piece of luggage and for this reason the Supreme Court regards the canine-sniff as *sui generis*.<sup>176</sup> This is not true of FLIR. The FLIR detects all heat emanating from the home, and based upon minute variations in that heat the instrument can pinpoint areas of concentration. Using a basic floor plan of the home, agents can then draw inferences about the location and source of heat emissions. The problem is that FLIR reacts equally to illegal marijuana cultivation or an unexpected electrical device in a closet.<sup>177</sup> FLIR is indiscriminate in its detection of heat, and any unexpected anomaly can result in officers unjustifiably searching a home.

The decisions analogizing FLIR to the dog sniff fail to account for several important distinctions. For instance, in *Solis*, after the court espoused that modern technology and its possible development led to a more protective test than a simple test of physical trespass,<sup>178</sup> stated, "No sophisticated mechanical or electronic devices were used. The investigation was not indiscriminate, but solely directed to the particular contraband."<sup>179</sup> This is completely nonanalogous to FLIR, where a sophisticated device is employed and is not directed to a particular contraband, but rather detects any and all escaping heat. Thus, *Penny-Feeney's* reliance on *Solis* is misplaced. The *Solis* court clearly recognized that pervasive indiscriminate technology was not similar to a canine-sniff and was violative of the Fourth Amendment.<sup>180</sup> FLIR and its indiscriminate, though arguably minimally-intrusive nature, fails under a complete analysis of *Solis*.

The Supreme Court's reasoning in *Place* equally dispels the comparison. The Court stated that the canine-sniff

does not expose noncontraband items that otherwise would remain hidden from public view, as does, for example an officer's rummaging through the contents of . . . luggage. . . . Moreover, the sniff discloses only the presence or absence of narcotics, a contraband item. Thus despite the fact that the sniff tells the authorities something about the contents of the luggage, the information obtained is limited. . . . In these respects, the canine sniff is *sui generis*.<sup>181</sup>

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176. See *United States v. Place*, 462 U.S. 696, 707 (1983).

177. See *United States v. Field*, 855 F. Supp. 1518, 1519 (W.D. Wis. 1994) (finding that the FLIR surveillance had detected a dehumidifier in the closet of a private residence from the heat it emitted).

178. See *Solis*, 536 F.2d at 882. The court reiterated the potential dangers of technology that led to the adoption of the *Katz* test of reasonableness, rather than the physical trespass requirement of *Olmstead v. United States*. See *id.*

179. *Id.*

180. See *id.*

181. *Place*, 462 U.S. at 707.



Again, FLIR imaging is not limited to the detection of contraband items. While heat is not classified as contraband, courts have attempted to distinguish contraband heat from non-contraband heat. Even accepting this designation, FLIR imaging exposes all heat, whether labeled contraband or not. Therefore, unlike the canine sniff, the FLIR is intrusive and should be proscribed by the Fourth Amendment.

### 3. FLIR Is Distinguishable From Plain View Visible Light Observations

Are heat emissions in “plain view,” such that they do not rise to the level of a search? The Tenth Circuit’s logic in *Cusumano*, holding that heat emissions are not in “plain view,” is persuasive. For an object to be in “plain view,” it must be *knowingly* exposed to the public.<sup>182</sup> Emitted heat can be visualized only with a thermal imager. To date, the general household does not have a thermal imager. Further, it is doubtful that the general public is aware that law enforcement has the capability of conducting a FLIR search, and even this knowledge does not mean that there is no constitutional protection. While this equipment is commercially available, its cost precludes general availability to the public. Thus, a dweller would not expect the public to see or even be able to detect heat emitted from activities within his home. To consider emitted heat as “exposed” to the public is an unreasonable stretch of logic.

It would be more accurate to consider the dweller as having exposed emitted heat to the police rather than to the public. Even if the public were well familiar with the capabilities of FLIR imaging, the requirement of “exposure” to the public would not be met. If this were not the case, then the reasonableness of a search would depend on how effectively the government conveyed to the public the capabilities of the technology used. The privacy of the home could hinge on a technological race of measure/counter-measure between the citizens and the government; a race the people would likely lose.<sup>183</sup> General acceptance by the public of high-tech police methods should not lead to abatement of Fourth Amendment rights<sup>184</sup> and the public’s increased awareness of technology should not cause a diminishment of the rights of citizens.<sup>185</sup> The Tenth Circuit was therefore correct in excluding heat emissions from the Plain View doctrine.

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

183. See *United States v. Cusumano*, 67 F.3d 1497, 1504 (10th Cir. 1995), *vacated on reh’g en banc* 83 F.3d 1247 (10th Cir. 1996).

184. See *State v. Young*, 867 P.2d 593, 598 (Wash. 1994).

185. See *id.* at 597.

C. *The Consequence of Unrestricted Use of FLIR:  
Unchecked Police Discretion*

Absent a clear limit, advancing technology will create additional complications. For instance, the current application of FLIR to identify specific activities within a residence requires an experienced technician.<sup>186</sup> However, it's only logical to assume that continuing evolution of sensing and imaging technology will lead to better image processing and enhanced image resolution. Computers may be used to combine images with other information to create more inferences or create enhanced images of the interior of a home based on those inferences.<sup>187</sup> The net result will be an increase in the amount of information that can be gathered from a thermal scan.

If thermal imagery is not considered intrusive at present, it is likely that at some point it will. Determining precisely where this point is located will be difficult. Technology evolves continuously. In contrast, predicting when a case or controversy will arise such that the warrantless use of FLIR may be challenged is not predictable. Therefore, a real danger exists that the government's technological capability will outpace case law regarding the intrusiveness of thermal imagery. The public will be left with outdated and obsolete standards to protect them from unreasonable intrusions into the privacy of their homes.<sup>188</sup> Law enforcement may be left without guidelines to determine at what point "intrusiveness" begins. So the line of thinking—that thermal imagery is currently non-intrusive and therefore does not constitute an unlawful search—ignores important legal questions that must be resolved.

Furthermore, there are dangers inherent in allowing the government unrestricted, warrantless use of thermal imagery. Heat emissions from a residence generally occur without the conscious knowledge of the dweller. Moreover, the public is generally unaware of the capabilities of thermal imaging technology.<sup>189</sup> Thus, in general,

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186. See *United States v. Field*, 855 F. Supp. 1518, 1522 (W.D. Wis. 1994) (describing typical operator duties and functions).

187. The *Cusumano* court expressed concern about the invasiveness of thermal imaging of private residences, stating,

It seems quite possible that given only a general knowledge of a home's floor plan, a thermal imager could be used to identify a host of activities of virtually every home in this country . . . . These are mundane activities, to be sure, but activities nonetheless conducted in the domestic enclave. The routine [activity] is no more the government's legitimate business than is the intimate. . . . [The Fourth Amendment] does not afford greater protection to the study than to the kitchen . . . .

*Cusumano*, 67 F.3d at 1505 n.14 (citation omitted).

188. "[A]s technology races ahead . . . our subjective expectations of privacy may be unconsciously altered. Our right to privacy may be eroded without our awareness, much less our consent." *Young*, 867 P.2d at 598.

189. "We rather doubt that society is aware that heat signatures can be read with any greater accuracy than tea leaves." *Cusumano*, 67 F.3d at 1505.

residents have no basis to expect that police could or would scan their home with FLIR seeking to ascertain what activities are occurring within the home. Commonly, thermal imaging devices have been focused on residences in the vicinity of the subject of the surveillance for "comparison purposes."<sup>190</sup> Indeed, police may only determine that the residence under surveillance is emitting excessive heat by comparing that residence with those of the subject's neighbors, who are not the focus of the surveillance. Should neighboring homeowners be suspected of growing marijuana if the "comparison" scan reveals "suspicious" heat emissions emanating from their homes? Similar heat emissions would be obtained from a residence growing African Violets.<sup>191</sup> Thus, because police look for differences in heat patterns that distinguish the target from whatever may be typical of other residences in the area, FLIR's operation gives law enforcement unfettered discretion and even *requires* police to scan private residences without citizen's knowledge or consent and without probable cause or even a reasonable suspicion that illegal activity may be transpiring inside.<sup>192</sup>

The Supreme Court has acknowledged the dangers inherent with unchecked police discretion. In *Katz*, the majority found that the police possessed enough information to obtain a warrant.<sup>193</sup> Despite this fact, the police conducted a search without first acquiring one. In spite of the narrowly intrusive manner of the search and the restraint exercised by police; the Court refused to sanction the *self-imposed* restraint. Instead, the Court reaffirmed earlier decisions mandating that police restraint without adherence to the proper judicial process is unreasonable under the Fourth Amendment.<sup>194</sup> The Court found that allowing the police such a high degree of discretion was constitutionally offensive.<sup>195</sup>

Moreover, as technology continues to advance, the threat that the use of FLIR will diminish an individual's Fourth Amendment protection will grow. For example, combining thermal imagery with satellite technology will permit police to scan entire neighborhoods, without a warrant.<sup>196</sup> The potential for abuse is significant, especially without precise guidelines. The public needs protection against the potential erosion of Fourth Amendment rights by the government's un-

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190. See *Field*, 855 F. Supp. at 1523 (explaining that two other houses were randomly scanned to create a control group); see also *United States v. Penny-Feeney*, 773 F. Supp. 220, 224 (D. Haw. 1991), *aff'd sub nom. on other grounds*, *United States v. Feeney*, 984 F.2d 1053 (9th Cir. 1993); *Young*, 867 P.2d at 595.

191. See *United States v. Ishmael*, 843 F. Supp. 205, 214 (E.D. Tex. 1994), *rev'd*, 48 F.3d 850 (5th Cir.), *cert. denied*, 116 S. Ct. 74, and *cert. denied*, 116 S. Ct. 75 (1995).

192. See *Young*, 867 P.2d at 600.

193. See *Katz*, 389 U.S. at 354.

194. See *id.* at 356-57.

195. See *id.* at 366. See also *Young*, 867 P.2d at 600.

196. See *Polatsek*, *supra* note 1, at 477.

restricted use of high technology surveillance. Thus, absent clearly delineated limits defining exactly when the use of FLIR becomes intrusive and constitutes an unreasonable search, government officials should be required to obtain a warrant before using FLIR.

Currently, the majority of courts have asserted that FLIR is non-intrusive and placed it in the same class with beepers,<sup>197</sup> pen registers,<sup>198</sup> and narcotics dogs—techniques used in other approved warrantless searches.<sup>199</sup> Furthermore, courts have opined the limited imaging resolution of FLIR means it cannot reveal the kinds of intimate details and activities expected by society to be protected by the Fourth Amendment.<sup>200</sup> Thus, the crucial analysis is whether the technology in question reveals any *intimate details* about the activity inside an individual's home.<sup>201</sup> Because FLIR imaging does not involve any physical intrusion into an individual's home, some courts hold that "[n]one of the interests which form the basis for the need for protection of a residence, namely the intimacy, personal autonomy, and privacy associated with the home, are threatened by thermal imagery."<sup>202</sup> Thus, based on the premise that FLIR is not physically intrusive, the majority of courts have found that society will not recognize as reasonable any subjective expectation of privacy in heat emitted from a residence.<sup>203</sup> However, as previously illustrated, such analysis is flawed since FLIR surveillance is unlike other methods of police surveillance, because (1) the lack of physical intrusiveness, standing alone, does not determine whether a surveillance technique is intrusive; (2) FLIR is unlike other surveillance methods; and (3) FLIR *can* intrude upon an individual's intimacy, personal autonomy, and privacy in the home.

#### CONCLUSION

The Fourth Amendment protects the public from unreasonable searches.<sup>204</sup> Evolving technology has called into question the meaning

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197. A beeper is a portable radio transmitter planted on the person or property, by police, to trace movement. The beeper emits radio signals that can be picked up by police with the proper equipment. See *United States v. Knotts*, 460 U.S. 276 (1983).

198. A pen register is a device that can be used to detect and make a record of telephone calls made from a specific phone, thus allowing police to know what phone calls are being made from a particular phone. See *Smith v. Maryland*, 442 U.S. 735, 736 (1979).

199. See *United States v. Ford*, 34 F.3d 992, 997 (11th Cir. 1994); *United States v. Penny-Feeney*, 773 F. Supp. 220, 226 (D. Haw. 1991), *aff'd sub nom. on other grounds*, *United States v. Feeney*, 984 F.2d 1053 (9th Cir. 1993).

200. See *Ford*, 34 F.3d at 996-97 (stating "[s]uch information is neither sensitive nor personal, nor does it reveal the specific activities within the mobile home").

201. See *United States v. Ishmael*, 48 F.3d 850, 855 (5th Cir.), *cert. denied*, 116 S. Ct. 74, *and cert. denied*, 116 S. Ct. 75 (1995).

202. *United States v. Pinson*, 24 F.3d 1056, 1059 (8th Cir. 1994).

203. See *supra* Part I.B.4.

204. U.S. CONST. amend. IV.

of reasonable and what society will accept as reasonable within the confines of the Fourth Amendment. The increasing level of sophistication of police surveillance equipment allows greater levels of intrusion to be made into a residence. This increasing sophistication of technology highlights the need for an objective standard for establishing what society will accept as reasonable. Indisputably, the *Katz* test remains viable in determining whether an individual has a reasonable expectation of privacy in an object searched. However, the *Katz* test appears inadequate to address some technological advances. Thus, law enforcement officers need clear limits such as the natural human sense restriction. This restriction test recognizes that society will only accept as reasonable any surveillance technology that extends natural human senses. Drawing the line at what is capable of being naturally sensed by humans is an appropriate objective standard for what society considers reasonable. Such an objective standard will provide law enforcement with adequate guidelines for searches and maintain the expectation of privacy citizens enjoy in their homes. Unfortunately, the use of thermal imagery, which extends far beyond the scope of traditional law enforcement technology, interferes with the reasonable expectation of society, and therefore its warrantless use should be proscribed. Because thermal imagery is not a simple enhancement of a natural human sense, the courts should not allow warrantless use of thermal imaging devices in law enforcement surveillance.

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