

## Syllabus

DOW CHEMICAL CO. *v.* UNITED STATES, BY AND  
THROUGH ADMINISTRATOR, ENVIRONMENTAL  
PROTECTION AGENCYCERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR  
THE SIXTH CIRCUIT

No. 84-1259. Argued December 10, 1985—Decided May 19, 1986

Petitioner operates a 2,000-acre chemical plant consisting of numerous covered buildings, with outdoor manufacturing equipment and piping conduits located between the various buildings exposed to visual observation from the air. Petitioner maintains elaborate security around the perimeter of the complex, barring ground-level public views of the area. When petitioner denied a request by the Environmental Protection Agency (EPA) for an on-site inspection of the plant, EPA did not seek an administrative search warrant, but instead employed a commercial aerial photographer, using a standard precision aerial mapping camera, to take photographs of the facility from various altitudes, all of which were within lawful navigable airspace. Upon becoming aware of the aerial photography, petitioner brought suit in Federal District Court, alleging that EPA's action violated the Fourth Amendment and was beyond its statutory investigative authority. The District Court granted summary judgment for petitioner, but the Court of Appeals reversed, holding that EPA's aerial observation did not exceed its investigatory authority and that the aerial photography of petitioner's plant complex without a warrant was not a search prohibited by the Fourth Amendment.

*Held:*

1. The fact that aerial photography by petitioner's competitors might be barred by state trade secrets law is irrelevant to the questions presented in this case. Governments do not generally seek to appropriate trade secrets of the private sector, and the right to be free of appropriation of trade secrets is protected by law. Moreover, state tort law governing unfair competition does not define the limits of the Fourth Amendment. Pp. 231-233.

2. The use of aerial observation and photography is within EPA's statutory authority. When Congress invests an agency such as EPA with enforcement and investigatory authority, it is not necessary to identify explicitly every technique that may be used in the course of executing the statutory mission. Although § 114(a) of the Clean Air Act, which provides for EPA's right of entry to premises for inspection purposes,

does not authorize aerial observation, that section appears to expand, not restrict, EPA's general investigatory powers, and there is no suggestion in the statute that the powers conferred by § 114(a) are intended to be exclusive. EPA needs no explicit statutory provision to employ methods of observation commonly available to the public at large. Pp. 233-234.

3. EPA's taking, without a warrant, of aerial photographs of petitioner's plant complex from an aircraft lawfully in public navigable airspace was not a search prohibited by the Fourth Amendment. The open areas of an industrial plant complex such as petitioner's are not analogous to the "curtilage" of a dwelling, which is entitled to protection as a place where the occupants have a reasonable and legitimate expectation of privacy that society is prepared to accept. See *California v. Ciraolo*, ante, p. 207. The intimate activities associated with family privacy and the home and its curtilage simply do not reach the outdoor areas or spaces between structures and buildings of a manufacturing plant. For purposes of aerial surveillance, the open areas of an industrial complex are more comparable to an "open field" in which an individual may not legitimately demand privacy. *Oliver v. United States*, 466 U. S. 170. Here, EPA was not employing some unique sensory device not available to the public, but rather was employing a conventional, albeit precise, commercial camera commonly used in mapmaking. The photographs were not so revealing of intimate details as to raise constitutional concerns. The mere fact that human vision is enhanced somewhat, at least to the degree here, does not give rise to constitutional problems. Pp. 234-239.

749 F. 2d 307, affirmed.

BURGER, C. J., delivered the opinion of the Court, in which WHITE, REHNQUIST, STEVENS, and O'CONNOR, JJ., joined, and in Part III of which BRENNAN, MARSHALL, BLACKMUN, and POWELL, JJ., joined. POWELL, J., filed an opinion concurring in part and dissenting in part, in which BRENNAN, MARSHALL, and BLACKMUN, JJ., joined, *post*, p. 240.

*Jane M. Gootee* argued the cause for petitioner. With her on the briefs were *James H. Hanes* and *Bernd W. Sandt*.

*Alan I. Horowitz* argued the cause for the United States. With him on the brief were *Acting Solicitor General Wallace*, *Assistant Attorney General Habicht*, *Deputy Solicitor General Frey*, *Dirk D. Snel*, and *Anne S. Almy*.\*

\*Briefs of *amici curiae* urging reversal were filed for the Chamber of Commerce of the United States of America et al. by *Robin S. Conrad*

CHIEF JUSTICE BURGER delivered the opinion of the Court.

We granted certiorari to review the holding of the Court of Appeals (a) that the Environmental Protection Agency's aerial observation of petitioner's plant complex did not exceed EPA's statutory investigatory authority, and (b) that EPA's aerial photography of petitioner's 2,000-acre plant complex without a warrant was not a search under the Fourth Amendment.

## I

Petitioner Dow Chemical Co. operates a 2,000-acre facility manufacturing chemicals at Midland, Michigan. The facility consists of numerous covered buildings, with manufacturing equipment and piping conduits located between the various buildings exposed to visual observation from the air. At all times, Dow has maintained elaborate security around the perimeter of the complex barring ground-level public views of these areas. It also investigates any low-level flights by aircraft over the facility. Dow has not undertaken, however, to conceal all manufacturing equipment within the complex from aerial views. Dow maintains that the cost of covering its exposed equipment would be prohibitive.

In early 1978, enforcement officials of EPA, with Dow's consent, made an on-site inspection of two powerplants in this complex. A subsequent EPA request for a second inspection, however, was denied, and EPA did not thereafter seek an administrative search warrant. Instead, EPA employed a commercial aerial photographer, using a standard floor-mounted, precision aerial mapping camera, to take photographs of the facility from altitudes of 12,000, 3,000, and 1,200 feet. At all times the aircraft was lawfully within navigable airspace. See 49 U. S. C. App. § 1304; 14 CFR § 91.79 (1985).

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and *Constance E. Brooks*; and for the Michigan Manufacturers' Association et al. by *John M. