

**THE "CHEMICAL SIGNATURE" OF THE FOURTH
AMENDMENT: GAS CHROMATOGRAPHY/MASS
SPECTROMETRY AND THE WAR ON DRUGS**

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*The protection afforded an individual by the Fourth Amendment would be eviscerated if . . . government agents could scan an individual's body with sensitive instruments capable of picking up the most minute or intimate object lodged thereon.*¹

INTRODUCTION

On the morning of March 29, 1993, a United States Navy surveillance aircraft, a P3 Orion, was on a routine drug-interdiction mission in international waters off the coast of the Dominican Republic.² Spotting a low-profile vessel in the waters below, the aviators identified the boat to be similar to the type of vessel commonly used in narcotics smuggling.³ After the Orion made several passes and witnessed the ship's crew members tossing bales overboard into the ocean, small arms tracer rounds came streaming towards the plane.⁴ Soon thereafter, Coast Guard officials aboard a Navy frigate, U.S.S. TAYLOR, in-

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¹United States v. Kenaan, 496 F.2d 181, 183 (1st Cir. 1974).

²United States v. Romero, 32 F.3d 641, 644 (1st Cir. 1994).

³See *id.*

⁴See *id.*

tercepted and boarded the low-profile vessel.⁵ After an exhaustive search, the American officials were unable to locate any contraband on the boat or on the defendants.⁶

Law enforcement officials, attempting to connect the bales of cocaine with the defendants, produced the Sentor, a state-of-the-art electronic device able to detect the faintest molecular traces of cocaine.⁷ The officers, using what looked like a large hand-held flashlight,⁸ approached the defendants and pointed the device towards their bodies.⁹ The machine began to vacuum in a large volume of air around the defendants bodies.¹⁰ The officers then took samples of the air on board the boat.¹¹ Within thirty seconds, the drug-interdiction officials were able to detect trace amounts of cocaine on both the defendants and the boat.¹² Based upon this and other evidence, the defendants were arrested and later convicted of smuggling narcotics.

The device used in that operation, dubbed Sentor,¹³ relies on the scientific

⁵*See id.*

⁶*See id.*

⁷*See id.* at 647.

⁸*World News Tonight With Peter Jennings*, ABC News, Oct. 3, 1991 (statement of John McKenzie, ABC correspondent).

⁹After the air sample is collected, the hand held-device is placed into a five-foot tall, 200-pound refrigerator shaped machine that heats the sample up and separates the chemical compounds by their boiling points through the application of high-speed gas chromatography. *See Sniffing for Drug Testing Vapors*, N.Y. TIMES, Oct. 9, 1991, at D6. A readout indicates the amount and type of drugs detected. *See id.*

¹⁰*See Franki Ranson, San Diego Police Consider Electronic Drug Detector*, L.A. TIMES, Apr. 21, 1990, at 5 (noting that “[t]he \$150,000 machine, called Sentor, was observed for three months at the [San Diego] Police Department”); David Hughes, *Thermedics Begins Production of Portable Bomb Detection Unit*, AVIATION WK. AND SPACE TECH., June, 19, 1989 (discussing the technology behind the Sentor and the EGIS device, which screens the air for particles of explosives rather than narcotics).

¹¹*See Romero*, 32 F.3d at 695.

¹²*See id.*; Anne Underwood, *Smart Weapons for the War on Drugs*, NEWSWEEK, Aug. 17, 1992, at 7 (discussing Sentor’s inherently sensitive nature).

¹³The Sentor is manufactured by Thermedics, Inc. of Waltham, Massachusetts. THERMEDICS, INC. NEWS RELEASE, THERMEDICS DETECTION TO DEVELOP PORTABLE DRUG-DETECTION SYSTEM FOR OFFICE OF NATIONAL DRUG CONTROL POLICY, Oct. 17, 1994 [hereinafter THERMEDICS, INC., NEWS RELEASE] (noting that the “Sentor drug-detection

method of high-speed gas chromatography. This method is an extremely sensitive filtering system that discerns between the characteristic speeds that heated substances display when passing through a column of gas.¹⁴ The Sentor filters a volume of air and screens out smoke, auto exhausts, and millions of other compounds, and identifies the amounts of cocaine, heroin, or methamphetamine that are present.¹⁵ Because the device only screens the air around a given piece of baggage or a particular individual, it can be deemed to be a non-invasive investigatory technique for drug searches.

The legal implications of such a machine that searches for drugs on a molecular level, are enormous. Imagine shaking hands with a cocaine user that had used the drug only hours before. Unbeknownst to you, there is now likely to be a trace residue of cocaine on *your* hands. You later hug a loved one and transfer a molecular particle of cocaine to them. After showering and washing your hands thoroughly, a trace amount of cocaine is likely to remain on your body.¹⁶ Although you are unaware of your "molecular possession," you could possibly be the victim of a humiliating search because the police, having reasonable suspicion¹⁷ to employ the Sentor device, have detected a particle of cocaine as small as one part per one hundred trillion.¹⁸

system . . . will be used by federal law enforcement agencies to enhance drug interdiction efforts); Franki Ranson, *San Diego Police Consider Electronic Drug Detector*, L.A. TIMES, April 21, 1990, at 5 (noting that "[t]he \$150,000 machine, called the Sentor, was observed for three days at the [San Diego] Police Department").

¹⁴See THERMEDICS, INC. NEWS RELEASE, *supra* note 13.

¹⁵See *id.* The machine can be programmed with the chemical signatures of other drugs. See *id.*

¹⁶Constitutional advocates, such as the American Civil Liberties Union (ACLU) worry that a device like Sentor could detect residues left by a visitor or delivery person. "Cocaine can be easily transferred simply by shaking hands with someone who has handled the drug: a pharmacist, toxicologist, police officer, or drug trafficker." Judith D. Wolferts, Note, *In re One Hundred Two Thousand Dollars: Cash Friendly Civil Forfeiture*, 1993 UTAH L. REV. 971, 979.

¹⁷The police, having "reasonable suspicion" that a suspect has, or is in the process of attempting to commit a crime, may conduct a limited intrusion into a suspect's Fourth Amendment, if under a totality of circumstances, the intrusion is reasonable. See *United States v. Cortez*, 449 U.S. 411, 417-18 (1981) (noting that an analysis of the totality of the circumstances in regards to a police stop of an individual, must be taken into account to judge the reasonableness of the stop); see also *Terry v. Ohio* 392 U.S. 1 (1968) (noting that in order for a police stop to be reasonable, the officer must have articulated suspicion that there may be a crime of violence committed).

¹⁸See Underwood, *supra* note 12, at 7. This figure is the equivalent of finding a specific grain of sand along a mile long beach.

This Comment will explore the constitutionality of the Sentor device. It is meant to be a preliminary and anticipatory discussion as the device's potential is only beginning to become fully realized by law enforcement officials. With no federal law clearly deciding the constitutionality of this technique, this discussion will argue that the use of the Sentor device should be found to violate the Fourth Amendment's requirement that searches be reasonable and particularized.

Part I of this Article will provide a basic understanding of gas chromatographic technology. Part II will discuss the Supreme Court's current interpretation of the Fourth Amendment with regards to governmental searches. Part III will compare and contrast the current interpretation with searches made using devices such as Sentor, that employ sophisticated technology to screen for drugs on a molecular level. Part IV will argue that use of Sentor and gas chromatography to screen for drugs should be deemed constitutionally invalid due to the machine's overly sensitive nature to cause excessive searches of innocent individuals who are merely in "molecular possession." In the alternative, Part IV will argue that Sentor should be deemed to at least constitute a Fourth Amendment search. Part V concludes that in light of past cases dealing with sense-enhanced search technology, the use of Sentor will be deemed constitutional by the Supreme Court.

I. GAS CHROMATOGRAPHY- BACKGROUND AND RELEVANT HISTORY

Gas Chromatography (GC) is not a new technology. For numerous years, the process has been integral to obtaining reliable drug tests of urine samples to screen for drug use.¹⁹ All chromatographic methods can be viewed as separating and analyzing the individual components of complex mixtures of drugs.²⁰

¹⁹See *Skinner v. Railway Labor Executives' Assoc.*, 489 U.S. 602 (1989) (upholding a district court's determination that drug and alcohol testing is reliable and constitutionally valid); Ira A. Lipman, *Drug Testing is Vital in the Workplace*, USA TODAY MAG., Jan. 1995 at 81 (noting that for drug testing, "[a]ll positive results are verified by means of gas chromatograph/mass spectrometry, the most sophisticated confirmation method available"); Allison Rose, Comment, *Mandatory Drug Testing of College Athletes: Are Athletes Being Denied Their Constitutional Rights?*, 16 PEPP. L. REV. 45, 49, n.34 (1988) ("Gas chromatography/mass spectrometry are the most accurate drug testing processes."). See generally Ruth S. Taube, *Drug Testing: Is Preemption the Answer?*, 33 SANTA CLARA L. REV. 657; Andrea M. Kanski, *Employee Drug Testing—Balancing the Employer's Right to Know With the Employee's Right to Privacy*, 1987 DET. C.L. REV. 57, (1987).

²⁰DOUGLAS A. SMOOG, 5 ANALYTICAL CHEMISTRY, 499 (discussing the applications of gas-liquid chromatography); Carlton E. Turner, *Drug Testing in the Workplace: Essay on Mechanics of Drug Testing*, 33 WM. & MARY L. REV. 147, 150 (1991) (noting that gas

The gas chromatograph,²¹ which is essentially an extremely sensitive filtering machine is instrumental in breaking down a gas sample or a liquid mixture into its molecular subcomponents.²² If, for example, an individual wanted to ascertain the molecular compounds in a particular liquid, the sample would be mixed with a liquid solvent.²³ The mixture is then heated until it forms a gas. The gas is then forced through a column,²⁴ which is a glass tube filled with special filtration material.²⁵ Each molecular compound in the sample will elute through a given column and temperature at a specific rate.²⁶ A detector is attached at the outgoing end of the column which records the quantity and concentration of each particular molecular compound contained in the sample.²⁷

During this process, a mass spectrometer may be used in conjunction with the gas chromatograph. A mass spectrometer bombards the sample with high-energy electrons to generate extensive fragmentation ions.²⁸ Because the

chromatography and mass spectrometry are confirmation methods for determining whether a particular sample contains drugs). For a more detailed treatment of gas chromatography, see generally J. WILLET, *GAS CHROMATOGRAPHY* (1987); R.L. GROB, ED., *2 MODERN PRACTICE OF GAS CHROMATOGRAPHY*, (1985); J.A. PERRY, *INTRODUCTION TO ANALYTICAL GAS CHROMATOGRAPHY*, (1981).

²¹ A gas chromatograph is an analytical tool that separates . . . volatile organic compounds, and produces a chart with a number of peaks. Each peak represents a distinct compound. By comparing the peaks and patterns of known liquids or gases and those of the unknown mixture, the analyst may be able to identify the compounds in the mixture. Irving C. Stone, Note, *Capabilities of Modern Forensic Laboratories*, 25 WM. & MARY L. REV. 659, 672 (1984).

²²United States v. Distler, 671 F.2d 954, 960 (1981).

²³*See id.*

²⁴There are two types of columns encountered in liquid-gas chromatography: packed and open tubular. SKOOG, *supra* note 20, at 494. Packed columns, which are the most convenient to use, are fabricated from glass or metal tubing and are typically 2 to 3 meters long. *See id.* at 495. The tubes are ordinarily in the shape of coils with diameters of approximately 15 cm. *See id.* Open tubular columns, or capillary columns which are often times made of glass or silica, are unprecedented in terms of speed of separation. *See id.*

²⁵*See id.*

²⁶*See id.*

²⁷*See id.*

²⁸*See* Turner, *supra* note 20, at 15 (discussing the combination of gas chromatographic and mass spectrometric technology).

sample is broken up to such a degree, the equipment can accurately determine which compounds are present.²⁹ Using GC and MS (GC/MS) simultaneously yields information about the sample with a high specificity level.³⁰

The gas chromatograph is an instrument used within the confines of the scientific laboratory.³¹ Courts have recognized gas chromatography as an extremely accurate³² technique in detecting the chemical/molecular makeup of perfume samples,³³ the cause of a fire suspected of being arson,³⁴ the presence of illicit drugs in urine samples,³⁵ and the "fingerprinting" of different oil samples.³⁶ For example, Rhode Island and Vermont require as a matter of law

²⁹*See id.*

³⁰Specificity is related to the ability of a test to exclude cross-reactivity—other drugs reacting to the test and causing inaccurate, or false positive results. *See id.* at 148. Sensitivity level differs from specificity. The technical meaning of sensitivity in drug testing is "how small a quantity can you detect?" *Id.* If one asks how sensitive the GS/MS method is for detecting, say, marijuana, the answer can be down to one or less than one nanogram (ng), or billionth of a gram per milliliter (ng/ml). *See id.* at 148.

³¹*See California v. Trombetta*, 467 U.S. 479, 482 n.3 (1984) (noting that the Gas Chromatograph Intoximeter is a laboratory instrument that analyzes the blood-alcohol concentration in a suspect's breath after she breathes into a breath chamber).

³²"Gas chromatography/mass spectrometry are the most accurate drug testing processes." Rose, *supra* note 19, at 49 n.34.

³³*See Model Imperial Supply Co. v. Westwind Cosmetics, Inc.*, 829 F. Supp. 35, 39 (E.D.N.Y. 1993) (noting that gas chromatography tests conducted by one corporation are more accurate and reliable than other general tests used by another corporation to measure various compounds in a sample of perfume).

³⁴*See Stone*, *supra* note 21, at 670-71.

³⁵*See Skinner v. Railway Labor Executives' Assoc.*, 489 U.S. 602, 610 n.3 (1989) (noting that if gas chromatography/mass spectrometry tests are properly conducted on urine samples, the presence of alcohol or drugs can be accurately detected).

