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Tenth Circuit

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UNITED STATES COURT OF APPEALS
TENTH CIRCUIT

PATRICK FISHER
Clerk

UNITED STATES OF AMERICA,)
)
 Plaintiff-Appellee,)
)
 vs.)
)
 CHRISTOPHER PAUL CUSUMANO,)
)
 Defendant-Appellant.)

No. 94-8056

UNITED STATES OF AMERICA,)
)
 Plaintiff-Appellee,)
)
 vs.)
)
 ROBERT WILLIAM PORCO,)
)
 Defendant-Appellant.)

No. 94-8057

APPEALS FROM THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF WYOMING
(93-CR-0102-B)

ON REHEARING EN BANC

David A. Kubichek, Assistant United States Attorney, (David D. Freudenthal, United States Attorney, with him on the brief), Casper, Wyoming, for Plaintiff-Appellant United States of America.

Howard A. Pincus, Assistant Federal Public Defender, (Michael G. Katz, Federal Public Defender, Denver, Colorado, with him on the brief in No. 98-8056; Donald Horowitz, Law Office of Donald Horowitz, Hackensack, New Jersey, and Geoffrey H. Simon, Parcel, Mauro, Hultin & Spaanstra, P.C., Denver, Colorado, on the brief in No. 98-8057), Denver, Colorado, for Defendants-Appellants Christopher Paul Cusumano and Robert William Porco.

Before SEYMOUR, Chief Judge, and McKAY, PORFILIO, ANDERSON, TACHA, BALDOCK, BRORBY, EBEL, KELLY, HENRY, BRISCOE, LUCERO, and MURPHY, Circuit Judges.

BALDOCK, Circuit Judge.

Defendants Christopher Paul Cusumano and Robert William Porco entered conditional pleas of guilty to manufacturing marijuana, 21 U.S.C. § 841(a)(1), and reserved their right to appeal the district court's denial of their motion to suppress. The district court sentenced each Defendant to thirty-months imprisonment. On appeal, Defendants contend that the affidavit in support of the search warrant issued against their residence contained improper information drawn from the warrantless use of a thermal imager. Defendants tell us that a thermal imager detects and records infrared radiation emitted from heat sources. According to Defendants, the warrantless use of the thermal imager to detect heat emissions from their residence violated the Fourth Amendment's

proscription against unreasonable searches, and, in the absence of such information, the affidavit did not establish probable cause to support the search warrant. We exercise jurisdiction under 28 U.S.C. § 1291. We hold that, absent any consideration of the information obtained from the warrantless use of the thermal imager, the affidavit established probable cause to support issuance of the search warrant. Accordingly, we do not decide whether the use of a thermal imager to detect heat emissions from a personal residence constitutes a search under the Fourth Amendment.

I.

In August 1993, the County Court of Laramie, Wyoming, issued a search warrant against the residence at 3679 Piper Lane, Cheyenne, Wyoming, upon the affidavit of County Detective Terry Bohlig. Detective Bohlig concluded that Defendants Cusumano and Porco were growing marijuana for sale in the basement of their rented residence.

Detective Bohlig based his conclusion upon the following verified facts:

1. Defendants stated to the landlord that a grow light in the basement's furnace room was used to grow fresh vegetables;
2. The landlord detected a strong musty odor in the basement of the residence;
3. The landlord observed cardboard covering the basement windows of the residence;
4. Power company reports indicated that the residence was consuming twice the amount of electricity as similar structures in the area;

5. An electrician, which Defendants hired unsuccessfully to approve electrical work in the basement of the residence, reported that the existing wiring could support a grow operation;
6. The electrician also reported that the use of power equipment to provide electricity to an alleged sound stage placed over the basement's indoor swimming pool was inconsistent with existing wiring;
7. Defendants were operating a generator in the garage of the residence purportedly to provide supplemental electricity for musical equipment in the basement, though no such equipment was ever observed;
8. Defendants received delivery of five hundred gallons of diesel fuel at the residence to operate the generator;
9. Defendants paid their rent in three-month installments of \$2,100.00 cash;
10. Resident Thomas J. Sanatello (a defendant in the district court) refused to allow the landlord's homeowners insurance agent to inspect the residence for a two week period;
11. The insurance agent observed two wheel barrows, a shovel, and sacks of soil near a door of the residence leading to the basement;
12. The insurance agent feared for his safety while speaking with Sanatello;
13. Defendants had no visible means of support;
14. A thermal imager scan of the residence indicated that Defendants were emitting high levels of heat from the residence, especially from the area of the basement containing the indoor swimming pool.

Based upon these facts, Detective Bohlig concluded in his affidavit that Defendants

Cusumano and Porco were growing marijuana in the basement's swimming pool, which

they had, in effect, made into an indoor greenhouse. A search of Defendants' residence confirmed Detective Bohlig's conclusion.

II.

The district court denied Defendants' motion to suppress the evidence resulting from execution of the search warrant. The district court held that the verified facts in Detective Bohlig's affidavit established probable cause to support issuance of the search warrant. United States v. Porco, 842 F. Supp. 1393, 1399-1401 (D. Wyo. 1994). In so holding, the court concluded that the warrantless use of the thermal imager to scan Defendants' residence did not constitute an unreasonable search under the Fourth Amendment. Id. at 1395-98. The court did not consider whether the affidavit established probable cause absent the results of the thermal imager scan.

A panel of this court affirmed the denial of Defendants' motion to suppress because the "totality of the evidence" presented in Detective Bohlig's affidavit established probable cause, thus supporting issuance of the search warrant. United States v. Cusumano, 67 F.3d 1497, 1510 (10th Cir. 1995). The panel "held," however, "that the warrantless use of a thermal imager upon a home violates the Fourth Amendment of the

Constitution.” Id. at 1510. A majority of the entire court voted to rehear these appeals en banc.¹

III.

The Fourth Amendment requires that “no Warrants shall issue, but upon probable cause, supported by Oath or affirmation.” U.S. Const. amend IV. In determining whether probable cause supported the issuance of a search warrant, we give “great deference” to the decision of the issuing magistrate or judge. United States v. Williams, 45 F.3d 1481, 1485 (10th Cir. 1995). We ask only whether the issuing magistrate or judge had a “substantial basis” for finding probable cause:

The task of the issuing magistrate is simply to make a practical, common sense decision whether, given all the circumstances set forth in the affidavit before him . . . there is a fair probability that contraband or evidence of a crime will be found in a particular place. And the duty of the reviewing court is simply to ensure that the magistrate had a substantial basis for concluding that probable cause existed.

Illinois v. Gates, 462 U.S. 213, 238-39 (1983) (internal ellipses, quotations, and brackets omitted). In our review, we may disregard allegedly tainted material in the affidavit and

¹ We originally granted the government’s motion for rehearing en banc on the issue of “whether the warrantless use of a thermal imager device on a private residence constitutes an unconstitutional search under the Fourth Amendment.” United States v. Cusumano, Nos. 94-8056 & 94-8057, Order at 1-2 (10th Cir. filed Dec. 8, 1995). We subsequently modified the issue on rehearing en banc to encompass “the entire Fourth Amendment question” as to the sufficiency of the search warrant. United States v. Cusumano, Nos. 94-8056 & 94-8057, Order at 1 (10th Cir. filed Jan. 9, 1996).

ask whether sufficient facts remain to establish probable cause. See Franks v. Delaware, 438 U.S. 154, 171-72 (1978); United States v. Knapp, 1 F.3d 1026, 1028-29 (10th Cir. 1993).

Applying these principles, we agree with the panel opinion that the “totality of the evidence substantially supports the conclusion that there was ‘a fair probability that contraband or evidence of a crime’ would be found in Defendants’ home.” Cusumano, 67 F.3d at 1510 (quoting Gates, 462 U.S. at 238). Apart from the fact that a thermal imager scan of Defendants’ residence indicated heat emissions in the area of the basement’s swimming pool, the remaining facts set forth in Detective Bohlig’s affidavit “provide more than ample support for the warrant that was issued.” Cusumano, 67 F.3d at 1510. We differ with the panel opinion and the district court, however, on the necessity of deciding the constitutionality of the warrantless use of the thermal imager in these cases.

We do not decide the constitutionality of the warrantless use of the thermal imager to scan Defendants’ residence because any such decision is unnecessary to a resolution of Defendants’ appeals. Any decision we might reach on that question would not alter the outcome of these appeals. Detective Bohlig’s affidavit was sufficient to establish

probable cause absent any consideration of the results of the thermal imager scan.²

Specifically, Detective Bohlig's affidavit set forth numerous facts in such detail that, in aggregate, lead us to conclude that a fair probability existed that Defendants were growing marijuana in the basement of their residence. Consequently, the search warrant was based on probable cause even without the information supplied by the thermal imager.

The Supreme Court has long endorsed, if not always adhered to, the notion that federal courts should address constitutional questions only when necessary to a resolution of the case or controversy before it.³ This is a "fundamental rule of judicial restraint." Three Affiliated Tribes v. World Engineering, 467 U.S. 138, 157 (1984); see also, Cartwright v. Maynard, 822 F.2d 1477, 1479 (10th Cir. 1987) (en banc) ("federal court will address constitutional question only when it is necessary to the resolution of the case"), aff'd, 486 U.S. 356 (1988); United States v. Nichols, 841 F.2d 1485, 1491 (10th Cir. 1988) ("We will not decide a constitutional question unless it is necessary to do so.").

² Our decision should not be confused with the notion that constitutional error may be harmless in some instances. We simply need not decide whether the warrantless use of a thermal imager to scan a personal residence constitutes constitutional error. Rather, we have set aside the information which the imager revealed in deciding the sufficiency of the affidavit in support of the search warrant.

³ Laurence Tribe explains that the use of judicial restraint in deciding whether to address constitutional issues is "part of a broader general prescription that courts do not review issues, especially constitutional issues, until they have to. Or more particularly, one is tempted to add, until they want to badly enough." Laurence Tribe, American Constitutional Law 72 (2d ed. 1988) (internal quotations and footnotes omitted).

“If there is one doctrine more deeply rooted than any other in the process of constitutional adjudication, it is that we ought not to pass on questions of constitutionality . . . unless such adjudication is unavoidable.” Specter Motor Services, Inc. v. McLaughlin, 323 U.S. 101, 105 (1944). In Zobrest v. Catalina Foothills School Dist., 113 S. Ct. 2462 (1993), Justice Blackmun forcefully stated the reasons, apropos here, for exercising restraint in addressing constitutional issues:

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. . . . [L]itigants, by agreeing on the legal issue presented, could extract the opinion of a court on . . . dubious constitutional principles, an opinion that would be difficult to characterize as anything but advisory.

Id. at 2471 (Blackmun, J., dissenting) (internal quotations and brackets omitted).

Both the government and Defendants urge us to decide whether the use of a thermal imager to scan a personal residence constitutes a search under the Fourth Amendment. For the reasons stated herein, however, we believe it neither necessary nor wise to do so at this time. The panel opinion appearing at 67 F.3d 1497 is vacated and the decision of the district court denying Defendants’ motion to suppress is affirmed, but solely for the reason that the affidavit in support of the search warrant was sufficient to

establish probable cause independent of any evidence resulting from the use of the thermal imager.⁴

AFFIRMED.

⁴ Defendants' motion requesting the court to take judicial notice of certain published literature regarding the thermal imager is DENIED. Defendant Cusumano's motion to withdraw his appeal is likewise DENIED.

Nos. 94-8056, *United States v. Cusumano*
94-8057, *United States v. Porco*

PORFILIO, Circuit Judge, specially concurring:

I agree with the court's Fourth Amendment analysis, as far as it goes, but I do not join the decision to avoid consideration of the issues relating to the government's use of a thermal imager. Having given notice to the parties that the court was going to hear "the entire Fourth Amendment question," including the use of the thermal imager, and having been treated to excellent arguments on both sides addressing only the use of the thermal imager, I believe the court makes a mistake to avoid the issue.

If en banc consideration is to be devoted to securing the uniformity of our decisions or to resolving "question[s] of exceptional importance," as required by Fed. R. App. P. 35(a), the court's decision here does neither. The resolution reached by the majority rests upon a routine Fourth Amendment analysis already undertaken by the panel. Not only was the panel's decision routine, but it also was totally in keeping with this Circuit's precedents. Moreover, no fair stretch of the imagination will allow the issue resolved here, which takes its place in the choked ranks of search and seizure cases, to assume the garb of an

exceptionally important question.

In the last analysis, then, the decision was reached because the majority simply disagrees with the way in which the panel analyzed the case. To me, that is an improper and unwarranted reason for action by the en banc court.

Yet, the issue the court chooses to overlook is precisely the kind of conundrum that meets the important question test of Rule 35(a). Therefore, I would have reached it, and I cannot join the decision not to do so.

Having arrived at that conclusion, I could indulge my ego and review the thermal imaging issue on my own. I choose not to do so because of the futility of the effort, except to note that within the very narrow facts of this case, I could not conclude use of the imager constituted a search within the limits of the Fourth Amendment.

Nos. 94-8056 and 94-8057, *United States v. Cusumano and Porco*

McKAY, Circuit Judge, dissenting in part and concurring in part, with SEYMOUR, Chief Judge, and HENRY, Circuit Judge, joining:

For the Court, Chief Justice Rehnquist wrote, “Harmless-error analysis is triggered only after the reviewing court discovers that an error has been committed.” Lockhart v. Fretwell, 506 U.S. 364, 369 n.2 (1993).¹ In United States v. Karo, 468 U.S. 705 (1984), the Court undertook precisely the same Fourth Amendment/harmless error analysis as the panel decision.² In Karo, the Court held that the government violated the Fourth Amendment by monitoring an electronic beeper device concealed in a can of ether in a private residence. Id. at 718. Yet, after an extensive analysis of the unconstitutionality of the secreted beeper device, the Court held that its use was harmless because sufficient

¹ Rule 52 of the Federal Rules of Criminal Procedure sets forth the standards for harmless error and plain error. In explaining the plain error analysis under Rule 52, the Court stated, “The first limitation on appellate authority under Rule 52(b) is that there indeed be an ‘error.’” United States v. Olano, 507 U.S. 725, 732 (1993). Logically, this same limitation on appellate authority would extend to the harmless error analysis.

Additionally, in a case concerning the qualified immunity doctrine--the analytical fraternal twin to the harmless error doctrine--the Court held that a constitutional violation must be established as a threshold issue before determination of the qualified immunity issue. Siegert v. Gilley, 500 U.S. 226, 231-33 (1991).

² Although there is some appeal to the majority’s contention in footnote 2 that this case does not involve harmless-error analysis, I am persuaded by Karo that the analysis which takes place in cases such as these is fundamentally the same as harmless-error analysis.

untainted evidence supported probable cause for the search warrant. Id. at 719-21.³

Most of the circuits that have reached the thermal imaging issue to declare its warrantless use constitutional did so despite the existence of additional information supporting the warrants, which clearly would have been sufficient to sustain those convictions if those courts had elected to apply the doctrine that this court has announced today.⁴ While they may have purported to find it necessary to rely on the thermal imager

³ Justices Stevens, Brennan, and Marshall dissented on the harmless error issue, stating that it should have been remanded to the trial court because the issue had not been raised in the petition for certiorari or briefed by the parties. Id. at 736 (Stevens, Brennan, and Marshall, J.J., dissenting). The sufficiency of the evidence supporting the search warrant and harmless error issues were raised, briefed, and argued by both parties before the panel in this case.

⁴ See United States v. Ishmael, 48 F.3d 850, 851-52 (5th Cir.) (supporting information included thermal imager readings plus a confidential informant, prior marijuana convictions, phone records with calls to marijuana horticulture suppliers, a steel structure with water being pumped in, and high electrical usage), cert. denied, 116 S. Ct. 74 (1995); United States v. Myers, 46 F.3d 668, 668 (7th Cir.) (supporting information included thermal imager reading plus inquiries into and sale of indoor hydroponic equipment for marijuana cultivation, high electrical usage, and an absence of garbage), cert. denied, 116 S. Ct. 213 (1995); United States v. Pinson, 24 F.3d 1056, 1057 (8th Cir.) (supporting information included thermal imager readings plus receipt of packages from suppliers of indoor hydroponic growing equipment and high electrical usage), cert. denied, 115 S. Ct. 664 (1994); United States v. Robertson, 39 F.3d 891, 892-93 (8th Cir. 1994) (supporting information included thermal imager readings plus confidential informant and observation of aluminum foil on windows), cert. denied, 115 S. Ct. 1812 (1995); see also United States v. Robinson, 62 F.3d 1325, 1327 (11th Cir. 1995) (decided after the panel decision in Cusumano) (supporting information included thermal imager readings plus delivery of indoor hydroponic equipment to the defendant, high electrical usage, a prefabricated metal building, and the failure of the defendant to file state income tax

information, a careful examination of their precedents suggests that they would have sustained those warrants without the thermal imaging information.⁵

In addition, this is not a case where no circuit has addressed the issue and therefore the prudential discretion to avoid reaching the constitutional issues where possible seems far from compelling, indeed perhaps even absurd.⁶ Our refusal to address and determine

returns despite paying for the hydroponic equipment with a \$7,000 cashier's check).

⁵ See, e.g., United States v. Foree, 43 F.3d 1572, 1575-77 (11th Cir. 1995) (probable cause finding based on confidential informant); United States v. Curtis, 965 F.2d 610, 613-14 (8th Cir. 1992) (probable cause finding based on confidential informant, anonymous tips, purchase of hydroponic equipment, and high electrical usage).

⁶ Three circuit courts, five district courts and one state supreme court had already decided this constitutional issue before the panel reached it. See United States v. Ishmael, 48 F.3d 853 (5th Cir. 1995); United States v. Myers, 46 F.3d 668 (7th Cir. 1995); United States v. Pinson, 24 F.3d 1056 (8th Cir. 1994); United States v. Field, 855 F. Supp. 1518 (W.D. Wis. 1994); United States v. Domitrovich, 852 F. Supp. 1460 (E.D. Wash. 1994); United States v. Deaner, 1992 WL 209966 (M.D. Pa. 1992); United States v. Kyllo, 809 F. Supp. 787 (D. Or. 1992); United States v. Penny-Feeney, 773 F. Supp. 220 (D. Haw. 1991); State v. Young, 867 P.2d 593 (Wash. 1994).

Two circuit cases back in 1993 declined to address the issue on first impression, finding instead sufficient evidence supported the search warrant. United States v. Feeney, 984 F.2d 1053, 1056 (9th Cir. 1993); United States v. Deaner, 1 F.3d 192, 197 (3d Cir. 1993). Just before the Pinson decision, the Eighth Circuit in 1994 declined to address the issue because sufficient evidence supported the search warrant. United States v. Olson, 21 F.3d 847, 849 (8th Cir.), cert. denied, 115 S. Ct. 230 (1994). Also in 1994, the Ninth Circuit remanded the issue to a district court for an evidentiary hearing on the intrusiveness of the thermal imaging device. United States v. Kyllo, 37 F.3d 526, 531 (9th Cir. 1994).

the constitutionality of the thermal imager is prudentially irresponsible given the plethora of jurisprudence on this issue over the last several years. This is particularly true if this court concludes, as I do, that the other circuits are dead wrong on the issue. Therefore, I must dissent from the court's conclusion that the panel decision over-stepped its authority in addressing the thermal imaging issue.

This circuit--in opinions authored by at least eight of the current active members of this court--has regularly reached both constitutional and non-constitutional issues before applying the harmless-error analysis.⁷ Undoubtedly there are numerous additional instances which we will leave for the law review scholars of the future to cite. The disciplined practice of finding constitutional error before determining whether the error is

⁷ See United States v. Gomez, 67 F.3d 1515, 1528 (10th Cir. 1995), cert. denied, 116 S. Ct. 737 (1996); Getter v. Wal-Mart Stores, Inc., 66 F.3d 1119, 1122-23 (10th Cir. 1995), cert. denied, 116 S. Ct. 1017 (1996); United States v. Martinez-Cigarroa, 44 F.3d 908, 911 (10th Cir.), cert. denied, 115 S. Ct. 1386 (1995); United States v. Robinson, 978 F.2d 1554, 1560 (10th Cir. 1992), cert. denied, 507 U.S. 1034 (1993); United States v. Burson, 952 F.2d 1196, 1201 (10th Cir. 1991), cert. denied, 503 U.S. 997 (1992); United States v. Jefferson, 925 F.2d 1242, 1253-55 (10th Cir. 1991); United States v. Wolf, 839 F.2d 1387, 1395 (10th Cir.), cert. denied, 488 U.S. 923 (1988); Myrick v. Maschner, 799 F.2d 642, 645-46 (10th Cir. 1986). I have previously performed the harmless-error analysis in this manner in many cases. See, e.g., United States v. Flanagan, 34 F.3d 949, 955 (10th Cir. 1994); United States v. Perdue, 8 F.3d 1455, 1469 (10th Cir. 1993); United States v. DeSoto, 950 F.2d 626, 630 (10th Cir. 1991); United States v. Thompson, 908 F.2d 648, 652 (10th Cir. 1990).

harmless is routinely applied by the Supreme Court and all of the circuits. See, e.g., United States v. Karo, 468 U.S. 705, 719-21 (1984). In light of these and numerous other authorities, it seems particularly surprising that this court would en banc a panel decision conforming to these standards for the sole purpose of overturning the panel's careful and deliberate decision to reach the constitutional issue before applying harmless-error analysis.

The magistrate judge who issued the warrant challenged in this case deliberately relied on information obtained by the warrantless use of a thermal imager to inspect activities inside Defendants' house. The district court squarely and specifically relied on the same warrantless use of the thermal imager to uphold the validity of the warrant and specifically addressed the question of whether the warrantless use of the thermal imager was constitutional. The same issue was specifically and squarely presented to a panel of this court which, under prevailing authorities, properly addressed it. Even under the en banc order of this court, the constitutionality of the warrantless use of a thermal imager was squarely and specifically before this court.⁸ The court today--with an issue which is

⁸ Originally, this court granted rehearing en banc to address "whether the warrantless use of a thermal imaging device on a private residence constitutes an unconstitutional search under the Fourth Amendment." Order (Dec. 8, 1995). Counsel for Mr. Cusumano then submitted a motion requesting clarification of the issue because, as framed, the issue did not present a "live" case or controversy because hearing only the thermal imaging issue would not change the outcome of the panel decision. Motion to Clarify Order Granting Suggestion for In Banc Review or To Dismiss that Order as Improvidently

properly before the court--is being derelict in its judicial duty to determine what is "unreasonable" under the Fourth Amendment. Because I believe the panel properly reached the issue and the en banc court should properly reach the issue, I set forth herein the analysis that demonstrates why the warrantless use of thermal imagers is an unconstitutional violation of the right to be secure in our homes and why the other circuits simply have failed to properly address the implications of this important issue.

Four points should be made at the outset. First, the fact that the thermal imager issue is now being routinely presented to the courts around the country demonstrates that it is not an issue of the future, but it is an on-going, wide-spread challenge to the privacy rights of America's citizens. The widespread use of thermal imagers today--even by law enforcement departments of limited financial means--is evidenced by the use of thermal imaging technology by the Sheriff's Department for Laramie County, Wyoming, in this case.

Second, while the information obtained by the thermal imager in this case is

Granted, at 5-6 (Dec. 29, 1995). This court then "clarified" its order granting rehearing en banc to consider "the entire Fourth Amendment question." Order (Jan. 9, 1996). As Judge Porfilio states in his special concurrence, this court has avoided the thermal imaging issue despite being treated to excellent arguments on that issue. Also, this court is vacating the panel decision on the thermal imaging issue without affecting the outcome of that decision.

relatively primitive (and the record in this case does not contain what we know about more invasive thermal imagers from the media), this court's decision should be based upon a principled analysis rather than on whether the search in the present case turned up alarmingly personal information. After all, the evil of the warrantless entry of officers into one's house does not turn on what they find, but that the government invaded a citizen's house on a warrantless basis.

Third, in some instances the government is using the thermal imager to invade the privacy of innocent by-standers. The law enforcement "experts" reading the information from the thermal imager use the device against the homes of those who live nearby the criminal suspect to establish a baseline. See, e.g., Robinson, 62 F.3d at 1327; Robertson, 39 F.3d at 893. Using the thermal imager in this manner is inherently nefarious because all of us are susceptible to having the private activities within our homes intruded upon by the government by merely living near one suspected of criminal activity.

Fourth, if we permit information obtained by thermal imaging to be considered waste, abandoned, or to be characterized as having some other non-protected legal status, then we not only permit unwarranted invasions by the police but analytically destroy civil remedies against privacy invaders such as the paparazzi and tabloid photographers. Our failure to draw the line at this first and primitive warrantless invasion would make it

particularly difficult to protect against the use of “passive” devices of the future that would invade the privacy of our chambers or that would re-create the full range of the activities in our homes by way of computer-assisted images broadcast at the station house, at the newsroom of the local press or television station, or on the Internet. This modest parade of the horribles is not fanciful: Any user of the Internet or follower of the news media is aware of the fact that the Brave New World is at hand.

Mr. Robert Porco and Mr. Christopher Cusumano appeal their convictions for the manufacture of marijuana in violation of 21 U.S.C. § 841(a)(1). There is no doubt that Messrs. Porco and Cusumano in fact performed the acts alleged in the indictment: they do not deny that the police, searching pursuant to a warrant, discovered a sophisticated indoor marijuana cultivation operation in the basement of their home. Their misdeeds notwithstanding, the Defendants contend that this warrant was supported by data and opinions drawn from the results of a warrantless thermal scan of their home. The Defendants argue that the warrantless use of a thermal imager upon their home violated the Fourth Amendment to the Constitution; that, in the absence of the unconstitutionally obtained thermal data, probable cause to support the warrant was lacking; and that the evidence discovered during the search of their home should therefore be suppressed. The district court was not swayed by the Defendants' reasoning and denied the motion to suppress. The Defendants then entered a conditional plea of guilty that reserved their

right to appeal the district court's decision on the motion to suppress. This appeal followed.

The parties do not dispute that the government, without seeking or obtaining a warrant, used a thermal imager to monitor the exterior of the Defendants' home and attached garage.⁹ The imager revealed a large "hot spot" along one wall of the home's attached garage; the windows set into this wall were blocked from visual observation by a large camper shell leaning against the wall of the garage. The imager also identified an unusual number of "hot spots" along the roof and near the front door of the home. The district court found, and the government concedes, that the number and location of these "hot spots" strengthened the government's already existing suspicion that the Defendants were cultivating marijuana in their home.

My analysis begins with the text of the Amendment: "The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and

⁹ A thermal imager detects and records infrared radiation emitted by the heat sources within its field of view. The imager identifies temperature differentials. The device is calibrated to the ambient background temperature; warmer objects then appear as white images against the dark (and cooler) background. The imager used in this case can distinguish objects whose temperatures differ by as little as .5 degree Celsius; however, its ability to resolve these temperature differentials into distinct images is more limited. Heat sources obscured by solid walls, for example, give rise to "hot spots" upon the surrounding walls. Identification of the activities that generate such hot spots is then a function of the operator's expertise and a general knowledge of the layout of the structure.

seizures, shall not be violated" U.S. Const. amend. IV. The necessary interstices of the sweeping protection explicit in the constitutional text have been filled in by judicial interpretation. Modern Fourth Amendment jurisprudence begins, of course, with Katz v. United States, 389 U.S. 347 (1967). Abandoning earlier formulations of the Fourth Amendment, which had defined the ambit of Fourth Amendment protection by reference to the law of trespass, see, e.g., Olmstead v. United States, 277 U.S. 438 (1928); Goldman v. United States, 316 U.S. 129 (1942), Katz erected an analytic framework grounded in an individual's "reasonable expectations of privacy." Katz, 389 U.S. at 352, 359, 361. The Katz inquiry has most commonly been stated in the terms employed by Justice Harlan in his Katz concurrence: has government action intruded upon interests in which an individual maintains a subjective expectation of privacy; if so, is that expectation one that society deems reasonable? See 389 U.S. at 360-62 (Harlan, J., concurring). The Defendants seek to shroud their actions in the security expressly afforded the home by the constitutional text--a security that has been traditionally deemed both objectively and subjectively reasonable. The government, for its part, denies that the imager intrudes upon domestic privacy at all. It claims that the device merely records the emanation of "waste heat" from the exterior of a building; that no reasonable expectation of privacy, either objective or subjective, exists in this "waste heat"; that the technical imprecision of the device is such as to leave private that which transpires inside a home; and that the Constitution does not forbid the government from employing modern technology to glean

incriminating data even from the most subtle of telltale signs.

This circuit, even after being completely briefed and hearing excellent oral advocacy on the issue, has failed to address the constitutionality of the warrantless use of the thermal imager. Other courts that have analyzed this question have split. The Seventh and Eighth Circuits recently embraced the analysis set forth in United States v. Penny-Feeney, 773 F. Supp. 220 (D. Haw. 1991), aff'd on other grounds, 984 F.2d 1053 (9th Cir. 1993), holding that the use of an imager is not a search within the meaning of the Fourth Amendment. See United States v. Myers, 46 F.3d 668 (7th Cir. 1995); United States v. Pinson, 24 F.3d 1056 (8th Cir.), cert. denied, 115 S. Ct. 664 (1994). The Eleventh Circuit, in United States v. Ford, 34 F.3d 992 (11th Cir. 1994), reached the same conclusion, albeit for slightly different reasons. The Fifth Circuit has rejected aspects of the Penny-Feeney and Ford frameworks, but, drawing upon the "open fields" doctrine, nonetheless has held that a thermal scan of a building outside the curtilage does not qualify as a Fourth Amendment search. See United States v. Ishmael, 48 F.3d 850 (5th Cir. 1995). The Supreme Court of Washington, interpreting both the Fourth Amendment and the relevant sections of the Washington Constitution, has determined that the warrantless use of a thermal imager runs afoul of both constitutions. State v. Young, 867 P.2d 593 (Wash. 1994).

A thermal imager operates by observing and recording the differential heat patterns radiating through the surface of a structure. Focusing upon this most basic aspect of the imager's operation, the circuits have reduced the Fourth Amendment inquiry to an analysis of the reasonable expectations of privacy residing in this "waste heat." See Ishmael, 48 F.3d at 853-57; Ford, 34 F.3d at 995-97; Pinson, 24 F.3d at 1058-59; Penny-Feeney, 773 F. Supp. at 225-28. A number of justifications have been put forth to support the conclusion that no expectation of privacy, either objective or subjective, exists in "waste heat." The observation of "waste heat" has been analogized to the garbage search approved in California v. Greenwood, 486 U.S. 35 (1988); to the dog sniff found constitutional in United States v. Place, 462 U.S. 696 (1983); to the pen register condoned by Smith v. Maryland, 442 U.S. 735 (1979); and to the overhead surveillance flights upheld in California v. Ciraolo, 476 U.S. 207 (1986); Dow Chem. Co. v. United States, 476 U.S. 227 (1986), and Florida v. Riley, 488 U.S. 445 (1989). It has been noted that (1) the thermal imager is a passive device, employed from beyond the curtilage, which emits no rays or beams and which does not intrude in any fashion upon the observed property; (2) the resolution of the device is limited and that, in general, it detects only hot spots on the exterior surfaces of a building; (3) in many cases the machine measures heat which has been actively vented from a structure by a defendant; and (4) the machine only observes a phenomenon that could be watched by any member of the public equipped with a similar instrument (which is commercially available).

I concede that the analogies called upon by our fellow circuits are somewhat persuasive, if not altogether compelling. I believe, however, that the other circuits have misframed the relevant Fourth Amendment inquiry and, in so doing, have asked, and answered, the wrong question. There is no question but that activities which take place within the sanctity of the home merit the most exacting Fourth Amendment protection. It is likewise undisputed that the illegal conduct which produced the heat detected by the thermal imager was performed within the four walls of the Defendants' home.¹⁰ It must, finally, be acknowledged that the heat gradients measured by the imager radiated beyond the confines of the home. Is the link between the "waste heat" observed by the imager and the activities that gave rise to that heat so attenuated as to restrict the "expectation of privacy" analysis to the heat alone? I think not.

To focus upon the "waste heat" radiating from a structure is to ignore both the purpose of the device and the manner in which it operates. The imager measures not "waste heat" but rather heat differentials; it records heat gradients across the exterior surface of a building. The laws of thermodynamics inform us that the amount of heat radiated from a given section of the exterior wall is directly related to the amount of heat generated by heat sources in proximity to the interior of that wall. Activities that generate

¹⁰ The government does not contend that the illegal activities were themselves in plain view.

a significant amount of heat therefore produce a heat "signature" that the imager can detect.¹¹ Under optimal conditions--viewing through an open window into a darkened room, for example--the imager (or one much like it) might well be able to resolve these heat signatures into somewhat indistinct images.¹² See, e.g., Young, 867 P.2d at 595 (noting that an imager can discern a human form through a curtained window under certain circumstances). More typically, the machine identifies only hot spots on a wall (as was true in this case). In either instance, it is the existence of these distinct interior sources that the device indirectly recognizes--with greater or lesser imprecision varying with the insulating attributes of the exterior walls--and records. While the heat lost by a building is data of some limited value,¹³ the true worth of the device--the very reason that

¹¹ Typical structures tend to radiate heat from exterior surfaces at a more or less uniform rate that varies with the average internal temperature of a building. Activities that generate enough heat to raise the temperature of an interior wall above that average cause the corresponding section of the exterior to radiate a somewhat greater amount of heat. The imager records this differential heat loss as a white "hot spot" on the exterior of the structure.

¹² The infrared targeting devices employed by the military are apparently now sophisticated enough to perform this feat. It seems only a matter of time before such capabilities trickle down to law enforcement.

¹³ The heat lost by a building is indicative of the amount of energy expended by the occupants of that building. I note that the vast majority of individuals who labor under high electric bills are engaged in deeds that are legal, harmless, and deserving of privacy. Without invitation or the sanction of a warrant, the government has no business studying such actions, much less relying upon them for the purposes of law enforcement. To the extent that certain criminal activities--such as prohibited botanical operations--consume large amounts of energy, inordinate heat loss is evidence of some slight weight.

the government turned the imager on the home of the Defendants--is predicated upon the translation of these thermal records into intelligible (albeit speculative) information about the activities that generate the observed heat. The utility of the machine depends therefore not on the inevitable and ubiquitous phenomenon of heat loss but on the presence of distinguishable heat signatures inside the structure. I see no reason to blind ourselves to the physical reality of this relationship by severing our analysis of the heat differentials emanating through the walls of a structure from an informed consideration of the heat sources within that structure.

My characterization of the issue follows naturally from the facts of Katz. It must be remembered that the bug at issue in Katz was fixed to the outside of a public phone booth. Reduced to its operational fundamentals, that bug did not monitor the interior of the phone booth at all; rather, it measured the molecular vibrations of the glass that encompassed that interior. Alternatively, it might fairly be said that the bug passively recorded the propagation of waste vibrational energy into the public sphere. Drawing upon the logic embraced by our fellow circuits, one could reason that the translation of the vibrational record into an account of that which transpired within the phone booth was simply a useful interpretation of abandoned energy--an analysis which would condone the search condemned by Katz. The Supreme Court in Katz did not dwell upon these physical minutiae, but, rather, recognized that the Fourth Amendment broadly protects

from government intrusion that which a person reasonably seeks to keep private. See Katz, 389 U.S. at 351-52; id. at 361 (Harlan, J., concurring). The Court eschewed an examination of the means by which the government obtained Mr. Katz's secrets and instead focused upon the expectations of privacy inhering in the secrets themselves. The fact that the inevitable physical manifestations of protected activity extended into a public area--such that the bug could record the exterior vibrations of the phone booth wall--was of "no constitutional significance." See Katz, 389 U.S. at 353. The (successful) attempt to breach the privacy reasonably afforded by the walls of the phone booth itself sufficed to implicate the Fourth Amendment.

I find nothing in the Penny-Feeney analysis upon which to base a distinction between the infrared radiation observed by the thermal imager and the molecular vibrations recorded by a microphone. Each is an exterior physical manifestation of an internal energy flow. Viewed in isolation, each phenomena is of relatively little interest; yet, properly interpreted, both thermal images and molecular vibrations disclose facts about the activities that spawned them. The microphone is, of course, a much more familiar device--so familiar, in fact, that it is easy to forget that the microphone records not words but the physical manifestations of sound waves. Lack of familiarity, however, cannot justify the severing of the physical phenomenon from the knowledge that technical prowess can extract from it. To do so would be "bad physics as well as bad law." See

Katz, 389 U.S. at 362. Katz looked not to the tools employed by the government nor to the phenomena measured by those tools but to the object of the government's efforts; I see no reason to do otherwise here. I acknowledge that the thermal imager monitors and records the heat signatures of the activities ongoing inside a structure. The pertinent inquiry is not, therefore, whether the Defendants retain an expectation of privacy in the "waste heat" radiated from their home but, rather, whether they possess an expectation of privacy in the heat signatures of the activities, intimate or otherwise, that they pursue within their home.¹⁴

It is plain under Katz and its progeny that the Defendants exhibited a subjective

¹⁴ The misplaced focus of the Penny-Feeney framework is further illuminated by consideration of the output of a more advanced thermal imager. If it were possible to track the movements of a person through the curtained windows of a darkened room, it seems certain that use of the imager--which would, in effect, be able to "see through walls"--would constitute a search within the meaning of the Fourth Amendment. The output of the device would of necessity intrude upon some "reasonable expectation of privacy"; the input given the device, however, would not differ from the imager at issue here. This advanced imager would operate on the same physical principles utilized by contemporary imagers; its greater capacity to resolve "waste heat" gradients into distinct images would reflect no alteration in the physical phenomenon observed by the device (i.e., the "waste heat") but merely an ability to interpret that phenomenon in a more discerning manner without the aid of a human operator. Yet, the Penny-Feeney analysis would accord "waste heat" an expectation of privacy in the one instance but not in the other--an outcome that comports with logic only if the focus of the analysis were to shift from the "waste heat" (in the latter case) to the information derived from a more perceptive interpretation of that heat (in the former case). I see no reason to embrace such a bifurcated analytical framework. The relevant question in each case should properly be the same: is there an "expectation of privacy" in the heat signatures of activities pursued within the home?

expectation of privacy in the heat signatures of their domestic activities. See Ishmael, 48 F.3d at 854-55 (holding that defendants possessed subjective expectations of privacy in "waste heat"). The Defendants sought privacy for their actions in the "sanctity of [the] home," Camara v. Municipal Court, 387 U.S. 523, 531 (1967), a location traditionally accorded the most stringent protection under the Fourth Amendment.¹⁵ It is true that the Defendants did not take all possible measures to protect themselves from a thermal imager.¹⁶ They did, however, take steps that would have thwarted all but the most

¹⁵ See United States v. Karo, 468 U.S. 705, 714 (1984) ("[P]rivate residences are places in which the individual normally expects privacy free of governmental intrusion not authorized by a warrant . . ."); Payton v. New York, 445 U.S. 573, 590 (1980) ("[T]he Fourth Amendment has drawn a firm line at the entrance to the house. Absent exigent circumstances, that threshold may not reasonably be crossed without a warrant."); Silverman v. United States, 365 U.S. 505, 511 (1961) ("At the very core [of the Fourth Amendment] stands the right of a man to retreat into his own home and there be free from unreasonable governmental intrusion."); see also Soldal v. Cook County, 113 S. Ct. 538 (1992); Florida v. Riley, 488 U.S. 445, 453-55 (1989) (O'Connor, J., concurring); California v. Ciraolo, 476 U.S. 207, 212-13 (1986); Welsh v. Wisconsin, 466 U.S. 740, 748-49 (1984); Steagald v. United States, 451 U.S. 204, 211-12 (1981); Katz, 389 U.S. at 361 (Harlan, J., concurring).

¹⁶ It is a matter of some dispute as to whether the Defendants actively vented heat from their home. The district court found that they had not. The government contends that the record demonstrates otherwise. My review of the facts suggests that the government may well be correct. It appears that the Defendants vented heat from a backup generator through a pipe out one of the windows in the garage. I note, however, that the outlet of the pipe was covered by the camper shell that the Defendants had placed against the wall of the garage. The thermal imager, therefore, did not detect the vented heat directly, but rather recorded a hot spot on the camper shell--an observation that parallels the detection of a non-vented heat source through a wall. It also appears that the Defendants ran a fan of some sort that vented heat from the house. The record does not indicate whether the imager distinguished the exhaust from this fan from other heat sources within the home or whether the observation of the exhaust heat played a role in

sophisticated of surveillance techniques: they grew their plants in the basement of their home, and they took affirmative steps to block the windows looking into that basement. These efforts compare favorably to those undertaken by the defendants in the "overflight" cases, Riley and Ciraolo, where the Supreme Court found that the defendants had exhibited subjective privacy expectations in preventing ground-level observation despite their failure to take precautions against aerial surveillance. See Riley, 488 U.S. at 449-50; Ciraolo, 476 U.S. at 211-12.

I therefore agree with the Fifth Circuit that the Defendants need not have anticipated and guarded against every investigative tool in the government's arsenal. See Ishmael, 48 F.3d at 854-55 ("Though the [defendants] did not--indeed, could not--take every precaution against the detection of the hydroponic laboratory [by a thermal imager], the balance of the evidence demonstrates that [they] exhibited a subjective expectation of privacy."). Otherwise the privacy of the home would be left at the mercy of the government's ability to exploit technological advances: the government could always argue that an individual's failure (or inability) to ward off the incursions of the latest

the analysis of the thermal data. Moreover, many, perhaps most, homes have exhaust fans of one sort or another, and that use of such a fan should not forfeit the reasonable expectation of privacy traditionally accorded the home. I therefore conclude that the possibility that the Defendants vented heat from their home does not alter the analysis given above.

scientific innovation forfeits the protection of the Fourth Amendment.¹⁷ See Katz, 389 U.S. at 362 (Harlan, J., concurring). Reasoning of this sort underlies the justly condemned holding of Olmstead v. United States, 277 U.S. 438 (1928). Despite the passive, non-intrusive character of a wiretap, we do not require that the people manifest an expectation that phone conversations remain inviolate by scrambling the signal. I fail to see why more should be required of those who conduct their affairs in their basements.

I turn to the second prong of the Katz framework. The government, seeking to minimize the degree to which this machine intrudes upon the "societally reasonable" privacy of the home, has taken pains to emphasize the technical inadequacies of its thermal imager--an argument that proved decisive in Ford, Myers, and Pinson. The government contends that this device is incapable of resolving images through the walls of a home and in fact does little more than identify hot spots on the exterior of a building. While such reassurances are comforting, I anticipate that this comfort will be ephemeral. It is in the nature of technology to improve, and I doubt that infrared technology is uniquely static. Infrared targeting devices presently employed by the military can

¹⁷ The Supreme Court has cautioned that the government cannot be allowed to manipulate the Katz framework to ensure the constitutionality of its own actions by, for example, consciously using public relations to lower subjective privacy expectations. See Smith v. Maryland, 442 U.S. 735, 740 n.5 (1979); see also United States v. Taborda, 635 F.2d 131, 137 (2d Cir. 1980). I likewise see no reason why the government should be able to make inroads upon an individual's privacy by arrogating to itself hitherto unrecognized dimensions of privacy before subjective expectations can form.

apparently identify the movement of a human body through underbrush and foliage. I imagine that it would be rather easy to identify (if not, strictly speaking, to watch) two people making love in the privacy of their darkened bedroom.¹⁸ I trust that the government would, in most instances, employ a more capable imager with discretion; nonetheless, the very existence of such discretion would run afoul of the Constitution. See Katz, 389 U.S. at 356-57. At best, the government invites a re-evaluation of these issues at some indeterminate time in the future; at worst, the government would allow the privacy of the home to hinge upon the outcome of a technological race of measure/counter-measure between the average citizen and the government--a race, I expect, that the people will surely lose.

In any event, there is no need to wait for the future: the thermal imager used here is quite plainly capable of revealing rather specific information regarding the internal activities of the home.¹⁹ The district court found (and we must accept this finding

¹⁸ The imager used in this case can resolve heat differentials greater than .5 degree Celsius. It would take no great wit to speculate as to the origin of two mild hot spots, commingled, in a bedroom at night. See also United States v. Field, 855 F. Supp. 1518, 1531 (W.D. Wis. 1994) (noting that thermal imagers can detect the tear ducts on a face); State v. Young, 867 P.2d 593, 595 (Wash. 1994) (noting that thermal imagers can detect "a human form through an open [curtained] window when the person is leaning against [the] curtain" or a person leaning against a plywood door).

¹⁹ It is somewhat disingenuous for the government to plead so forcefully the deficiencies of its machine while simultaneously averring that the output of that device is sufficiently reliable to support the warrant that issued.

because it is not clearly erroneous) that the thermal readings, when interpreted in the context of the roughly known layout of the house, enabled the government to conclude that the Defendants were raising plants in their basement--a detail of the Defendants' home life that is hardly common and that could not have been discerned from the street or from the air by a member of the public. The Seventh, Eighth, and Eleventh Circuits have determined that the secrets unveiled by a thermal imager are not sufficiently "intimate" to give rise to a Fourth Amendment violation. See Myers, 46 F.3d at 669-70; Ford, 34 F.3d at 996 (citing Dow Chemical and Riley); Pinson, 24 F.3d at 1059. The circuits have, I think, misapprehended the most pernicious of the device's capabilities. The machine intrudes upon the privacy of the home not because it records white spots on a dark background but rather because the interpretation of that data allows the government to monitor those domestic activities that generate a significant amount of heat. Thus, while the imager cannot reproduce images or sounds, it nonetheless strips the sanctuary of the home of one vital dimension of its security: the "right to be let alone" from the arbitrary and discretionary monitoring of our actions by government officials.²⁰

²⁰ I therefore respectfully disagree with the conclusions reached in Ford, 34 F.3d at 996-97, and Ishmael, 48 F.3d at 856. I believe Ford and Ishmael underestimate the ability of the government to interpret thermal data so as to discern indirectly that which is cloaked from visual detection: the character of activities occurring within the walls of the home. I recognize that the government's ability to glean the secrets of the home from thermal data differs from more common methods of surveillance: it requires a two-step process of data collection and explicit data interpretation; it reveals only those activities that generate a sufficient amount of heat; and it is somewhat less precise than visual or aural investigation. However, as noted above, microphones and bugs also incorporate an

Olmstead v. United States, 277 U.S. 438, 478 (1928) (Brandeis, J., dissenting); see also Camara v. Municipal Court, 387 U.S. 523, 528 (1967); United States v. Karo, 468 U.S. 705 (1984). It is true that the aspect of the Defendants' home life that was uncovered by the imager is not so intimate as the activities of the bedroom.²¹ What one does in the privacy of one's basement, however, deserves the same Fourth Amendment protection as one's bedroom. Compare Riley, 488 U.S. at 452 (plurality decision) (visual surveillance of the interior of a greenhouse observed "no intimate details connected with the use of the home") (dicta) and Dow Chemical, 476 U.S. at 237-39 (camera surveillance that revealed outlines of commercial buildings did not disclose intimate details of the home) with Karo,

implicit two-stage process of data collection (the measurement of vibrations) and interpretation (the reproduction of those vibrations into sound). Even mundane activities are accorded a presumption of privacy when performed in the privacy of the home, and the government finds the imager sufficiently precise to deem its output valuable--an evaluation to which I defer.

²¹ 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 typical of virtually every home in this country: the use of a shower, bath, or hot tub; the running of one's dishwasher or clothes dryer; or the baking of bread, or a turkey, or cookies. See United States v. Field, 855 F. Supp. 1518, 1519 (W.D. Wis. 1994) (noting that a thermal imager had detected the heat emitted from a dehumidifier in a closet). These are mundane activities, to be sure, but activities nonetheless conducted in the domestic enclave. The routine is no more the government's legitimate business than is the intimate. The text of the Fourth Amendment encompasses "persons, houses, papers, and effects." U.S. Const. amend. IV. It does not, by its terms, afford greater protection to the study than to the kitchen, or to a diary than to a contract, or to an undergarment than to a pocket watch.

468 U.S. 705 (discussed below).²²

It is true that the government is not prohibited from using modern technology to extract latent information from the most subtle of physical phenomena. See United States v. Knotts, 460 U.S. 276, 282 (1983). But compare Dow Chemical, 476 U.S. at 238 ("[S]urveillance of private property by using highly sophisticated surveillance equipment not generally available to the public . . . might be constitutionally proscribed absent a warrant."). That is not to say, however, that the government may employ scientific innovations to make inroads upon the security of the people in their homes. Technological wizardry neither obviates nor supplants a warrant. Words carried out of the house on the wind travel beyond the domain of the Fourth Amendment, but a government official may not replicate a trick of the wind with a parabolic microphone. Confidences unwittingly disclosed to a government mole freely admitted into the sanctuary of the home do not trouble the Constitution, but secrets overheard by a bug may not be procured without a warrant. The government's use of technology must be weighed in the Fourth Amendment balance not because the Constitution constrains the government to employ antiquated surveillance techniques but because the march of science over the

²² Compare also Arizona v. Hicks, 480 U.S. 321, 325 (1987) ("It matters not that the search uncovered nothing of any great personal value to respondent--serial numbers rather than . . . letters or photographs. A search is a search, even if it happens to disclose nothing but the bottom of a turntable.").

course of this century has time and again laid bare secrets that society had (erroneously) assumed to lie safely beyond the perception of the government. See Olmstead, 277 U.S. at 473, 474-79 (Brandeis, J., dissenting) ("Subtler and more far-reaching means of invading privacy have become available to the Government. Discovery and invention have made it possible for the Government, by means far more effective than stretching upon the rack, to obtain disclosure in court of what is whispered in the closet.").²³ Katz, read in the light of the abandoned reasoning of the Olmstead majority, confirms that it is those expectations of privacy that define the contours of the Fourth Amendment--not the actual capabilities of the government's arsenal of investigatory methods.

No explicit societal expectation of privacy inheres in the heat signatures of activity within the home, and I doubt that society is aware that heat signatures can be read with any greater accuracy than tea leaves. The contours of the privacy expressly guaranteed the home by the Fourth Amendment are not, however, determined by the outcome of a game of hide-and-seek played by the government and the people. It is abundantly clear that the people retain a "reasonable expectation of privacy" in the undetected, unmonitored performance of those domestic activities that are not knowingly exposed to the public. See Dow Chemical, 476 U.S. at 236 ("Dow plainly has a reasonable,

²³ See also Katz, 389 U.S. at 360-62 (Harlan, J., concurring); Dow Chemical, 476 U.S. at 238-39; Ishmael, 48 F.3d at 855; Taborda, 635 F.2d at 138-39; United States v. Agapito, 620 F.2d 324, 329-30 (2d Cir.), cert. denied, 449 U.S. 834 (1980).

legitimate, and objective expectation of privacy within the interior of its covered buildings."); United States v. Karo, 468 U.S. 705, 714 (1984) ("At the risk of belaboring the obvious, . . . [the individual's expectation in the privacy of a residence] is plainly one that society is prepared to recognize as reasonable.").²⁴ The mere fact that the government utilized a novel or uncommon method of surveillance does not suffice to carve an exception from the general societal expectation that deeds conducted in the privacy of one's basement will in fact remain private unless a warrant is obtained.²⁵ Compare Karo, 468 U.S. 705 (discussed below); Riley, 488 U.S. at 454-55 (O'Connor, J., concurring) (analyzing helicopter surveillance to determine if such activity were sufficiently regular or commonplace to support a finding that privacy from this form of aerial observation was not objectively reasonable). If the refuge of the home fails to ward off unimagined threats to the privacy of the people, the "security" explicitly mandated by the Constitution will wither as the government supplants older, more blunt techniques with more subtle,

²⁴ See also Oliver v. United States, 466 U.S. 170, 178 (1984) ("The [Fourth] Amendment reflects the recognition of the Framers that certain enclaves should be free from arbitrary government interference. . . . [T]he Court since the enactment of the [] Amendment has stressed 'the overriding respect for the sanctity of the home that has been embedded in our traditions since the origins of the Republic.'" (quoting Payton, 445 U.S. at 601 (Powell, J., concurring))); Katz, 389 U.S. at 361; Silverman, 365 U.S. at 511-12.

²⁵ "Crime, even in the privacy of one's own quarters, is, of course, of grave concern to society, and the law allows such crime to be reached on proper showing. . . . When the right of privacy must reasonably yield to the right of search is, as a rule, to be decided by a judicial officer, not by a policeman or government enforcement agent." Johnson v. United States, 333 U.S. 10, 14 (1948) (Jackson, J.).

"passive" depredations. This result would comport neither with the plain language of the Amendment nor with the Supreme Court's post-Katz conception of the Fourth Amendment. Consequently, I would hold that the use of a thermal imager upon the home intrudes upon an expectation of privacy that society deems reasonable.

Likewise, I would conclude that the Defendants did not "knowingly expose" the heat signatures of their botanical endeavors to the public so as to place those activities in "plain view." The Supreme Court, in supporting its holdings in the aerial surveillance cases, took pains to emphasize that the details noted by government officials were observable by the naked eye or by a conventional, commonly available camera.²⁶ That is

²⁶ See Riley, 488 U.S. at 451 ("Any member of the public could legally have been flying over Riley's property in a helicopter . . . and could have observed Riley's greenhouse."); id. at 454-55 (O'Connor, J., concurring); Ciraolo, 476 U.S. at 213-14 ("[The officers] were able to observe plants readily discernible to the naked eye Any member of the public flying in this airspace who glanced down could have seen everything that these officers observed."); id. at 214-15 ("Justice Harlan's observations about future electronic developments . . . were plainly not aimed at simple visual observations from a public place." (emphasis added)); Dow Chem., 476 U.S. at 229, 231 ("Any person with an airplane and an aerial camera could readily duplicate them."); id. at 238 ("Although [the photographs] undoubtedly give EPA more detailed information than naked-eye views, they remain limited to an outline of the facility's buildings and equipment.").

I recognize that the use of illumination or binoculars to improve the visibility of an object already in plain view has been held constitutional. See Texas v. Brown, 460 U.S. 730, 740 (1983) (plurality opinion); United States v. Lee, 274 U.S. 559, 563 (1927); Fullbright v. United States, 392 F.2d 432, 434-45 (10th Cir.), cert. denied, 393 U.S. 830 (1968). But see United States v. Taborda, 635 F.2d 131, 137-39 (2d Cir. 1980) (holding that telescopic observation of the home "impair[s] a legitimate expectation of privacy").

certainly not the case here. More fundamentally, the essence of the "plain view" exception is predicated upon the "knowing[]" exposure" of information to the public. See Ciruolo, 476 U.S. at 215 (quoting Katz, 389 U.S. at 361 (Harlan, J., concurring)). I do not believe an individual "knowingly exposes" that which goes on in the basement of the home. Although the thermal radiation observed by the machine propagates through the walls of the home into the public sphere, the Constitution demands no "more than the 'precautions customarily taken by those seeking privacy.'" Riley, 488 U.S. at 454 (O'Connor, J., concurring) (citation omitted).²⁷ It is hardly "customary" for an individual to seek privacy by controlling heat emissions, and a person's right to be secure inside her or his home should not hinge on the insulating capacity of the walls. An individual is "entitled to assume" that the heat signatures of domestic conduct will remain unmonitored. See Ciruolo, 476 U.S. at 214-15; cf. Riley, 488 U.S. at 451. I would therefore decline to extend the "plain view" exception to encompass thermal imagery.²⁸

There is, nonetheless, an obvious distinction between common tools that enhance vision and a sophisticated instrument that observes infrared radiation.

²⁷ It is therefore irrelevant whether the Defendants vented heat from their home. Such venting may well ease the observation of heat signatures by a thermal imager. However, to say that such exposure was "knowing" would distort the meaning of the term to an unreasonable degree. In any event, an individual need not swelter in an unventilated home as the cost of taking "customar[y] precautions" against government monitoring.

²⁸ I note, lastly, that the "plain view" exception has been strictly interpreted: movement of a piece of stereo equipment by a few inches has been held sufficient to take the observation of serial numbers outside the realm of the exception. See Arizona v. Hicks, 480 U.S. 321 (1987).

My analysis finds further support in the details of United States v. Karo, a case addressed neither by the government nor by our fellow circuit courts.²⁹ In Karo, an electronic beeper had been placed inside a can of ether; the government used the beeper to track the movements of the can over the course of several months. The defendants in Karo were eventually followed to a private residence suspected (correctly, as it turned out) of concealing a drug lab. Activation of the beeper revealed that the can of ether had been stored in the suspect home. At trial the defendants contended that the warrantless use of the beeper impermissibly intruded into the privacy of the home. The Supreme Court, distinguishing United States v. Knotts, 460 U.S. 276 (1983), agreed:

In this case, had a DEA agent thought it useful to enter the Taos residence to verify that the ether was actually in the house and had he done so surreptitiously and without a warrant, there is little doubt that he would have engaged in an unreasonable search within the meaning of the Fourth Amendment. For purposes of the Amendment, the result is the same where, without a warrant, the Government surreptitiously employs an electronic device to obtain information that it could not have obtained by observation from outside the curtilage of the house. The beeper tells the agent that a particular article is actually located at a particular time in the private residence

The monitoring of an electronic device such as the beeper is, of course, less intrusive than a full-scale search, but it does reveal a critical fact about the interior of the premises that the Government is extremely

²⁹ In fact, the contrary analyses offered by other courts cite instead to United States v. Knotts, 460 U.S. 276 (1983), a case expressly distinguished by the Supreme Court in Karo and rejected as inappropriate to the home. See, e.g., Ishmael, 48 F.3d at 855; Ford, 34 F.3d at 997; Penny-Feeney, 773 F. Supp. at 226. In Knotts, the Supreme Court upheld the use of a beeper to monitor movements outside a home. In light of Karo, Knotts must be considered wholly inapplicable to an analysis of activities within the home.

interested in knowing and that it could not have otherwise obtained without a warrant. The case is thus not like Knotts, for there the beeper told the authorities nothing about the interior of Knotts' cabin. The information obtained in Knotts was "voluntarily conveyed to anyone who wanted to look . . .," 460 U.S., at 281; here, as we have said, the monitoring indicated that the beeper was inside the house, a fact that could not have been visually verified.

468 U.S. at 715.

In Karo, therefore, the revelation of a single detail about the interior of the home--whether or not the beeper was still inside the home--sufficed to violate the Fourth Amendment. There is no reason why the protection of the Fourth Amendment should be less demanding in the case at hand. The thermal imager detected hot spots that, interpreted in the light of the government's expertise, alerted the government to the likely presence of a hidden cultivation operation--a fact, like that disclosed by the beeper in Karo, that was of "extreme interest" to the government and that could not have been "visually verified" from beyond the curtilage.³⁰ The Fifth Circuit correctly concluded that the intrusiveness of the imager is similar to that of a beeper, see Ishmael, 48 F.3d at 855-56--a level of intrusion that Karo held to violate society's objectively reasonable

³⁰ The thermal observations were, admittedly, not as conclusive as the beeper output; yet, the district court found that "[the imager] showed hot spots which caused the agents to suspect in all probability the premises were being used for a marijuana grow operation," R. Vol. II, at 192-93, and the government deemed (and deems) its interpretation of the thermal readings sufficiently reliable to offer it as support for the search warrant that was eventually obtained. This distinction is therefore not a meaningful one.

expectations of privacy in the home. See also Young, 867 P.2d at 602 (reaching a similar result).

I find nothing to dissuade me in the other cases relied upon by our fellow circuits. The abandoned waste analogy central to the Penny-Feeney analysis is largely inapposite to a correct characterization of the relevant issues. California v. Greenwood, in any event, turned upon two factors: the voluntary nature of the relinquishment of trash into the hands of third parties and the frequency with which people or animals rummage through curbside garbage bags. See 486 U.S. at 40-41. It is neither common nor expected for homes to be scanned with thermal imagers, nor can the process by which heat signatures escape through the walls of the home be termed "voluntary" within the common usage of that word. Heat loss and heat conduction (or radiation) obey the laws of physics and are not phenomena over which an individual customarily exerts control.³¹ An individual no more chooses to have his or her home emit infrared radiation than she or he chooses to absorb or reflect visible light, but we have never heard the process of sight described in terms of abandoned photons.³² See Young, 867 P.2d at 602-03.

³¹ Moreover, in insulating a structure an individual implements a quite practical and reasonable measure designed to minimize heat loss. My familiarity with the climate of Wyoming leads me to believe that the Defendants' home was, in fact, insulated.

³² This is not to say that a heat signature might not be in "plain view" if, for example, it were located in an "open field." Compare Ishmael, 48 F.3d 850. The heat signatures located within the Defendants' home were not in plain view.

The analogy to the pen register approved in Smith v. Maryland, 442 U.S. 735 (1979), fails to sway me for similar reasons. The Court in Smith concluded, first, that telephone users know that the phone company, for its own purposes, records the numbers dialed on a given phone; and second, that dialing information was therefore voluntarily turned over to a third party. The former conclusion defeated the defendant's subjective expectation of privacy; the latter demonstrated that any expectation was unreasonable in any event. See 442 U.S. at 742-45. Individuals neither anticipate thermal imagery nor voluntarily disclose thermal signatures to the public. Smith is therefore inapplicable here.

The dog sniff held constitutional in United States v. Place, 462 U.S. 696 (1983), offers a more precise comparison. The dog sniff, like the thermal imager, extracts information about the interior of an object solely from an analysis of external physical phenomena. The dog sniff, however, detects only the presence of narcotics that an individual cannot lawfully possess; the dog sniff therefore cannot reveal information about conduct or activity that an individual has a right to pursue. See 462 U.S. at 707. The thermal imager is far less discriminating in its ability to identify illegal activity, and it empowers the government to detect a vast array of innocent conduct.³³ The Court, in holding a dog sniff to be a non-search within the meaning of the Fourth Amendment,

³³ The Defendants could, for example, have been growing African violets in the basement--a perfectly legal and not uncommon avocation.

emphasized that the unique qualities of the dog sniff rendered it "sui generis." Id. Because the imager lacks the precision of the dog sniff, we should not extend Place to allow the warrantless use of thermal imagers upon a home.³⁴ See Young, 867 P.2d at 603-04.

The science of investigation has progressed to the point where the government can now divine useful data from clues so slight as to be beyond the awareness of the average citizen. Subtlety cannot uncover that which the Constitution undoubtedly shields from the less refined tools of days past. Use of a thermal imager enables the government to discover that which is shielded from the public by the walls of the home. The government's contention that its technical wizardry should free it from the restraints mandated by the Fourth Amendment is a fallacy. Rather, the protections afforded by the

³⁴ Furthermore, the luggage examined in Place, far from being secreted in the basement of a home, had been voluntarily brought into a public place. The Second Circuit has held that a dog sniff may not be used to detect narcotics through the door of a residence. United States v. Thomas, 757 F.2d 1359, 1367 (2d Cir.) ("With a trained dog police may obtain information about what is inside a dwelling that they could not derive from the use of their own senses. . . . Here the defendant had a legitimate expectation that the contents of his closed apartment would remain private, that they could not be "sensed" from outside his door. Use of the trained dog impermissibly intruded on that legitimate expectation."), cert. denied sub nom., 474 U.S. 819 (1985); cf. United States v. Garcia, 42 F.3d 604, 606 (10th Cir. 1994) (upholding dog sniff of a sleeper compartment and distinguishing Thomas as turning on the "heightened expectation of privacy inside a dwelling"), cert. denied, 115 S. Ct. 1713 (1995). Criticism of Thomas has emphasized that dog sniffs detect only contraband. See, e.g., United States v. Lingenfelter, 997 F.2d 632, 638 (9th Cir. 1993). Such criticism is not relevant in this case.

Fourth Amendment are most crucial when technological advances give the government access to the private affairs within the homes of American citizens.³⁵ Otherwise, technological advances would erode this bedrock principle of our civil liberties to dust. I would therefore hold that the government must obtain a warrant before scanning a home with a thermal imager.³⁶

The government does not dispute that it failed to obtain a warrant before turning a thermal imager upon the Defendants' home, which I would hold was an unconstitutional warrantless search. The unconstitutionally obtained information gleaned from the thermal analysis was, in turn, used to support the warrant that was ultimately procured.

³⁵ "Indiscriminate monitoring of property that has been withdrawn from public view would present far too serious a threat to privacy interests in the home to escape entirely some sort of Fourth Amendment oversight." Karo, 468 U.S. at 716. "A man can still control a small part of his environment, his house; he can retreat thence from outsiders, secure in the knowledge that they cannot get at him without disobeying the Constitution. That is still a sizable hunk of liberty--worth protecting from encroachment. A sane, decent, civilized society must provide some such oasis, some shelter from public scrutiny, some insulated enclosure, some enclave, some inviolate place which is a man's castle." United States v. On Lee, 193 F.2d 306, 315-16 (2d Cir. 1951) (Frank, J., dissenting), aff'd, 343 U.S. 747 (1952).

³⁶ I need not address the constitutionality of a thermal scan of a business or a building beyond the curtilage. Compare Ishmael, 48 F.3d at 855-57 (holding constitutional the warrantless thermal observation of a building beyond the curtilage). Whether the lowered expectation of privacy in such structures would sufficiently ameliorate the intrusion of a thermal scan is a question that properly awaits a different case.

The Defendants argue that without the thermal imager information, there was insufficient evidence to support probable cause for the search warrant; the government argues that there was sufficient evidence to establish probable cause for the search warrant even without the thermal imager data. As is normally the case with a harmless error issue, I would determine the harmless question only after first establishing the existence of constitutional error. Because I am persuaded that a constitutional error occurred, I would consider whether the affidavit upon which the warrant request was based contains sufficient untainted evidence to validate the warrant. See, e.g., Karo, 468 U.S. at 719. "In evaluating claims of warrant deficiencies, we need only determine whether the issuing magistrate had 'a substantial basis for concluding that probable cause existed.'" United States v. Corral, 970 F.2d 719, 726 (10th Cir. 1992) (quoting Illinois v. Gates, 462 U.S. 213, 238-39 (1983)).

The district court found, and I accept, that the contested warrant was predicated upon the following facts. Information obtained from the Defendants' landlady indicated that the Defendants had installed in the garage an electric generator that they ran day and night; that the Defendants had rewired the basement's electrical system and installed new lighting in the basement to grow vegetables (or so they said); that, while visiting the house, she had noted a strong, musty odor in the basement; that the Defendants consistently paid their rent in cash; and that the Defendants had on one occasion denied

her entrance to the house and had only reluctantly allowed her to enter on another occasion. The Defendants had no identifiable employment or other means of support. The Defendants consumed roughly twice as much electricity as the typical household. A local electrician had reported that the Defendants had requested that he make suspicious modifications to the basement's electrical system; the electrician, believing the rewiring to be unsafe and doubting the Defendants' rationale for their request,³⁷ had refused. Finally, the Defendants, in refusing to allow a local insurance agent to enter the house, had behaved in a manner that had made the agent fear for his safety; the agent also indicated that he had seen wheelbarrows and sacks of soil outside the doors leading to the basement.

I agree that these facts, read in the light most favorable to the government, provide more than ample support for the warrant that was issued. The totality of the evidence substantially supports the conclusion that there was "a fair probability that contraband or evidence of a crime" would be found in the Defendants' home. Illinois v. Gates, 462 U.S. 213, 238 (1983). Therefore, I concur in the majority's result because the motion to suppress was properly denied. I dissent from the majority's refusal to reach the merits of the constitutional issue.

³⁷ The Defendants had told him that they wished to build a sound stage on top of an indoor swimming pool located in the basement.