³⁶*See United States v. Distler*, 671 F.2d 954, 960 (6th Cir. 1981) (holding that gas chromatograph analysis is generally accepted in the field of oil matching or oil fingerprinting). "We deem general acceptance [in the scientific community] as being nearly synonymous with reliability. If a scientific process is reliable or scientifically accurate, courts may also deem it "generally accepted." *United States v. Franks* 511 F.2d 25, 33 n.12 (6th Cir. 1975), *cert. denied*, 422 U.S. 1042 (1975); *see also United States v. Slade*, 447 F. Supp. 638, 644 (E.D. Tex 1978) (noting that oil matching tests conducted with the gas chromatograph and two additional detectors yield oil spill identification results in "in the neighborhood of 99.7%."); *Commonwealth of Puerto Rico v. SS Zoe Colocotroni*, 456 F. Supp. 1327, 1342-43 (D.P.R. 1978), *aff'd*, 602 F.2d 12 (1st Cir. 1979) (noting that gas chroma-

that a confirmatory test by gas chromatography with mass spectrometry or an equivalent scientific method be used when testing urine samples for the presence of illicit drugs.³⁷ The Journal of the American Medical Association (JAMA) also recognizes the accuracy and necessity of gas chromatography to obtain reliable results of a sample's chemical makeup.³⁸

In light of various bomb-related tragedy's, one American company was quick to recognize the need for a prophylactic instrument and began to produce a device, dubbed EGIS, which could detect the most minute traces of explosives in the air by sampling a large volume of air around a person or piece of luggage, and literally "sniff out" the explosives using high-speed gas chromatography.³⁹ To create the Sentor device, the manufacturer needed only to de-

tography is a reliable method for matching oil samples).

The American Society for Testing and Materials (ASTM), a non-profit charitable organization, has written that there is a standard reliable method of gas chromatography testing for analyzing various types of samples. See Application of Am. Soc'y for Testing Materials, 231 F. Supp. 686 (E.D. Pa. 1964) (explaining a standard uniform method of procedure).

³⁷See VT. STAT. ANN. tit. 21, § 514 (6)(A) (1987); R.I. GEN. LAWS 28-6.5-1 (D) (1987).

³⁸See Arthur J. McBay, et al., *Urine Testing for Marijuana Use*, 249 JAMA 881 (1983) ("Gas Chromatography-mass spectrometry assays . . . are available and proved accurate and sufficiently sensitive.").

³⁹As gas chromatography became a reliable and legitimate lab technique for obtaining the chemical breakdown of a particular gaseous or liquid sample, its potential as a security screening measure for detecting explosives at airports became apparent after the loss of Pan American Airlines flight 103 over Lockerbie, Scotland. After a bomb rocked the World Trade Center in New York City in 1993 and a bomb destroyed much of the Federal Building in Oklahoma City, Oklahoma in 1995, the potential use of gas chromatography to screen the air in airports for the chemical signatures of various explosives became even more pronounced. Thermedics, Inc., of Woburn, Massachusetts, began producing the EGIS portable bomb detection unit that could trace the presence of plastic explosives in the air around a piece of luggage as minute as one part per 100 trillion parts of air. David Hughes, *Thermedics Begins Production of Portable Bomb Detection Unit*, AVIATION WK. AND SPACE TECH., June 19, 1989, at 164. The portable explosives detection unit known as the EGIS system, consists of a sample collecting unit that is hand held and weighs less than ten pounds. See *id.* "The portable unit can automatically trace the chemical signature of plastic explosives, TNT and nitroglycerin, which is used in dynamite, and alert the equipment operator." *Id.*; see also Ron Feemster, *Secure Air Travel Still Eludes U.S.*, NEWSDAY, Oct. 11, 1992 at 109 (noting that the EGIS system is "tuned to the 'chemical signature' of common explosives and examines a sample of the air surrounding an object for traces of these substances").

Thermedics began developing the EGIS system for the U.S. State Department in 1985 and the Department has invested \$7.1 million on the development of the system prior to 1989. *Id.* The Federal Aviation Administration has spent at least four million to fund Thermedics'

wise a new machine, identical to EGIS in terms of hardware,⁴⁰ that could pick up the chemical signatures of drugs rather than high explosives.⁴¹ Although the Sentor is currently being used by United States Customs, the Drug Enforcement Administration (DEA), and the FBI,⁴² the Supreme Court has yet to determine the Sentor's constitutionality under the Fourth Amendment.

PART II.- HISTORY AND RECENT INTERPRETATION OF THE FOURTH AMENDMENT BY THE SUPREME COURT

The Fourth Amendment specifies "the right of the people to be secure against unreasonable searches and seizures."⁴³ This guarantee acts as a vanguard against unjustified intrusions into individual privacy and property interests.⁴⁴ Moreover, this Amendment is indispensable in securing the full enjoyment of the rights of personal security, personal liberty, and private property.⁴⁵ In *Camara v. Municipal Court*,⁴⁶ the Supreme Court stated that "[the] basic purpose of this amendment . . . is to safeguard the privacy and security of individuals against arbitrary invasion by government officials."⁴⁷

Nonetheless, the Supreme Court has struggled to determine when a governmental intrusion constitutes a "search," and what specific action was

research. See *Bomb Detector Sales*, AVIATION WK. AND SPACE TECH., Aug. 7, 1989 at 13 (noting FAA's contribution to research that could improve airport security). The FAA continued its support for gas chromatographic technology to thwart terrorism by awarding Thermedics \$850,000 to continue development of a walkthrough explosives detector. See *FAA Funds Explosives Detection Research*, FLIGHT INT'L, Jan. 19, 1994.

⁴⁰See Hughes, *supra* note 39, at 164.

⁴¹See *id.*

⁴²See Underwood, *supra* note 12 (noting early government drug busts that have employed Sentor); THERMEDICS, INC. NEWS RELEASE, *supra* note 13. (noting various federal agencies that have acquired Sentor).

⁴³U.S. CONST., amend. IV.

⁴⁴See Anthony G. Amsterdam, *Perspectives on the Fourth Amendment*, 58 MINN. L. REV. 349, 377-79 (1974) (noting the limitation the Fourth Amendment places on police powers).

⁴⁵2 J. STORY, COMMENTARIES ON THE CONSTITUTION OF THE UNITED STATES 679 (1858).

⁴⁶387 U.S. 523 (1967).

⁴⁷*Id.* at 528.

needed to make it so. From *Olmstead v. United States*⁴⁸ decided in 1928 which required "actual physical invasion" by governmental authorities to be a search, to *Katz v. United States*⁴⁹ in 1967 which repudiated the physical requirement of *Olmstead*, the Court appears to have run the gamut of interpretation in this area of Fourth Amendment substantive law.

The threshold question in Fourth Amendment analysis is whether the conduct of government agents constitutes a "search" or a "seizure" that interferes with an individual's rights.⁵⁰ If the conduct is not a "search" or a "seizure," then no Fourth Amendment inquiry will be necessary. If there is a "search" or "seizure" the courts will examine the reasonableness of the conduct versus the claimant's constitutional interests.⁵¹

Historically, "[t]he Fourth Amendment was aimed directly at the abhorred practice of breaking in, ransacking and searching homes and other buildings and seizing people's personal belongings without warrants issued by magistrates."⁵² As has been long recognized by the Supreme Court and various commentators, the prohibition of British general warrants was one of the central purposes of the Fourth Amendment.⁵³ The general warrant was a British document authorizing law enforcement officials to conduct an unlimited search of a suspect's property.⁵⁴

As technology advanced,⁵⁵ law enforcement officials gained the ability to

⁴⁸277 U.S. 438 (1928) (holding that "actual physical invasion" by governmental authorities had to take place to constitute a "search" under the meaning of the Fourth Amendment).

⁴⁹389 U.S. 347 (1967). In *Katz*, the Court noted that "the Fourth Amendment protects people, not places," thereby replacing the "actual physical invasion" threshold of *Olmstead v. United States*. *Id.* at 353.

⁵⁰*Rakas v. Illinois*, 439 U.S. 128 (1978).

⁵¹*See, e.g.*, *Terry v. Ohio*, 392 U.S. 1 (1968); *see also* *United States v. Jacobsen*, 466 U.S. 109, 113 (1984); *Delaware v. Prouse*, 440 U.S. 648, 654 (1979).

⁵²*Katz*, 389 U.S. at 367 (Black, J., dissenting). "The Amendment deserves, and this Court has given it, a liberal construction in order to protect against warrantless searches of buildings and seizures of tangible personal effects." *Id.*

⁵³*See* *Maryland v. Garrison*, 480 U.S. 79, 84 (1987) (discussing general warrants); *Coolidge v. New Hampshire*, 403 U.S. 443, 467 (1971) (Stewart, J., concurring) (same).

⁵⁴N. LASSON, *THE HISTORY AND DEVELOPMENT OF THE FOURTH AMENDMENT TO THE UNITED STATES CONSTITUTION* 28-42 (1937).

⁵⁵Anthony Amsterdam notes that "because the Court will never know what the police

conduct searches using electronic surveillance to obtain the same information that once would have required "actual physical invasion" as laid down in *Olmstead*.⁵⁶ Law enforcement use of infrared and thermal devices to "see" through walls in the dark,⁵⁷ "pen registers"⁵⁸ to record numbers dialed from a telephone, "beepers"⁵⁹ used to track a suspect's movements, or high altitude aircraft⁶⁰ to photograph a company's facility on the ground, have usually been deemed by the Supreme Court as measures not generally requiring a warrant. Many commentators have argued that numerous Supreme Court decisions⁶¹ with respect to searches and new technologies have led to a rapid erosion of the Fourth Amendment.⁶²

will come up with next . . . frightening paraphernalia which the vaunted marvels of an electronic age may visit upon human society," can seriously undermine constitutional protections. Amsterdam, *supra* note 44, at 386.

⁵⁶See 227 U.S. at 438 (stating that "actual physical invasion" of a dwelling was the dispositive factor in there being a Fourth Amendment "search").

⁵⁷See *United States v. Copen*, 541 F.2d 211 (9th Cir. 1976) (discussing governmental use of infrared equipment to observe a narcotics smuggling operation at night); *United States v. Porco*, 842 F. Supp. 1393 (D. Wyo. 1994), *aff'd* *United States v. Cusumano*, 83 F.3d 1247 (10th Cir. 1996) (discussing use of thermal imaging equipment as a means of surveillance); *United States v. Kyllo*, 809 F. Supp. 787 (D. Or. 1992) *aff'd* by *United States v. Kyllo*, 37 F.3d 526 (9th Cir. 1994) (same).

⁵⁸See *Smith v. Maryland*, 442 U.S. 735, 744-46 (1979) (noting that use of a "pen register" does not require police to obtain a warrant).

⁵⁹See *United States v. Knotts*, 460 U.S. 276, 284-85 (1983) (noting that use of a "beeper" device does not usually require a warrant).

⁶⁰See *Dow Chem. Co. v. United States*, 476 U.S. 227, 239 (1986) (noting that police did not need a warrant to use high-powered cameras to photograph Dow Chemical facility); *California v. Ciraolo*, 476 U.S. 207, 215 (1986) (noting that police did not need a warrant to fly over a house in a small airplane at an altitude of 1000 feet, and photograph the yard below).

⁶¹See *supra* notes 59-61.

⁶²A wealth of literature exists on the perception that the Court has increasingly been willing to give the police the upper-hand in fighting the drug war at the expense of the Fourth Amendment. See, e.g., Christine A. Atkinson, Note, *Mandatory Drug Testing in the Public Work Sector: Erosion of Fourth Amendment Protections*, 12 U. BRIDGEPORT L. REV. 293 (1991); Lisa K. Coleman, Comment, *California v. Acevedo: The Erosion of the Fourth Amendment Right to Be Free From Unreasonable Searches*, 22 MEM. ST. U. L. REV. 831 (1992); Todd M. Gascon, Note, *Something Smells in the Fifth Circuit: The Further Erosion of the Fourth Amendment*, 14 U. DAYTON L. REV. 761 (1989); Brian J. O'Connell, Note, *Search and Seizure: The Erosion of the Fourth Amendment Under the Terry Standard: Creat-*

Technological advancement, coupled with America's overriding concern with fighting the "war on drugs," has immensely compromised the Fourth Amendment to the United States Constitution.⁶³ The compelling government interest in controlling the influx of drugs all too often results in a judicial attitude that the ends justify the means.⁶⁴ For example, the Supreme Court in *United States v. Jacobsen*⁶⁵ announced that no one may have a legitimate expectation of privacy in narcotics.⁶⁶ The Court in *Jacobsen* announced that "Congress has decided—and there is no question about its power to do so—to treat the interest in 'privately' possessing cocaine as illegitimate; thus governmental conduct that can reveal whether a substance is cocaine, and no other arguably 'private' fact, compromises no legitimate privacy interest."⁶⁷ The Supreme Court has further held that canine sniffs⁶⁸, aerial searches⁶⁹, and drug field tests⁷⁰ are not searches within the purview of the Fourth Amendment.⁷¹

ing Suspicion in High Crime Areas: State v. Andrews, 16 U. DAYTON L. REV. 717 (1991).

⁶³Lynne M. Pochurek, Comment, *From the Battlefield to the Homefront: Infrared Surveillance and the War on Drugs Place Privacy Under Siege*, 7 ST. THOMAS L. REV. 137, 137 (1994) (noting that America's drug war seems to be the justification for the Supreme Courts' allowing new technologies that will impinge upon Fourth Amendment rights).

⁶⁴Hope Walker Hall, Comment, *Sniffing Out the Fourth Amendment: United States v. Place-Dog Sniffs Ten Years Later*, 46 ME. L. REV. 151 (1994). In *Terry v. Ohio*, 392 U.S. 1, 39, Justice Douglas, the only dissenter stated that "[t]here have been powerful hydraulic pressures throughout our history that bear heavily on the Court to water down constitutional guarantees and give the police the upper hand." One commentator has noted that "if the conduct is literally unforgivable, then ruthless measures are easily justified." Paul Finkelman, *The Second Casualty of War: Civil Liberties and the War on Drugs*, 66 S. CAL L. REV. 1389, 1390 (1993); see Daniel J. Karkosh, Note, *The Shrinking Scope of Individual Privacy: Drug Cases Make Bad Law*, 24 SUFFOLK U. L. REV. 1009 (1990) (noting that the drug war has had an especially eroding impact on the Fourth Amendment).

⁶⁵466 U.S. 109 (1984).

⁶⁶See *id.* at 121-22; Hall, *supra* note 64, at 151 n.1 (discussing the Court's finding that an interest in possessing contraband is inherently an illegitimate interest).

⁶⁷*Id.* at 123. The Court has reasoned that "[t]he public has a compelling interest in detecting those who would traffic in deadly drugs for personal profit." *Mendenhall v. United States*, 446 U.S. 544, 561.

⁶⁸See *United States v. Place*, 462 U.S. 696 (1983).

⁶⁹See *Dow Chem. Co., v. United States*, 476 U.S. 227 (1986), and *California v. Ci-raolo*, 476 U.S. 207 (1986).

⁷⁰See *Jacobsen*, 466 U.S. at 109.

In *United States v. Place*,⁷² the Supreme Court determined that drug sniffs by trained canines did not constitute a “search.” One could argue that the Court allowed individual constitutional rights to take a backseat to the more urgent war on drugs. The Court has recognized enforcement problems associated with apprehending elusive narcotics traffickers and has decided that the Fourth Amendment is not violated by minimally intrusive canine searches that require only a limited detention of suspected individuals.⁷³ In *Place*, the Court reasoned that government intrusions into an individual’s privacy in order to fight the drug war outweighed the individual’s Fourth Amendment’s interests against brief police searches and seizures.⁷⁴

There have only been two federal cases discussing but not significantly analyzing the constitutionality of gas chromatography as a governmental drug field testing⁷⁵ investigatory technique. In *United States v. Romero*,⁷⁶ the defendant asserted that although gas chromatographic technology had been used for years, the mobile, in-the-field Sentor device that was used to convict him, had not been proven reliable.⁷⁷ Additionally, the defendant claimed that Coast Guard officials took no prophylactic measures to prevent post-arrest contamination.⁷⁸ The court forewent any examination of the reliability of the Sentor

⁷¹See Hall, *supra* note 64.

⁷²462 U.S. 696 (1983).

⁷³See *id.* at 703.

⁷⁴See *id.* (“The exception to the probable-cause requirement for limited seizures of the person . . . rests on a balancing of the competing interests . . .”). “Because of the inherently transient nature of drug courier activity at airports, allowing police to make brief investigative stops of persons at airports on reasonable suspicion of drug-trafficking substantially enhances the likelihood that police will be able to prevent to flow of narcotics into distribution channels.” *Id.* at 704; see also *New Jersey v. T.L.O.*, 469 U.S. 325, 342 (1985) (noting that a public school student’s expectation of privacy in not being searched was outweighed by allowing school officials to conduct warrantless searches in order to keep the school drug free); *O’Connor v. Ortega*, 480 U.S. 709, 721-22 (1987) (noting that the state’s need to provide efficient and proper operation in the workplace, outweighed a public employee’s right to keep his office desk locked and free from search).

⁷⁵By “field testing” I refer to methods employed by police officers on the street to uncover facts, and not part of any police laboratory investigation.

⁷⁶32 F.3d 641 (1st Cir. 1994).

⁷⁷See *id.* at 647.

⁷⁸See *id.*

system, because the court found that there was enough evidence to convict regardless of any contamination.⁷⁹

In *United States v. Lee*,⁸⁰ the court found that the admissibility of test results from the Sentor device should follow the same standard as the admissibility of evidence from expert witnesses.⁸¹ The court, however, did not look into the reliability of the Sentor device. Instead the court remanded that issue to the district court.⁸²

Although there has been little case law regarding gas chromatography as a drug field testing method or extensive legal analysis regarding the use of high-speed gas chromatography by law enforcement officials to fight the drug war on American streets. This technology is likely to be the next Fourth Amendment battle fought on the steps of the United States Supreme Court.

A. RECENT HISTORY OF FOURTH AMENDMENT INTERPRETATION

The contemporary understanding of what is encapsulated within the Court's view of "privacy" came in 1967 in *Katz v. United States*.⁸³ In *Katz*, the Court did an about-face from its previous interpretation in *Olmstead*⁸⁴ by repudiating the notion that a governmental search required "actual physical invasion."⁸⁵

In *Katz*, the Court held that governmental action which "violate[s] . . . privacy upon which [one] justifiably relie[s]" is protected by the Fourth Amendment.⁸⁶ In that case, the defendant had been charged with the federal offense of relaying betting information on a public telephone across state

⁷⁹*See id.*

⁸⁰25 F.3d 997 (11th Cir. 1994).

⁸¹*See id.* at 998-99.

⁸²*See id.* at 999.

⁸³389 U.S. 347 (1967).

⁸⁴277 U.S. 438 (1928).

⁸⁵*Katz*, 389 U.S. at 353. In *Olmstead*, the Court conducted a Fourth Amendment analysis when federal agents wiretapped the telephone of individuals suspected of violating the Prohibition Act. Because the officers had placed the tap on phone lines outside of the defendant's residence and thereby committing no actual physical invasion of the home, the 5-4 majority of the Court found there to be no Fourth Amendment search. *See Olmstead*, 277 U.S. at 464.

⁸⁶*Katz*, 389 U.S. at 353.

lines.⁸⁷ Without the defendant's knowledge, the FBI had placed a wiretapping device on the exterior of the booth without a warrant, giving them the ability to monitor the conversation.⁸⁸ The Supreme Court reversed Katz's original conviction finding that the wiretapping constituted an unconstitutional warrantless search.⁸⁹

Refusing to continue following the *Olmstead* requirement of "actual physical invasion" by governmental authorities,⁹⁰ Justice Stewart, writing for the majority announced, "[w]hat a person knowingly exposes to the public, even in his own home or office, is not a subject of Fourth Amendment protection. But what he seeks to preserve as private, even in an area accessible to the public, may be constitutionally protected."⁹¹ The Court noted that Mr. Katz had closed the door of the telephone booth and paid the toll for a private phone conversation.⁹² As a result, the wiretapping of the conversation, violated a reasonable expectation of privacy on which the defendant had relied.⁹³ The defendant was "surely entitled to assume that the words he utter[ed] into the mouthpiece w[ould] not be broadcast to the world."⁹⁴

Justice Harlan noted in his concurrence that allowing physical trespass to be a dispositive factor was "bad physics as well as bad law, for reasonable expectations of privacy may be defeated by electronic as well as physical invasion."⁹⁵ Justice Harlan expounded upon the majority's ruling by creating a two-prong analysis of whether an individual may rely upon Fourth Amendment protections of privacy.⁹⁶ First, it must be established that the individual had a

⁸⁷*See id.* at 348.

⁸⁸*See id.*

⁸⁹*See id.* at 359.

⁹⁰According to the Court, "[t]he Fourth Amendment protects people, not places." *Katz*, at 351.

⁹¹*Id.*

⁹²*See id.* at 352.

⁹³*Id.* at 353.

⁹⁴*Id.* at 352.

⁹⁵*Id.* at 362 (Harlan, J., concurring).

⁹⁶*See id.* (Harlan, J., concurring).

subjective expectation of privacy.⁹⁷ Second, this expectation must be one that society is willing to recognize as reasonable.⁹⁸ After *Katz*, Justice Harlan's "reasonable expectation of privacy" test represents the characterization of the central Fourth Amendment interest.⁹⁹

Integral to the discussion at hand is the importance attached in *Katz* to the location of the individual in context to their Fourth Amendment privacy interests.¹⁰⁰ The expectation of privacy which an individual would expect in his home is substantially different than that he or she could expect elsewhere. Whereas an individual's home¹⁰¹ has been deemed a constitutionally protected area,¹⁰² the Fourth Amendment does not protect those things that an individual knowingly exposes to the public.¹⁰³ "Thus, a man's home is, for most pur-

⁹⁷See *id.* at 361 (Harlan, J., concurring).

⁹⁸See *id.* This second prong has been described as inherently being Catch-22. "It acknowledges that 'what a person seeks to protect as private, even in an area accessible to the public, may be constitutionally protected.' However the Court generally finds that society would not consider it reasonable to expect privacy in anything that is accessible to the public." Susan Moore, Comment, *Does Heat Emanate Beyond the Threshold?: Home Infrared Emissions, Remote Sensing and the Fourth Amendment Threshold*, 70 CHI.-KENT L. REV. 803, 821 (1994) (quoting *Katz v. United States*, 389 U.S. at 351-352).

⁹⁹See James J. Tomkovicz, *Beyond Secrecy For Secrecy's Sake: Toward an Expanded Vision of the Fourth Amendment Privacy Province*, 36 HASTINGS L.J. 645, 646-47 (1985) (discussing how the *Katz* test would be the touchstone of future Court analysis of the Fourth Amendment). The language of *Katz* could be found in numerous future cases. See, e.g., *Smith v. Maryland*, 442 U.S. 735, 740 (1979); *United States v. Miller*, 425 U.S. 435, 442 (1976); *United States v. Dionisio*, 410 U.S. 1, 8 (1973); *United States v. White*, 401 U.S. 745, 752 (1971); *Terry v. Ohio*, 392 U.S. 1, 9 (1968).

¹⁰⁰"Under the *Katz* expectation of privacy test, particular attention must be given to the nature of the place at which the observed objects or activities are located, for this will bear directly upon whether there was a justified expectation of privacy as to those objects or activities." 1 WAYNE R. LAFAYE, *SEARCH AND SEIZURE: A TREATISE ON THE FOURTH AMENDMENT* 339 (2d. ed. 1987).

¹⁰¹"[A]n individual might be justified in expecting freedom from telescopic intrusion in the confines of a private place such as his own home." Note, *From Private Places to Personal Privacy: A Post-Katz Study of Fourth Amendment Protection*, 43 N.Y.U. L. REV. 968, 985 (1968).

¹⁰²It is generally acknowledged that a private home is a constitutionally protected area. See *Weeks v. United States*, 232 U.S. 383. This stands in contrast with *Hester v. United States*, 265 U.S. 57, where the Court held that an open field is not a such a protected area.

¹⁰³See *Katz*, 389 U.S. at 351; see also *Lewis v. United States*, 385 U.S. 206, 210 (1966); *United States v. Lee*, 274 U.S. 559, 563 (1927).

poses, a place where he expects privacy, but objects, activities, or statements that he exposes to the 'plain view' of outsiders are not 'protected' because no intention to keep them to himself has been exhibited."¹⁰⁴ As a result, the Court has noted that "conversations in the open would not be protected against being overheard, for the expectation of privacy under the circumstances would be unreasonable."¹⁰⁵

Katz provides the backdrop to subjective notions of privacy versus the government's use of electronic or sophisticated sense-enhancing techniques to perform informational searches on an individual. A brief analysis of Supreme Court decisions that followed *Katz* regarding various sense-enhanced techniques will prove valuable as a backdrop to Part IV's discussion of the intrusions that gas chromatographic searches pose to an individual's privacy. Specifically, Part IV examines the reasonable expectation of privacy/sense-enhanced searches in regard to governmental use of electronic tracking devices, aerial searches, thermal-infrared devices, and the use of canines to search individuals for drugs.

1. ELECTRONIC TRACKING DEVICES ("BEEPERS")

A beeper is a transmitter that emits signals that can be monitored by a radio receiver.¹⁰⁶ In *United States v. Knotts*,¹⁰⁷ the police employed a small radio transmitter, or beeper, by surreptitiously concealing it in a chemical container that was being transported by the defendant's car.¹⁰⁸ By monitoring the radio signals that were emitted by the transmitter, the police were able to "tail" the defendant.¹⁰⁹ The "beeper" led the police to a drug-manufacturing laboratory.¹¹⁰ Although the police failed to obtain a warrant to use the "beeper," the Supreme Court upheld this surveillance technique reasoning that the beeper was merely "augmenting the sensory faculties" of the police.¹¹¹ The Court

¹⁰⁴*Katz*, 389 U.S. at 361.

¹⁰⁵*Id.*

¹⁰⁶*United States v. Knotts*, 460 U.S. 276, 277 (1983).

¹⁰⁷*Id.*

¹⁰⁸*See id.*

¹⁰⁹*See id.* at 278.

¹¹⁰*See id.* at 279.

¹¹¹*Id.* at 282.

noted that simple visual surveillance could have told the police the same thing.¹¹² In essence, the Court was holding that the defendant was in the plain view of the police even though they could not "see" him.¹¹³ Furthermore, the Court asserted that the police could have legally followed the suspect's automobile by simply driving behind him.¹¹⁴

In *Knotts*, the Court emphasized that it was significant that the suspect was out in public.¹¹⁵ The Court held that monitoring the signals that beepers emit from the "public" domain falls outside Fourth Amendment regulation.¹¹⁶ People should not reasonably expect a high degree of privacy when out in public.¹¹⁷ In *Knotts*, the defendant's reasonable expectation of privacy was very low because her movements were in public.¹¹⁸

2. AERIAL SEARCHES

In *California v. Ciraolo*,¹¹⁹ the Supreme Court upheld the warrantless surveillance of a house by the police who were flying at 1000 feet in order to photograph the defendant's yard.¹²⁰ Examination of the photographs showed that there was marijuana growing on the curtilage of the property.¹²¹ This evidence was brought before a magistrate who issued a warrant allowing the po-

¹¹²*See id.*

¹¹³*See id.*

¹¹⁴*See id.* at 285.

¹¹⁵*See id.* at 281.

¹¹⁶*See id.* at 285.

¹¹⁷*See Knotts*, 460 U.S. at 281-82.

¹¹⁸*Cf.* *United States v. Karo*, 468 U.S. 705 (1984) (discussing that the government had conducted a search when it used a beeper in a house in order to track defendant's movements). For further comparison of *Knotts* and *Karo*, see Clifford S. Fishman, *Electronic Tracking Devices and the Fourth Amendment: Knotts, Karo, and the Questions Still Unanswered*, 34 CATH. U. L. REV. 277 (1985).

¹¹⁹476 U.S. 207 (1986).

¹²⁰*See id.* at 215.

¹²¹*See id.* at 209.

lice to commence a full search of the suspect's property.¹²²

In evaluating this surveillance method, the Court emphasized that "any member of the public flying in this airspace who glanced down could have seen everything that these officers observed."¹²³ The Court further noted that "[f]rom this point they were able to observe plants readily discernible to the naked eye as marijuana."¹²⁴ To reach this result, the Court ignored the "reasonable expectation of privacy" standard that it set forth in *Katz*.¹²⁵ The facts of the case revealed that the defendant had a ten-foot-high inner fence and a six-foot-high outer fence to keep out peering eyes.¹²⁶ Although the Court conceded that the defendant clearly exhibited a subjective expectation of privacy,¹²⁷ the Court proclaimed that the defendant's expectation of privacy was "unreasonable and not an expectation that society [was] prepared to honor."¹²⁸ In essence, by finding an interest in drugs unreasonable,¹²⁹ and thereby contracting the scope and boundary of the Fourth Amendment, the Court found that these police activities did not constitute a search because the officer in question was at a vantage point "where he ha[d] a right to be."¹³⁰

The closest the Supreme Court has come to defining what constitutes a search in light of recent advances in technological sophistication¹³¹ was in *Dow*

¹²²*See id.*

¹²³*Id.* at 213-14.

¹²⁴*Id.* at 213.

¹²⁵*See Katz*, 389 U.S. at 361 (Harlan, J., concurring).

¹²⁶*See Ciralo*, 476 U.S. at 209-11.

¹²⁷*See id.* at 211.

¹²⁸*Id.* at 214. In *Florida v. Riley*, 488 U.S. 445, (1989), police used a helicopter, circling at 400 feet to observe a greenhouse that was growing marijuana. Because two small panels on the top of the greenhouse were missing, the Court concluded that an expectation of privacy against aerial surveillance was unreasonable. The fact that there was a "do not enter" sign in addition to a wire fence, was not enough to persuade the Court that there was a significant privacy invasion by the government. *See id.* at 448-52. By dismissing *Riley* as simply a "drug case," Justice Brennan believed that it was "only at the peril of our own liberties." *Id.* at 463 (Brennan, J., dissenting).

¹²⁹*See supra* notes 122-129.

¹³⁰*Ciralo*, 476 U.S. at 213.

¹³¹*See Daniel J. Polatsek, Note, Thermal Imaging and the Fourth Amendment: Pushing*

Chemical Co. v. United States.¹³² The Court held that there was no Fourth Amendment search when the Environmental Protection Agency (EPA) used a precision aerial mapping camera to photograph Dow's company facility¹³³ on the ground from navigable airspace altitudes as high as 12,000 feet.¹³⁴ The \$20,000 camera was powerful enough to reveal details on the ground only inches long.¹³⁵ The Court noted:

Here, the EPA was not employing some unique sensory device that, for example, could penetrate the walls of buildings and record conversations in Dow's plants, offices, or laboratories, but rather a conventional, albeit precise, commercial camera commonly used in map-making . . . [A]s the government concedes . . . surveillance of private property by using highly sophisticated surveillance equipment *not generally available to the public*, such as satellite technology, might be constitutionally proscribed absent a warrant . . . the mere fact that human vision is enhanced somewhat, at least to the degree here, does not give rise to constitutional problems.¹³⁶

The Court's reasoning in *Dow* will be instructive to the discussion of gas chromatography in Part IV because it acknowledges that the technology employed to conduct a search does matter, and at least some kind of threshold does exist.

The four dissenters in *Dow* criticized the majority opinion, finding that the camera used was not a typical picture taking device.¹³⁷ For the dissent, the

the Katz Test Towards Terminal Velocity, 13 J. MARSHALL J. COMPUTER & INFO. L. 453, 457 (1995).

¹³²476 U.S. 227 (1986).

¹³³The Court called Dow a "2,000-acre outdoor manufacturing facility" and "vast industrial complex." "We find it important that this is not an area immediately adjacent to a private home, where privacy expectations are most heightened." The majority treats the place at which the camera was directed as a most important consideration in determining whether Fourth Amendment activity occurred. See LAFAVE, *supra* note 101.

¹³⁴See *Dow*, 476 U.S. at 229.

¹³⁵See *id.* at 242 n.4, 243 (Powell, J., concurring in part and dissenting in part).

¹³⁶*Id.* at 238 (emphasis added).

¹³⁷See *id.* at 251-52 n.13 (Powell, J., concurring in part and dissenting in part).

camera's price tag was a factor that could not be dismissed.¹³⁸ "Satellite photography hardly could have been more informative about Dow's technology. Nor are members of the public likely to purchase \$22,000.00 cameras."¹³⁹

It seems that the reasoning in *Ciraolo* applies to the logic in *Dow*. The plane was where "any member of the public flying in this airspace who glanced down" could see the facility and that the photographer was at a vantage point "where he ha[d] a right to be."¹⁴⁰ However, "[t]he Court in *Dow* prophetically stated that, had the government employed technology more sophisticated than a readily obtainable mapping camera without a search warrant, serious constitutional concerns would arise."¹⁴¹

3. THERMAL INFRARED IMAGING

A Forward Looking Infrared Device (FLID or FLIR) detects and analyzes the electromagnetic radiation (EMR) that all living things produce.¹⁴² Because all objects with temperatures above zero are constantly emitting thermal infrared radiation, FLID can detect and identify an object for thermal investigation.¹⁴³ When attached to a monitor, distinctive temperature contrasts are shown by displaying tonal or color variations across the objects' surfaces.¹⁴⁴ For the past few years, law enforcement agencies have used thermal infrared technology to scan buildings to detect the enormous amounts of heat produced by indoor marijuana growing operations.¹⁴⁵

¹³⁸*See id.*

¹³⁹*Id.*

¹⁴⁰*See Ciraolo*, 476 U.S. at 213.

¹⁴¹Polatsek, *supra* note 132, at 463.

¹⁴²*See* 5 THOMAS E. AVERY & GRAYDON L. BERLIN, FUNDAMENTALS OF REMOTE SENSING AND AIRPHOTO INTERPRETATION (1992) (explaining electromagnetic radiation and how it is detected).

¹⁴³*See Fiscal Year 1995 Budget and Posture of the United States Army, Before the Subcomm. on Defense Comm. of Appropriations*, 103d Cong., 2d Sess. 133 (statement of General Gordon R. Sullivan).

¹⁴⁴Moore, *supra* note 98, at 810 (stating that thermal imaging devices "display the immediate, high resolution images of the objects" under surveillance).

¹⁴⁵*See* GM Hughes, *Texas Instruments Introduce Night Vision System to Help Police See in the Dark*, PR Newswire, Oct. 17, 1993 (Financial News), available in LEXIS, Nexis NEWS Library, PRNEWS File at *1 (discussing this new technology which was unveiled at

The first case dealing with a relationship between the FLID and the Fourth Amendment was *United States v. Penny-Feeney*.¹⁴⁶ In that case, the police, using a helicopter equipped with thermal imaging, flew over the defendant's home at 5:15 a.m. and monitored the house's rooftop.¹⁴⁷ Although the roof appeared to be as dark as other homes on the block, the FLID revealed enormous concentrations of heat emanating from the roof.¹⁴⁸ The police reasoned that this was consistent with the enormous concentrations of heat emitted by growing lamps used for indoor marijuana cultivation. Other rooftops in the neighborhood appeared to be much cooler.¹⁴⁹ A search warrant was issued based upon probable cause that there was an indoor marijuana growing operation in the defendant's home.¹⁵⁰ A search confirmed the suspicion.

The *Penny-Feeney* court, applying the *Katz* two-prong test, held that when a person fails to stop heat from escaping through her walls or rooftop, the person ceases to enjoy a reasonable expectation of privacy because the lost heat is no more than discarded waste.¹⁵¹ Finding that a privacy interest in preventing heat from escaping from a home is not a right that society recognizes as reasonable, the *Penny-Feeney* court concluded that no search had occurred.¹⁵²

a police convention).

¹⁴⁶773 F. Supp. 220 (D. Haw. 1991).

¹⁴⁷*See id.* at 223.

¹⁴⁸*See id.* at 223-24.

¹⁴⁹*See id.* at 224.

¹⁵⁰*See id.*

¹⁵¹*See id.* at 226. For an interesting analogy of what constitutes "waste," see *California v. Greenwood*, 486 U.S. 35 (1987) (noting that once an individual places discarded trash outside her residence and thereby exposes it to the public, the individual loses the reasonable expectation of privacy that the waste will not fall into police hands).

¹⁵²*See Penny-Feeney*, 773 F. Supp. at 228. Other cases have held that thermal infrared technology does not constitute a search. *See United States v. Pinson*, 24 F.3d 1056 (8th Cir. 1994), *cert. denied*, 513 U.S. 1057 (1994) (noting that Pinson's expectation of privacy in heat emanating from his home is one that society cannot view as objectively reasonable); *United States v. Ford*, 34 F.3d 992 (11th Cir. 1994); *United States v. Zimmer*, 14 F.3d 286 (6th Cir. 1994) (upholding the use of thermal imaging by the police to uncover and indoor marijuana growing operation); *United States v. Deaner*, 1 F.3d 192 (3d Cir. 1993) (noting that police use of an infrared device did not constitute a search and thus was inviolate of the Fourth Amendment); *United States v. Broussard*, 987 F.2d 215 (5th Cir. 1993) (upholding the use of thermal imaging on defendant's mobile home); *United States v. Porco*, 842 F. Supp. 1393, 1397 (D. Wyo. 1994) (noting that police usage of thermal imaging detected nothing more than "heat waste" which the defendants never tried to conceal); *United States*

The court emphasized that FLID was passive in that it did nothing to penetrate the structure by only measuring EMR transmissions which already were being emanated.¹⁵³

Likening emanating narcotic odors to escaping heat, the court noted that the defendant did not take any precautions to prevent heat from escaping and that the use of this technology was no different from using a canine to sniff out drugs.¹⁵⁴ Similar to the canine search in *United States v. Place*,¹⁵⁵ the court observed that the thermal search was non-invasive and unlikely to be humiliating for a suspect.¹⁵⁶ The fact that the police were monitoring an individual's home, which has been deemed a constitutionally protected area,¹⁵⁷ did not appear to influence the court.

In similar cases, other courts have ruled that it is of no significance that FLID is a high-tech device not generally available to the public.¹⁵⁸ Additionally, courts often find that, like the canine search in *Place*, use of FLID compromises no legitimate "private fact" about intimate details occurring within a home or building.¹⁵⁹

v. *Kyllo*, 809 F. Supp. 787 (D. Or. 1992) (same). Compare *Washington v. Young*, 867 P.2d 593, 598 (Wash. 1994) (FLID "represents a particularly intrusive means of surveillance.").

¹⁵³See *Penny-Feeney*, 773 F. Supp. at 228.

¹⁵⁴See *id.*; *Wisconsin v. McKee*, 510 N.W.2d 807, 810 (Wis. Ct. App. 1993) (noting that use of thermal imaging was similar to a canine sniff thereby not constituting a search). *But see United States v. Field*, 855 F. Supp. 1518, 1533 (W.D. Wis. 1994) (noting that a canine sniff is not analogous to thermal imaging).

¹⁵⁵462 U.S. 696 (1983).

¹⁵⁶See *Penny-Feeney*, 773 F. Supp. at 226.

¹⁵⁷See *Katz v. United States*, 389 U.S. 347, 350 (1967); *Weeks v. United States*, 232 U.S. 383, 391 (1914) (recognizing "the sanctity of a man's home"); see also *Boyd v. United States*, 116 U.S. 616, 630 (1886) (noting that the Fourth Amendment protects against governmental intrusion upon "the sanctity of a man's home and the privacies of life").

¹⁵⁸See *supra* note 153 (noting federal cases where FLIR has been found not to violate the Fourth Amendment).

¹⁵⁹See *United States v. Kyllo*, 809 F. Supp. 787, 792 (D. Or. 1992) (concluding that, "[n]o intimate details of the home were observed and there was no intrusion upon the privacy of the individuals within the home.").

4. DRUG-SNIFFING CANINES

Canine sniffs differ from the previously discussed police investigatory methods in that there is no sophisticated technology employed to enhance the senses. Trained canines are employed by law enforcement authorities specifically to enhance the human olfactory sense by detecting and locating illicit narcotics on an individual,¹⁶⁰ within a car,¹⁶¹ or inside a container.¹⁶²

The seminal case concerning the use of drug sniffing canines by the police was decided by the Court in *United States v. Place*.¹⁶³ In that case DEA agents stopped a "suspicious looking" individual at La Guardia airport in New York.¹⁶⁴ After Mr. Place refused to consent to an inspection of his luggage, the officers informed him that they were going to take the luggage from him and have it subjected to a canine sniff.¹⁶⁵ After a drug sniffing dog "alerted"¹⁶⁶ the officers that the bag contained narcotics, they obtained a war-

¹⁶⁰*See Doe v. Renfrow*, 631 F.2d 91 (7th Cir. 1980), *cert. denied*, 451 U.S. 1022 (1981) (allowing dragnet drug sweep of public school students).

¹⁶¹*See United States v. Stone*, 866 F.2d 359 (10th Cir. 1989) (dog jumping inside a car's hatchback to locate drugs did not constitute a search); *State v. Martinez*, 547 P.2d 62 (Ariz. 1976) (drug sniffing dog searching automobile based upon police reasonable suspicion did not constitute a search).

¹⁶²*See United States v. Place*, 462 U.S. 696 (1983) (allowing the search of defendant's luggage whom the police found suspicious); *United States v. Waltzer*, 682 F.2d 370 (2d Cir. 1982) (allowing canine drug sniff of an individual's luggage who fit a "drug courier profile"); *United States v. Beale*, 674 F.2d 1327 (9th Cir. 1982) (same). *See generally United States v. Maldonado-Espinosa*, 968 F.2d 101 (1st Cir. 1992) (canines used to sniff out drugs within luggage inside an airport); *United States v. Riley*, 927 F.2d 1045 (8th Cir. 1991) (same); *United States v. Doe*, 786 F. Supp. 1073 (D.P.R. 1991) (same).

¹⁶³462 U.S. 696 (1983).

¹⁶⁴*See id.* at 698.

¹⁶⁵*See id.* at 699.

¹⁶⁶An "alert" is a signal given by a drug-sniffing dog. "If the dog wags his tail or barks when sniffing for drugs, it constitutes legal 'probable cause' . . ." Jeff Brazil and Steve Berry, *You May Be Drug Free, But is Your Money?*, ORLANDO SENTINEL TRIB., June 15, 1992, at A6. *Compare with* Debbie M. Price, *Use of Drug-Sniffing Dogs Challenged*, WASH. POST, May 6, 1990, at D1. (The ACLU has long opposed searches by dogs because "[e]verything the dog does, no matter what it is, the police claim it's a hit. If the dog barks, it's a hit. If the dog sits down, it's a hit. If the dog fell over dead, they'd probably claim the scent of cocaine killed him.") (quoting Fred Joseph, ACLU attorney).

rant to open the bag.¹⁶⁷ The luggage contained a large amount of cocaine and Place was convicted for narcotics possession.¹⁶⁸

The Court determined that the use of trained canines to detect the presence of contraband in containers did not constitute a search and therefore did not violate the Fourth Amendment.¹⁶⁹ Finding the search to be “*sui generis*,”¹⁷⁰ the Court noted that the manner of the search was “much less intrusive than a typical search.”¹⁷¹ The Court held:

We are aware of no other investigative procedure that is so limited both in manner in which the information is obtained and in the content of the information revealed by the procedure. Therefore, we conclude that the particular course of investigation that the agents intended to pursue here—exposure of respondent’s luggage, which was located in a *public place*, to a trained canine—did not constitute a “search” within the meaning of the Fourth Amendment.¹⁷²

The Court noted that a search by a canine, based upon the reasonable suspicion standard articulated in *Terry v. Ohio*,¹⁷³ will only reveal whether or not the individual is carrying contraband, and nothing else. “Thus, despite the fact that the sniff tells the authorities something about the contents of the luggage,

¹⁶⁷See *Place*, 462 U.S. at 699.

¹⁶⁸See *id.*

¹⁶⁹See *id.* at 707.

¹⁷⁰“Of its own kind or class; *i.e.*, the *only one* of its own kind; peculiar.” 6 BLACK’S LAW DICTIONARY 1434.

¹⁷¹See *Place*, 462 U.S. at 707.

¹⁷²*Id.* (emphasis added).

¹⁷³392 U.S. 1, 88 (1968) (noting that in order for a police stop to be reasonable, the officer must have articulated suspicion that there may be a crime of violence committed). *Terry* allows officers to stop an individual as long as the police officer can justify the particular intrusion and “be able to point to specific and articulated facts which, taken together with rational inferences from those facts, reasonably warrant that intrusion.” *Id.* at 20-21 (citing *Camara v. Municipal Court*, 387 U.S. 523, 534-37 (1967)). In *Terry*, the Court reduced the level of suspicion necessary to conduct a stop and frisk of a suspect from probable cause to reasonable suspicion because frisks were considered far less intrusive than seizure and arrest. See *id.* at 27-30.

the information obtained is limited."¹⁷⁴

To the Court, the drug sniff is a non-invasive technique and unlikely to cause public humiliation to anyone except a suspect who is carrying contraband.¹⁷⁵ As the touchstone case for the admissibility of drug sniffs, *Place* is frequently cited and relied upon by circuit courts.¹⁷⁶

Notwithstanding the Court's holding, the conviction of *Place* was reversed.¹⁷⁷ Citing *Terry*, the Court found that even though the officers possessed the requisite reasonable suspicion, the ninety minute detention of *Place* was an unreasonable length of time for a *Terry* stop,¹⁷⁸ and was therefore unconstitutional. The dog sniff, however, was found to be constitutional.¹⁷⁹

Drug sniffing dogs are by no means a fool proof way to screen for drugs. In *Doe v. Renfrow*,¹⁸⁰ a case where the Supreme Court denied certiorari,¹⁸¹ a trained canine "alerted" a police officer that a particular junior high school student was carrying narcotics during a canine "sweep" of the entire school.¹⁸² The school officials had reason to believe that the girl had concealed illicit drugs on her body when, even after emptying her pockets, the canine continued to "alert."¹⁸³ After two female officials conducted a strip search of the student, no drugs were found.¹⁸⁴ What did turn up was the fact that the reason the dog began to "alert" was that the student had been playing with her dog that morning who was in heat.¹⁸⁵ Apparently, the odor that remained on the

¹⁷⁴*Place*, 462 U.S. at 707.

¹⁷⁵*See id.*

¹⁷⁶*See, e.g.*, *United States v. Harvey*, 961 F.2d 1361, 1363 (8th Cir. 1992); *United States v. Morales-Zamora*, 914 F.2d 200, 203-204 (10th Cir. 1990).

¹⁷⁷*See Place*, 462 U.S. at 710.

¹⁷⁸*See id.*

¹⁷⁹*See id.*

¹⁸⁰475 F. Supp. 1012 (N.D. Ind. 1979), *cert. denied*, 451 U.S. 1022 (1981).

¹⁸¹*See id.* at 1022.

¹⁸²*See id.* at 1016.

¹⁸³*See id.* at 1017.

¹⁸⁴*See id.*

¹⁸⁵*See id.*

student was sniffed by the canine. Interestingly, of the fifty students that the dog “alerted” to be carrying drugs, only seventeen were in actual possession.¹⁸⁶

B. THE PROBABLE CAUSE REQUIREMENT OF THE FOURTH AMENDMENT

In *Doe*, it was significant that the officers searched only those individuals to whom the canine “alerted.” The dog’s reaction provided the police and school officials with an individualized suspicion that a particular student was carrying narcotics. This is consistent with the Fourth Amendment which states in pertinent part, “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.”¹⁸⁷

The probable cause requirement obliges the police to have some individualized suspicion that a particular individual has committed a particular crime.¹⁸⁸ Individualized suspicion helps to deter arbitrary and general searches and seizures and requires that articulated facts support any police intrusion of one’s rights.¹⁸⁹ Although the concept of probable cause is found within the Warrant Clause of the Fourth Amendment, historically it has been required for all searches and seizures.¹⁹⁰

A classic illustration of the requirement of individualized suspicion occurred in *Ybarra v. Illinois*.¹⁹¹ In *Ybarra*, police officers obtained a Complaint for Search Warrant from a magistrate to enter the Aurora Tap Tavern and

¹⁸⁶*See id.* at 1017, 1028.

¹⁸⁷U.S. CONST. amend. IV.

¹⁸⁸“Although some quantum of individualized suspicion is usually a prerequisite to a constitutional search or seizure, . . . the Fourth Amendment imposes no irreducible requirement of such suspicion.” *United States v. Martinez-Fuerte*, 428 U.S. 543, 560-61 (1976); *see also* *Pennsylvania v. Mimms*, 434 U.S. 106, 121-22 (1977) (Stevens, J., dissenting) (stating that “individualized inquiry” is usually necessary for each police intrusion). *Compare* *Skinner v. Railway Labor Executives’ Ass’n*, 489 U.S. 602, 624 (1989) (“[S]howing of individualized suspicion is not a constitutional floor, below which a search must be presumed unreasonable.”).

¹⁸⁹*See* Thomas K. Clancy, *The Role of Individualized Suspicion in Assessing the Reasonableness of Searches and Seizures*, 25 MEMPHIS L. REV. 483 (1995).

¹⁹⁰*See id.*

¹⁹¹444 U.S. 85, 88-91 (1979).

search a bartender who was suspected of distributing heroin.¹⁹² The complaint did not state that the bar was frequented by persons intending to purchase illicit narcotics.¹⁹³ Announcing that they would perform a search of bar patrons for weapons,¹⁹⁴ one officer searched the defendant and felt what the officer described as "a cigarette pack with objects in it."¹⁹⁵ The officer had no individual suspicion that Ybarra in particular had committed a crime.¹⁹⁶ The search of the cigarette pack yielded six tin foil packets of heroin.¹⁹⁷ The search of Ybarra was found by the Supreme Court to violate the Fourth Amendment because:

a person's mere propinquity to others independently suspected of criminal activity does not, without more, give rise to probable cause to search that person. Where the standard is probable cause, a search or seizure of a person must be supported by probable cause *particularized* with respect to that person.¹⁹⁸

Thus, the probable cause requirement¹⁹⁹ and the particularity requirement of the Fourth Amendment require that only reasonable searches be conducted.²⁰⁰

¹⁹²*See id.* at 88.

¹⁹³*See id.* at 90.

¹⁹⁴Although a reasonable frisk for weapons is permitted under *Terry v. Ohio*, 392 U.S. 1 (1967), the Court in *Ybarra* responded that the frisk "was not supported by a reasonable belief that he was armed and presently dangerous, a belief which this Court has invariably held must form the predicate to a patdown of a person for weapons." *Ybarra*, 444 U.S. at 92. Moreover, *Ybarra* gave no indication of possessing a weapon. *See id.*

¹⁹⁵*Ybarra*, 444 U.S. at 88.

¹⁹⁶*See id.* *Ybarra* made no gestures indicative of criminal conduct, made no movements that might suggest an attempt to conceal contraband, and said nothing of a suspicious nature to the police officers. *See id.*

¹⁹⁷*See id.* at 89.

¹⁹⁸*Id.* at 91 (emphasis added).

¹⁹⁹Probable cause is best defined by the Court as information tending to support a reasonable belief that there is a "substantial chance" or "fair probability" that evidence of a crime is present or that a person has committed a crime. *See Illinois v. Gates*, 462 U.S. 213, 238, 244 n.13 (1983).

²⁰⁰*See New Jersey v. T.L.O.* 469 U.S. 325, 340 (1985); *United States v. Montoya de Hernandez*, 473 U.S. 531, 537 (1985); *Carroll v. United States*, 267 U.S. 132, 147 (1925)

In *Ybarra*, the officers were unable to point to specific and articulated facts which collectively would give a reasonable officer probable cause to believe a patron had committed a crime. The purpose of the probable cause requirement is to prevent those dragnet like, unparticularized general searches and seizures that were part of the police raid in *Ybarra*.²⁰¹

West v. Cabell,²⁰² decided by the Court eighty-five years earlier, announced a similar requirement of probable cause in regards to warrants issued for individuals suspected of committing a crime. In that case, the plaintiff, whose birth name was Vandy M. West, brought an action against a United States Marshal and others, who had arrested him pursuant to a warrant issued by the commissioner of a circuit court.²⁰³ The warrant ordered federal marshals to “‘arrest the body of James West,’ upon a charge of murder of John Cameron in the Indian country in the Western District of Arkansas.”²⁰⁴ The evidence at trial showed that Vandy West had never been known or called by any other name.²⁰⁵ Justice Gray, speaking for the Court, announced that,

a warrant for the arrest of James West, without other description of the person intended, gives no authority to a arrest a person whose name is V. M. West or Vandy West, and who has never been known as James West; and it is immaterial that such person was the one the commis-

(The Fourth Amendment “does not denounce all searches and seizures, but only such as are unreasonable.”).

²⁰¹See Russell W. Galloway, Jr., *The Unwelcome Guest: A Status Report Concerning General Searches and Seizures in 1984*, 24 SANTA CLARA L. REV. 279-94 (1984). Searches and seizures do not, however, require probable cause if they are inherently less invasive than full blown searches, the government interest outweighs the intrusion and the search and/or seizure is reasonable. See *Terry v. Ohio*, 392 U.S. 1 (1968). Whether these questions are met will depend upon a totality of the circumstances in each particular case. See *Florida v. Royer*, 460 U.S. 491, 500 (1983) (noting that the scope of the intrusion permitted will necessarily depend on the particular set of circumstances in each case). In *United States v. Place*, for example, the Court noted that the duration of a limited police stop is a significant factor in determining “whether the seizure is so minimally intrusive as to be justifiable on reasonable suspicion.” 462 U.S. 696, 709 (1983).

²⁰²153 U.S. 78 (1894).

²⁰³ See *id.*

²⁰⁴ *Id.*

²⁰⁵ See *id.*

sioner had in mind when he issued the warrant.²⁰⁶

Relying on the Fourth Amendment and a provision of section 1014 of the Revised Statutes,²⁰⁷ the Court intimated that complaints and warrants "must specify the name of the person whose arrest is ordered" and if the name is not known some reasonable physical description must be included on the warrant."²⁰⁸

The Court intimated that it is a central teaching of Fourth Amendment jurisprudence that specificity must be a basis for police action.²⁰⁹ In *United States v. Shavers*,²¹⁰ the Eighth Circuit reversed a conviction specifically because a sufficient set of facts did not exist to make a reasonable officer believe that a crime had been committed by a particular individual.²¹¹ In *Shavers*, after a bank had been robbed, police officers were informed that the two suspects were described as black males about 5'8 tall, one of whom was wearing a black jacket.²¹² The arresting officer knew no more than these facts and that the suspect whom he stopped was no more than a block away from the bank.²¹³ The Eighth Circuit determined that the population of the area was about 50% black and that many men stood at a height of 5'8 tall. As a result, the court remanded for further proceeding including a possible new suppression hearing.²¹⁴

The Eighth Circuit in *Shavers* was not convinced that the arresting officer had sufficient probable cause to effectuate a search of the defendant.²¹⁵ Rely-

²⁰⁶West, 153 U.S. at 81.

²⁰⁷*See id.* at 87.

²⁰⁸*Id.* at 86. *Accord* *Coolidge v. New Hampshire*, 403 U.S. 443, 471 (1971) (Seizure of items not specifically named in the search warrant "is a violation of the express constitutional requirement of '[w]arrants . . . particularly describing . . . [the] things to be seized.'")

²⁰⁹*See* *Terry v. Ohio*, 392 U.S. 1, 21 n. 18 (1968).

²¹⁰524 F.2d 1094 (8th Cir. 1975).

²¹¹*See id.*

²¹²*See id.* at 1095.

²¹³*See id.*

²¹⁴*See id.*

²¹⁵*See id.* at 1096.

ing on the Supreme Court's ruling in *Beck v. Ohio*,²¹⁶ the court noted that satisfactory probable cause must depend on "whether at the moment the arrest was made . . . the facts and circumstances within [the arresting officers'] knowledge and of which they had reasonably trustworthy information were sufficient to warrant a prudent man in believing that the [suspect] had committed or was committing an offense."²¹⁷ The *Shavers* court, which relied on *Beck's* totality of the circumstances analysis in assessing the justification for conducting a search, did not believe that the officer had enough particularized information to warrant probable cause.²¹⁸

III. APPLICATION OF THE FOURTH AMENDMENT TO SENTOR

In light of the Supreme Court's current trend in Fourth Amendment interpretation of warrantless, sense-enhanced searches, at first blush it would seem the Court will uphold Sentor's gas chromatographic method as not constituting a search, drawing a nexus between it and drug canine searches. Once the technological aspect of the Sentor device is removed, the difference between the two techniques appears to reach the vanishing point: Sentor is no more than an electronic canine. The constitutionality of using the Sentor has a direct connection with the *Place* decision.²¹⁹ Comparatively, both methods are non-invasive, thus reducing public humiliation incidental to a search.²²⁰ Furthermore, both seek only the presence of narcotics and are thus limited in scope.²²¹ Lastly, the usage of the techniques could likely decrease the traffic of illegal narcotics into the United States—an interest which the Court felt outweighed the competing interest of privacy in *Place*.²²²

The similarity in heat emanations escaping from a home and narcotic va-

²¹⁶379 U.S. 89 (1964).

²¹⁷*Id.* at 91.

²¹⁸The established principle of probable cause embodies the "best compromise that has been found" for reconciling conflicting State and defendant interests and "safeguard[ing] citizens from rash and unreasonable interferences with privacy." *Ybarra v. Illinois*, 444 U.S. 85, 95 (1979) (quoting *Brinegar v. United States*, 338 U.S. 160, 176 (1949)).

²¹⁹*See United States v. Place*, 462 U.S. 696 (1983).

²²⁰*See id.* at 707.

²²¹*See id.* at 704.

²²²*See id.* at 704-07.

pors emitted by a person or container is also compelling. In *United States v. Penney-Feeney*,²²³ where the police used a helicopter equipped with thermal imaging instruments to detect an indoor marijuana growing operation, the district court specifically relied upon the Supreme Courts' finding in *Ciraolo* that the aircraft was in public navigable airspace.²²⁴ In *Penney-Feeney*, it was significant that the FLID was physically nonintrusive, an attribute that the court deemed "[o]f utmost importance."²²⁵ Additionally, the probable cause requirement of the Fourth Amendment would appear to be satisfied because the thermal imaging is directed at a specific building, the home of the suspect under investigation.

To the court, heat emanations were analogous to odors given off by narcotics because "they constitute a physical fact indicative of possible crime" ²²⁶ The *Penney-Feeney* court likened the escaping heat to "waste" and found that the defendant did not have a legitimate expectation of privacy in "heat waste," especially when the defendant in no way attempted to prevent the heat from escaping.²²⁷

If the Supreme Court used the *Penny-Feeney* rational of likening narcotic odors and heat emanations as being waste byproducts, Sentor would likely be found not to constitute a search under the Fourth Amendment. Inherent in the *Penny-Feeney* ruling is the notion that heat emanations are no longer part of the home.²²⁸ Applying this line of reasoning to Sentor, it would seem that the emanation of odor, whether body scent or escaping vapors from narcotics on the individual or her effects, is transformed from the private domain to the public one. In *Penny-Feeney*, the court found that the defendants had exposed their own heat garbage to the public which was sufficient to defeat their claim of an invalid search and seizure.²²⁹

Such broad reasoning could pave the way for Sentor to be available to every law enforcement agency in the United States. Transplanting the *Penny-Feeney* rationale to the Sentor, the police, using the non-invasive Sentor to

²²³773 F. Supp. 220 (D. Haw. 1991).

²²⁴*See id.* at 227.

²²⁵*Id.* at 228.

²²⁶*Id.* at 227.

²²⁷*See id.* at 225.

²²⁸*See id.* at 226.

²²⁹*See id.*

monitor odors that are in the public domain, especially “illegitimate” narcotic odors, arguably would not compromise any private fact that society would be willing to recognize. Moreover, the Supreme Court could rationalize that narcotic odors are waste garbage in the most literal sense and that the Sentor, whose only mission is to uncover this discarded trash, compromises no legitimate privacy concern of the individual carrying the contraband.

Based upon the standards defined in *Ciraolo*, the Court could determine that Sentor was not a search. This is because Sentor’s only mission is to detect and locate narcotics. In *Ciraolo*, the Court proclaimed that the defendant’s expectation of privacy in growing marijuana was “unreasonable and not an expectation that society [was] prepared to honor.”²³⁰ In the Court’s examination of whether Mr. Ciraolo had a subjective expectation of privacy under *Katz*, the Court noted that it was not significant that the defendant placed tall fences around his property to conceal his marijuana growing operation.²³¹ What was significant was whether “the government’s intrusion infringes upon the personal and societal values protected by the Fourth Amendment.”²³²

In various decisions, including *United States v. Mendenhall*²³³ and *United States v. Jacobsen*,²³⁴ the Court found an interest in possessing narcotics to be illegitimate—a value that society will not recognize. The Court reasoned that “[t]he public has a compelling interest in detecting those who would traffic in deadly drugs for personal profit.”²³⁵

In *Ciraolo*, the Court reasoned that the homeowner’s interest in privacy²³⁶ was overcome by the police’s investigatory technique which was performed in a “physically nonintrusive manner.”²³⁷ From this, if the Court did not object to use of a surveillance tactic in a constitutionally protected area, it appears

²³⁰California v. Ciraolo, 476 U.S. 207, 214 (1986).

²³¹See *id.* at 207.

²³²*Id.*

²³³446 U.S. 544 (1980).

²³⁴466 U.S. 109 (1984).

²³⁵*Mendenhall*, 446 U.S. at 561. The Court has found that there is no arguably legitimate “private” interest in possessing narcotics. See 466 U.S. at 123.

²³⁶A home is a place in which a subjective expectation of privacy virtually always will be legitimate. See *Payton v. New York*, 445 U.S. 573, 589 (1980).

²³⁷*Ciraolo*, 476 U.S. at 213-14.

likely that use of a technique like the Sentor in the public domain would be fair game.

In this respect, the *Ciraolo* logic would seem to hold that the Sentor would not be deemed a "search" under the Fourth Amendment. The *Ciraolo* view suggests that the Sentor is merely looking for something an individual has no legitimate right to have, and that the government is looking in a nonintrusive way. Just as the overflight in *Ciraolo* did not require physical entry onto the defendant's land, the Sentor does not require the police to physically touch a drug carrying suspect.²³⁸ Similarly, just as the police in *Ciraolo* and *Dow* were flying in an area where any member of the public had a right to be,²³⁹ the police would likely implement Sentor where they necessarily have a right to be—public streets.

United States v. Knotts,²⁴⁰ was also instrumental in noting the expectations of privacy in the public domain. In *Knotts*, "a person traveling in an automobile on public thoroughfares ha[d] no reasonable expectation of privacy in his movements from one place to another."²⁴¹ Because the Court believes a car has "little capacity for escaping public scrutiny,"²⁴² one could argue that the police would be able to employ the gas chromatographic Sentor on public streets.²⁴³ In the final analysis, a car's occupants are in plain view²⁴⁴ on public streets, just as an individual who walks down a public sidewalk.

Nevertheless, it is one thing to say that the individual who walks down the street has no subjective expectation of privacy against the eyes and ears of an intrusive public. The question arises, however, whether an individual who places contraband, such as narcotics, in his or her pocket or purse, expects the

²³⁸See Frank Ranson, *San Diego Police Consider Electronic Drug Detector*, L.A. TIMES, Apr. 21, 1990, at 5. (discussing how Sentor operates); see also THERMEDICS INC., SENTOR DRUG DETECTION SYSTEM [*hereinafter*: DETECTION SYSTEM] (company literature explaining the "simple one-button one-person operation" of the Sentor device).

²³⁹See *Ciraolo*, 476 U.S. at 213-14; *Dow Chem. Co. v. United States*, 476 U.S. 227, 239 (1986).

²⁴⁰460 U.S. 276 (1983).

²⁴¹*Id.* at 281.

²⁴²*Cardwell v. Lewis*, 417 U.S. 583, 590 (1974).

²⁴³See *Katz v. United States*, 389 U.S. 347, 361 (1967) ("[O]bjects, activities, or statements that [an individual] exposes to the 'plain view' of outsiders are not 'protected' because no intention to keep them to himself has been exhibited.") *Id.*

²⁴⁴See *id.*

object to remain hidden. Naturally, one places personal effects such as money, credit cards, and other documents inside a wallet or a purse as a matter of simple organizational convenience. It is difficult to say, however, that these objects are not stored in these places specifically to prevent them from being seen by others. They are placed there because the individual subjectively believes, even if subconsciously, they will be kept private.

Knotts, however, is distinguishable from this logic. There, the Court found that the defendant, “voluntarily conveyed to anyone who wanted to look, the fact that he was traveling over particular roads in a particular direction, the fact of whatever stops he made, and the fact that of his final destination”²⁴⁵ It cannot be said, however, that by walking down the street an individual invites people or the police to know what is in their purse, briefcase, or the like. To enjoy the promises of liberty, the individual must participate in the benefits which liberty provides: notably freedom of action and movement.

IV. RETHINKING THE CONSTITUTIONALITY OF SENTOR

A. PRELIMINARY QUESTIONS

At first blush, one is apt to conclude that the Supreme Court would find the use of *Sentor* to be no different from the canine search in *Place*.²⁴⁶ Such a conclusion would be misplaced because the two search methods diverge on an extremely important constitutional principle. The Fourth Amendment’s requirement of “probable cause” in regards to searches requires that there be individualized suspicion of a particular suspect who is thought to be engaging in criminal activity. A police officer must be able to point to specific and articulated facts which reasonably warrant the search.²⁴⁷ An officer needs to know that when a drug-sniffing dog “alerts” that a particular individual is carrying narcotics, there is a strong likelihood that, that individual, and not some other person is the true trafficker.

The detection and location of narcotics are two mutually exclusive tasks. A drug-sniffing canine is able to do both. That is, not only does the canine possess the ability to detect the presence of narcotics via its olfactory senses, the canine is further able to detect the location of the contraband. This is signifi-

²⁴⁵*Knotts*, 460 U.S. at 282.

²⁴⁶*See* *United States v. Place*, 462 U.S. 696 (1983).

²⁴⁷*See* *Terry v. Ohio*, 392 U.S. 1, 20-21 (1968) (citing *Camara v. Municipal Court*, 387 U.S. 523, 534-37 (1967)).

cant because not only does the canine's precision aid the officer in honing in on a specific location where narcotics have been hidden, it also substantially increases the likelihood that the individual or container that emitted the narcotic vapors was the person or thing that the dog had sniffed.

Sentor is distinguishable. The device can only tell you that drugs are in the air.²⁴⁸ A dog, however, can not only tell you drugs are there, but *exactly* where they are.²⁴⁹ The problem is that air is fluid and moves whether individuals pass through it or not. The theories behind this idea are the principles of Brownian motion and diffusion.

The scientific principle of Brownian motion dictates that particles in the air are constantly in motion, zigzagging back and forth in violent disarray.²⁵⁰ The best way to approach the concept of Brownian motion is to think about watching a film in a dark movie theater with the projector at the back of the room.²⁵¹ As a triangular beam of light is cast from the projector to the screen, millions of tiny "dust" particles are readily seen within the beam. Although individuals in the theater remain motionless, the particles are continually moving.²⁵²

The theory of diffusion can best be described as molecules tending to move from regions of greater concentration to those of lesser concentration.²⁵³ This is best seen when a person opens a container of ammonia or sprays on perfume at one end of a large room. Within moments, another individual at the other end of the room is readily able to sense the aroma.²⁵⁴ In the most literal sense, the air around us moves. This idea is extremely important to the constitutionality of Sentor. Sentor is unable to discriminate whose air it inhales. As a result, Sentor may erroneously alert an officer that an individual is carrying contraband, thus giving probable cause to conduct a full search of that innocent individual.

²⁴⁸See Colin Flaherty, *Portable Drug Detector Unveiled*, UPI, Apr. 20, 1990 (statement of San Diego Police Department official which field-tested the Sentor device).

²⁴⁹See *id.* (emphasis added).

²⁵⁰See ERIC M. ROGERS, *PHYSICS FOR THE INQUIRING MIND*, 362 (1960); CLIFFORD E. SWARTZ, *PHENOMENAL PHYSICS*, 313 (1981); GEORGE GAMOW & JOHN M. CLEVELAND, *3 PHYSICS: FOUNDATIONS AND FRONTIERS*, 205-6 (1976).

²⁵¹See ROGERS, *supra* note 250, at 362.

²⁵²See *id.*

²⁵³See DOUGLAS C. GIANCOLI, *PHYSICS*, 216, (1980).

²⁵⁴See *id.*; see also THEODORE P. SNOW & J. MICHAEL SHULL, *PHYSICS*, 418 (1986).

Consider the following: the police have a tip by an informant who has been reliable in the past, that "X" is trafficking a large quantity of heroin on her person. In fact, "X" is not carrying drugs. Based upon this, the police have reasonable suspicion to conduct a non-invasive Sentor "sniff." The officer using the Sentor had participated in a major drug bust earlier that morning and had "picked up" a trace amount of heroin on her uniform. While extending her arm with the collecting mechanism, the officer sucks the air in around the suspect which includes some air from around herself, thereby contaminating the sample. The super-sensitive Sentor identifies the air sample as "positive" for heroin content. This gives the officer probable cause to believe the suspect is carrying narcotics thus justifying a need to search the person. Although no heroin is found, an innocent citizen has been subjected to a full search that may have been extremely humiliating.

In regards to individualized suspicion, a great divide is seen when one compares the use of Sentor to the electronic beepers used in *Knotts*. In *Knotts*, the police secretly placed a beeper in a chemical container that was being transported in the subject's car.²⁵⁵ As the police were tracking the radio transmissions of the beeper, they knew that they were following a particular drug-manufacturing suspect.²⁵⁶ Because the beeper had been physically attached to the chemical container, the police knew that the radio emissions of the transmitter would lead them to wherever the container was taken.²⁵⁷

Sentor is distinguishable. The machine only determines whether or not narcotic vapors are part of the air sample it takes.²⁵⁸ Thus, a gas chromatographic search is unlikely to be particularized. If the device determined that narcotics residue was within the fabric, the vague conclusion could be reached that this particular individual had come into contact with cocaine either intentionally or otherwise.

The principles of kinetic diffusion and Brownian motion dictate that air does not sit still.²⁵⁹ Molecules of air are in continually constant motion across various concentration gradients.²⁶⁰ Although Sentor's gas chromatography is an extremely useful and precise technique in describing the contents of a par-

²⁵⁵See *United States v. Knotts*, 460 U.S. 276, 277 (1983).

²⁵⁶See *id.*

²⁵⁷See *id.* at 276-79.

²⁵⁸See Flaherty, *supra* note 248.

²⁵⁹See *supra* notes 250-254 and accompanying text.

²⁶⁰See *supra* notes 250-254 and accompanying text.

ticular liquid or gas, the machine is not sufficiently accurate for Fourth Amendment purposes.

*Dow Chemical Co. v. United States*²⁶¹ and *California v. Ciraolo*²⁶² are distinct in the following respect. In those cases, the subject of investigation was an industrial complex and the backyard of a home. The officers within the aircraft knew that when they were photographing the subjects of investigation, the developed pictures would be of that particular target. Sentor, however, is not the same and thus cannot be evaluated along the same reasoning. Sentor does not know when it screens a particular individual whether or not the air that it finds cocaine in, is not the air that was at another end of a room five minutes before, "belonging" to someone else.

In this respect it is difficult to conclude that Sentor is sufficiently accurate to provide probable cause and particularized suspicion in order to perform a search as required by the Fourth Amendment.²⁶³ A positive "alert" by Sentor that a screened air sample contains contraband, in actuality tells the police officer very little. In a room full of people, the officer will know that the contraband is somewhere and possibility on someone's person, but like the tavern search in *Ybarra*, the "alert" cannot rise to the level of individualized suspicion because it is unclear that an illegal act was committed by a particular individual.

Whereas drug sniffing canines are usually trained to detect usable or larger quantities of drugs,²⁶⁴ Sentor uses high-speed gas chromatography to search for narcotic particles on a much smaller scale. As an instrument that can detect trace amounts of narcotics that no canine could,²⁶⁵ what should be the threshold amount of drugs present on an individual to warrant probable cause for a search? Because Sentor is sensitive enough to detect a spoonful of sugar

²⁶¹476 U.S. 227 (1986).

²⁶²476 U.S. 207 (1986).

²⁶³See *supra* note 199 discussing probable cause.

²⁶⁴See Ranson, *supra* note 238, at 5 (statement of Matt Weathersby, community relations spokesman for the San Diego Police Department). This is not to say that canines are sometimes able to detect trace amounts of cocaine on U.S. currency because often times they can. See Mark Curriden, *Courts Reject Drug-Tainted Evidence*, 79 A.B.A.J. 22, Aug. 1993, at 1 (noting that drug sniffing canines often detect residue amounts of cocaine that are usually found on U.S. currency).

²⁶⁵See generally Ranson, *supra* note 238. Canines are trained to locate useable quantities of drugs that may be concealed. Sentor is designed to find trace amounts of narcotics that may only be molecular in size. See *id.*

in the water of an Olympic sized swimming pool,²⁶⁶ the question becomes whether possession of molecular amounts of cocaine is actual possession of the drug and should be enough to give probable cause for a search.

B. COCAINE TAINTED CURRENCY

Cocaine residue found on United States currency presents another significant reason the Court should depart from its current Fourth Amendment interpretation and find *Sentor* to be a drug field testing technique inconsistent with the Fourth Amendment's requirement that searches be reasonable. LaFave notes that "[i]t has been estimated that most of the cash in circulation (the estimates range from 70% to 97% of all bills) contains sufficient quantities of cocaine to alert a trained dog."²⁶⁷ This could be a result of the currency being near or part of the illegal drug trade at some point in time.²⁶⁸ Tests using gas chromatography continue to prove this is true,²⁶⁹ and *Sentor* could "sniff out" these trace odors on an individual's person thus giving the police probable cause to conduct a search of the person. Thus, as a result of the *Sentor*'s inherently sensitive gas chromatographic method to detect minute traces of cocaine that no canine could, numerous law abiding citizens may be subjected to an embarrassing search simply because they were unaware that their wallet contained "contraband" cash.²⁷⁰

²⁶⁶See Craig Neff, *Bosworth Faces the Music*, SPORTS ILLUSTRATED MAGAZINE, Jan. 5, 1987 (noting that because gas chromatography/mass spectrometry are so sensitive, there is little chance to chemically mask steroid traces in a urine sample).

²⁶⁷See WAYNE R. LAFAVE, 1 SEARCH AND SEIZURE, §2.2(F) (1988) (noting that police might wind up stopping people for merely carrying cash); see also Curriden, *supra* note 264, at 22 (noting that the latest estimate is that cocaine is on 70% of all U.S. currency); Brazil and Berry, *supra* note 166, at A6 (Toxicologist Wayne Morris, who has testified in hundreds of criminal cases, notes that as much as 90 percent of currency in some cities tests positive for cocaine).

²⁶⁸"Dope is a cash business . . . [Dealers] rely on cash for money dealings. There's no such thing as an enforceable dope contract." *Nation's Money Supply Dusted With Cocaine*, UPI, Dec. 13, 1987 [*hereinafter Nation's Money Supply*] (quoting U.S. Attorney Steve Graham, who investigates drug cases in San Francisco).

²⁶⁹In a study of 57 bills by toxicologist Wayne Morris, a gas chromatograph and mass spectrometer were used to determine that six of nine samples carried detectable amounts of cocaine. See Brazil and Berry, *supra* note 166, at A6; see also *Nation's Money Supply*, *supra* note 268 (noting that high precision instruments such as mass spectrometers have found tiny traces of cocaine on bills from Miami, Dallas, Los Angeles, Seattle, Milwaukee, Syracuse and Pittsburgh).

²⁷⁰LAFAVE, *supra* note 100, at §2.2(f) n. 199. As a policy matter, one is apt to ask

In numerous Supreme Court decisions, the Court has ruled that only reasonable searches and seizures may be conducted by law enforcement officials.²⁷¹ The problem for *Sentor* is that its potential benefit will decrease each time it alerts to a unassuming individual who is merely carrying dollars with slight traces of cocaine. If everyone the police have reasonable suspicion on are exposed to the *Sentor* "sniff," then reasonable suspicion as a concept will be subsumed by probable cause. In other words, *Sentor* would almost virtually guarantee the police a basis for probable cause to conduct a search, since it is likely that most individuals are carrying some amount of currency.

The Court has held that the *Terry* doctrine²⁷² allows personal security and privacy interests to be overcome, and authorizes a limited intrusion, if the officers have reason to suspect that criminal activity is afoot.²⁷³ Society should not reach the point where "in order to preserve a modicum of privacy, [a person] is compelled to encase himself in a light-tight, air-proof box."²⁷⁴

whether the amount of money in someone's wallet should act as a proxy for their risk of being stopped by the police. Assuming the reliability of the cocaine/currency test, wealthier individuals, with a greater likelihood of carrying larger quantities of bills, could be more likely of being searched as opposed to less affluent individuals, despite the fact that they are law abiding citizens at the time of the stop. Thus, the prince is more culpable than the pauper—individuals with more cash on their person are more likely to give rise to probable cause for the police to use the *Sentor* device and then conduct a full search.

²⁷¹See *New Jersey v. T.L.O.* 469 U.S. 325, 340 (1985); *United States v. Montoya de Hernandez*, 473 U.S. 531, 537 (1985); *Carroll v. United States*, 267 U.S. 132, 147 (1925) ("The Fourth Amendment does not denounce all searches and seizures, but only such as are unreasonable.").

²⁷²See *Terry v. Ohio*, 392 U.S. 1, 88 (1968).

²⁷³*United States v. Place*, 462 U.S. 696, 716 (1983); see also *Michigan v. Summers*, 452 U.S. 692, 699 (1981) ("Some seizures . . . constitute such limited intrusions on the personal security of those detained and are justified by such substantial law enforcement interests that they may be made on less than probable cause, so long as police have an articulated basis for suspecting criminal activity.").

²⁷⁴*Lorenzana v. Superior Court*, 511 P.2d 33, 41 (Cal. 1973). In *Katz v. United States*, discussed in Part III, the police overheard Mr. Katz's phone conversations by placing a listening device on the exterior of the phone booth. Professor Anthony Amsterdam observed that:

Mr. Katz could, of course, have protected himself against surveillance by forbearing to use the phone; and—so far as I am presently advised of the state of the mechanical arts—anyone can protect himself against surveillance by retiring to the cellar, cloaking all the windows with thick caulking, turning off the lights and remaining absolutely quiet . . . What kind of society is that?

Whereas the Court in *Place* felt that a drug sniff would not compromise any fact except that an individual was carrying contraband, use of Sentor might indicate that an individual is positively possessing narcotics when if fact they are only in unconscious molecular possession. Gas chromatographic technology may be too sensitive. This fact compounded with the concern that United States currency is tainted with cocaine²⁷⁵ is an important reason that the Supreme Court should find the use of the Sentor device and others like it²⁷⁶ to be unconstitutional search techniques.

The Supreme Court should follow lower state and federal court rulings which have increasingly been willing to reverse convictions sustained by use of methods like the implementation of drug sniffing dogs because of the pervasiveness of cocaine on United States currency.²⁷⁷ Thus, although the manufacturer of Sentor states that the machine only errs one out of a hundred times for

Amsterdam, *supra* note 44, at 402. According to Justice Brennan's dissent in *Florida v. Riley*, "[t]he question is not whether you or I must draw the blinds before we commit a crime. It is whether you and I must discipline ourselves to draw the blinds every time we enter a room, under pain of surveillance if we do not." *Florida v. Riley* 488 U.S. 445, 464 (1989) (Brennan, J., dissenting)

²⁷⁵See Curriden, *supra* note 264 (discussing the pervasiveness of cocaine on U.S. currency).

²⁷⁶"Ionscan of New Jersey's Barringer Instruments, Inc., unlike Sentor, tests only for particles, not vapor, but uses ion-mobility spectrometry (measuring different speeds of charged particles) to identify any nine drugs in four seconds." Underwood, *supra* note 12, at 7.

²⁷⁷See, e.g., \$191,910 in U.S. Currency, 16 F.3d 1051, 1062 n. 21 (9th Cir. 1994) (noting that drug tainted currency could undermine the accuracy of drug-sniffing canines); *United States v. \$53,082 in U.S. Currency*, 985 F.2d 245, 250 n.5 (6th Cir. 1993) (same); *United States v. \$639,558 in U.S. Currency*, 955 F.2d 712, 714 n.2 (D.C. Cir. 1992) (same); *United States v. \$80,760 in U.S. Currency*, 978 F.2d 709 (5th Cir. 1992) (same). See also Curriden, *supra* note 264 (noting the judicial response to empirical evidence showing the increase of cocaine residues on currency). Officials responsible for drug interdiction seem to understand the courts' response to the cocaine/currency problem:

I would not want to walk into court and rely exclusively on a dog sniff for a forfeiture of money . . . There are a lot of guys out there that have shown that there is trace [of] dope on a lot of money out there. And for that reason alone, I'd want more than just the dog.

Price, *supra* note 166, at D1 (quoting Charles S. Saphos, chief of the U.S. Justice Department's Narcotic and Dangerous Drug Section).

samples tested,²⁷⁸ that does not address the problem. Accuracy of this kind may not necessarily mean there is only one mistake out of a hundred, rather, it could possibly mean that there are ninety-nine false positives out of a hundred, due to the machine's inherently sensitive nature and the pervasiveness of cocaine tainted currency in the United States.

To be sure, "the probability that every single person in the United States is carrying drug-tainted money is almost certain," and the Drug Enforcement Administration has been aware of it for the past few years.²⁷⁹ In *Lord v. Florida*,²⁸⁰ the court reversed a conviction for a defendant who had been convicted based upon trace amounts of cocaine found on a crumpled up dollar bill. The *Lord* court noted that "[t]he mere presence of trace amounts of cocaine on a common object . . . is insufficient to support a felony conviction of possession of cocaine."²⁸¹ Similarly in *Jones v. DEA*,²⁸² United States District Judge Thomas Wiseman noted that "the evidence of the narcotic-trained dog's alert

²⁷⁸See Hughes, *supra* note 39, at 174.

²⁷⁹Curriden, *supra* note 264, at 22 (quoting forensic chemist, Dr. James Woodford, who testifies in cases where trace amounts of cocaine are an issue). "Cocaine in South Florida is so pervasive that microscopic traces of the drug can be found on much of the currency circulating in the area." *Id.* (quoting the presiding judge in *Lord v. Florida*, 616 So. 2d 1065 (Fla. 1993)). See also Alan Abrahamson, *Prevalence of Drug Tainted Money Voids Case*, L.A. TIMES, Nov. 13, 1994, at B1. ("[V]irtually everyone in Los Angeles is conceivably at risk of being barked at by drug-sniffing police dogs.") (quoting *United States v. U.S. Currency*, 39 F.3d 1039 (9th Cir. 1994)). "The notion that most U.S. currency is tainted with drugs has been well known in law enforcement and scientific circles for about 10 years." *Id.*

In a 1989 experiment conducted by Dr. William Hearn, a Miami toxicologist, 135 dollar bills were collected in 12 cities around the country. Of the 135 bills, only four showed no traces of cocaine. See Curriden, *supra* note 264, at 22. Attorney Mark Curriden reported that:

In 1987, a study by a DEA scientist found that one-third of all money at the federal Reserve Building in Chicago was tainted with cocaine. His report. . . said traces of cocaine were found on the agency's high speed sorting equipment and that the drug probably was being *transferred* to the currency.

Id. (emphasis added).

²⁸⁰616 So. 2d 1065 (Fla. 1993).

²⁸¹*Id.* at 1067.

²⁸²867 F. Supp. 626 (M.D. Tenn. 1993).

to currency is of extremely little probative weight.”²⁸³

In *United States v. United States Currency*,²⁸⁴ the Ninth Circuit held that a narcotics detection dog’s positive alert, standing alone, was insufficient to establish that the \$30,060 that was found in a defendant’s car had some concrete connection to the illegal drug trade. Finding it uncontradicted that seventy-five percent of all the currency in Los Angeles was tainted with cocaine residue,²⁸⁵ the court found that it would be likely that a narcotics detection dog would positively alert when presented with a large sum of money from the vicinity.²⁸⁶ In that case the court found that the government could not show that the “‘aggregate of facts’” raised more than mere suspicion that the money found in the car was connected to drugs.

Cocaine adheres to what it touches.²⁸⁷ The spread of cocaine from tainted bills to newer, fresher bills is increasing at apparently exponential levels, raising the likelihood that law-abiding individuals may be carrying “contraband currency.”²⁸⁸ As a tainted bill mingles against previously untainted bills, those bills will be contaminated as well.²⁸⁹ Because of this, there is generally a

²⁸³*Id.* at 719-20. “It cannot be doubted that contaminated money is widespread.” *Id.* at 720.

²⁸⁴39 F.3d 1039 (9th Cir. 1994).

²⁸⁵*See id.* at 1042. Numerous judicial circuits have found that cocaine tainted currency is widespread. *See* \$191,910 in U.S. Currency, 16 F.3d 1051, 1062 n.21 (9th Cir. 1994) (noting that drug tainted currency could undermine the accuracy of drug-sniffing canines); *United States v. \$53,082 in U.S. Currency*, 985 F.2d 245, 250 n.5 (6th Cir. 1993) (same); *United States v. \$639,558 in U.S. Currency*, 955 F.2d 712, 714 n.2 (D.C. Cir. 1992) (same); *United States v. \$80,760 in U.S. Currency*, 978 F.2d 709 (5th Cir. 1992) (same).

²⁸⁶*See United States Currency*, 39 F.3d at 1042-43.

²⁸⁷*See Brazil and Berry*, *supra* note 166, at A6. “Cash and cocaine go together like Armani suits and designer stubble.” *Drug Money*, THE ECONOMIST, April 15, 1989, at 32.

²⁸⁸Price, *supra* note 166, at D1. “It’s one thing if you raid a crack house and find \$5,000,” said Arthur Spitzer, an ACLU lawyer. “It’s another if you use a dog to take \$200 that’s in the pocket of someone who has a regular job.” *Id.*

²⁸⁹*See id.* “[A] single bill in contact with cocaine during a deal or used to snort coke can contaminate an entire cash drawer through a combination of friction, body heat or body moisture.” *Id.* *See also, Brazil and Berry*, *supra* note 166, at A5 (“If it’s [sic] been in circulation long enough, it’ll be tainted.”). The most likely bill to be contaminated is the \$20 bill. “When you’re trading \$100,000 or \$200,000 (for drugs) you don’t give it to the guy in ones.” Abrahamson, *supra* note 279, at B1 (quoting forensic toxicologist Jay B. Williams).

steady dispersal of residue on currency across the country.²⁹⁰

Cocaine contamination of United States currency is so rampant that some bank tellers have absorbed enough through their hands to be detected in their urine.²⁹¹ In fact, as little as two milligrams of cocaine, an amount commonly found on United States currency, that is dissolved in water is able to be absorbed directly through the skin.²⁹²

A fascinating study by the *Miami Herald* was conducted in 1985 to address this problem and the interesting consequences that could result.²⁹³ The researchers asked eleven individuals from the South Florida area to each supply a \$20 bill for testing. Among those who agreed were then Dade County prosecutor, now Attorney General Janet Reno, then Miss America Kylee Barker Brandon, the Catholic archbishop, Broward County Sheriff Nick Navarro, and Jeb Bush, son of President Bush.²⁹⁴

As it turned out, ten of the eleven bills were tainted by significant traces of cocaine. With the exception of Nick Navarro,²⁹⁵ who was "innocent," all the others were in "possession," albeit a trace amount of cocaine. Had the test not been conducted, but a drug sniffing dog or Sentor been employed on the street after reasonable suspicion, police could have theoretically had probable cause to conduct a full search of all these prominent and innocent citizens.²⁹⁶

²⁹⁰See *Nation's Money Supply*, *supra* note 268 (discussing the transfer process of cocaine from one bill to another).

²⁹¹See *Price*, *supra* note 166, at D1 (noting a study conducted by Frederic Rieders, laboratory director at National Medical Services in Willgrove, Pa.).

²⁹²See *id.*

²⁹³See Margaret Landers, *Look Who Has Cocaine*, MIAMI HERALD, Feb. 19, 1985, at 1C.

²⁹⁴See *id.* A similar study was conducted by the *Orlando Sentinel Tribune*. In that study, local prominent officials in the Orlando, Florida vicinity were asked to provide cash from their wallets. These individuals included a police chief, circuit judge, state senator, a college president, and a newspaper editor. Most of the cash collected tested positive for cocaine. See *Brazil and Berry*, *supra* note 166, at A1.

²⁹⁵The sheriff deliberately washed the bill beforehand.

²⁹⁶In Justice Brennan's dissent in *United States v. Jacobsen*, the Justice worried that there could be serious implications if the Court kept going down the road that it had established in *United States v. Place*, where the Court found that drug-sniffing canines did not constitute a search. In dissent, Justice Brennan noted that:

[U]nder the Court's analysis in these cases, law enforcement officers could re-

C. BEYOND COCAINE TAINTED CURRENCY AND PROBABLE CAUSE

To this point, the discussion has argued that based upon strong evidence suggesting that a significant amount of United States currency is tainted with cocaine, a sensitive gas chromatographic device like *Sentor* should be deemed an unconstitutional surveillance technique. Assuming *arguendo* that the device could be made less sensitive and more particularized, strong reasons remain why the Supreme Court should find *Sentor* to constitute a "search" under the Fourth Amendment.

Although in *Dow Chemical Co. v. United States*,²⁹⁷ the Court found that the EPA's use of high altitude photographic surveillance did not constitute a search, the language of the case provides the strongest argument for the Court to deem the use of *Sentor* a "search" within the meaning of the Fourth Amendment. Indeed, *Dow* could be one Supreme Court case law which might be able to justify calling *Sentor* a true Fourth Amendment search.

In *Dow*, the Court made a distinction between sophisticated technology used by the state that is or is not "generally available to the public."²⁹⁸ The \$20,000 aerial camera used in that case was commonly used in map-making, and was in the final analysis, simply a camera, albeit more powerful than a conventional one. But, it does appear that there is a threshold at work in *Dow*: the level of technology employed by the government to conduct surveillance does matter, and that it may have limits.

One could argue that the Court's decision in *Dow* places too much emphasis on the level of technology being employed to enhance sensory perception by governmental officials. For example, *Dow* makes a distinction between photographs taken with high altitude precision cameras and those taken using satellites. Although both could theoretically take the same picture, where the picture is taken from appears to be of significance. Obviously, satellites are not

lease a trained cocaine-sensitive dog . . . a "canine cocaine connoisseur"—to roam the streets at random, alerting officers to people carrying cocaine. Or, if a device were developed that, when aimed at a person, would detect instantaneously whether the person is carrying cocaine, there would be no Fourth Amendment bar, under the Court's approach, to the police setting up such a device on a street corner and scanning all passerby In short, under the interpretation of the Fourth Amendment first suggested in *Place* and first applied in this case, these surveillance techniques would not constitute searches and therefore could be freely pursued whenever and wherever law enforcement officers desire.

United States v. Jacobsen, 466 U.S. 109, 138 (Brennan, J., dissenting).

²⁹⁷476 U.S. 227 (1986).

²⁹⁸*Id.* at 238.

available in most consumer stores.

In relation to the Sentor's use of gas chromatography, it could be argued that the "in general use" principle in *Dow* should become a standard for the Supreme Court to follow. For example, the Sentor device costs \$150,000.00.²⁹⁹ Even though the majority in *Dow* did not wish to heed the dissent's observation that "members of the public are unlikely to purchase \$22,000 cameras,"³⁰⁰ perhaps there may be an amount that is too much. Maybe Sentor's \$150,000 price tag is or surpasses that threshold amount.

As gas chromatography is a scientific laboratory technique, it is arguable that taking this technology, a previously lab oriented method, and making it a drug testing technique on the streets, is so new and cutting edge that it has not reached the level of even being capable of general usage by the public. This was precisely the argument the defendant made in *United States v. Romero*,³⁰¹ one of the few cases where Sentor was used by the federal government.³⁰²

The line of reasoning in this argument has already found support in at least one federal court. In *United States v. Ishmael*,³⁰³ a case that dealt with the use of FLIR to detect an indoor marijuana growing operation, the court held that:

[In *Dow*] the Supreme Court found . . . that the surveillance of private property using highly sophisticated surveillance equipment might be constitutionally proscribed absent a warrant. The Court finds that the thermal imaging equipment used by the government in this case *was exactly* the type of sophisticated technology that concerned the Supreme Court [in *Dow*]. . . The thermal imaging tapes made by officers trespassing on private land using hand held equipment offend the Fourth Amendment for the same reason.³⁰⁴

The *Ishmael* court was also not persuaded by the *Penny-Feeney* rationale that heat escaping from a building could be easily likened to abandoned gar-

²⁹⁹ See Ranson, *supra* note 10.

³⁰⁰ *Dow*, 476 U.S. at 251 n.13 (Powell, J., dissenting in part).

³⁰¹ 32 F.3d 641 (1st Cir. 1994).

³⁰² See *id.* The defendant claimed that, "although the testing technology has been used for years, the mobile, in-the-field testing instruments used . . . were relatively recent creations." *Id.* at 647.

³⁰³ 843 F. Supp. 205 (E.D. Tex. 1994).

³⁰⁴ *Id.* at 212 (emphasis added).

bage, finding that such logic could water down the Fourth Amendment to the point where little would still remain.³⁰⁵ Moreover, the court also refused the comparison of canine sniffs to the use of the FLIR. First, the court noted that the thermal imager is unable to distinguish between “contraband heat” and “legal heat,” so that the result of a FLIR search will result in more intrusion than a sniff.³⁰⁶ Second, the court stated that although a dog’s sense of smell is more acute than a humans, use of a dog cannot compare to a machine that can determine slight gradations in heat from 1500 feet away. In a similar vein, a canine should not rightly be compared to a device like Sentor, which is capable of locating traces of narcotics as small as one part per 100 trillion.

V. CONCLUSION

This article has stated that based upon past Supreme Court interpretation of the Fourth Amendment, there is a likelihood that the Court might apply precedent for other sense enhanced searches and find that the gas chromatographic Sentor does not constitute a Fourth Amendment search. Indeed, application of the Court’s holdings in *Ciraolo*, *Knotts*, *Penny-Feeney*, *Dow*, and *Place*, would likely pave the way for the Sentor device to be the next cutting edge means of fighting the war on drugs.

This article argues that the Court’s previous interpretation should be inapplicable to the Sentor device because of the device’s inability to isolate the narcotic-positive air sample’s origin. Thus, this article argues that usage of Sentor is inconsistent with the Fourth Amendment’s probable cause requirement because the machine is unable to determine whether or not the air sample tested is truly derived from the subject of investigation.

Additionally, because strong evidence exists suggesting that a significant amount of United States currency is tainted with cocaine, this article posits that there is a strong likelihood that Sentor might indicate that most suspects “sniffed” were carrying cocaine when in fact they are not. This unacceptable number of false-positive alerts by Sentor would make the general usage of the device an unreasonable search under the Fourth Amendment. The presumption is great that Sentor would “alert” to individuals in possession of cocaine tainted currency, thereby giving police the discretion to conduct numerous humiliating searches of law abiding citizens.

Assuming the device could be made less sensitive, being able to overcome the cocaine currency problem, this article argues in the alternative that Sentor should at least be found to constitute a “search” under the Fourth Amendment.

³⁰⁵*See id.* at 213.

³⁰⁶*Id.*

The Supreme Court must ensure that technology does not overtake constitutional guarantees. This discussion has advanced the notion that an air filtration device like Sentor is at, or passes the threshold of *Dow*'s general availability principle. The implicit *Dow* principle is significant in that as technology will continue to change and revolutionize the United States, *Dow* can act as a mechanical brake to prevent technological advances from overtaking the Fourth Amendment. This article urges the Supreme Court to apply the brake now.

It can only be said that in deciding the constitutionality of gas chromatography as a drug field testing investigatory technique, the Supreme Court will likely do what it has done in most of the aforementioned sense-enhanced search cases. That is, it will weigh competing interests. In the past, the Court has made the war on drugs loom as a more worthwhile objective than privacy considerations. It could continue to do so in the future. In the end, one can only hope that there are enough remnant particles of the Fourth Amendment left so as to be measurable by even the most sensitive of gas chromatographic devices.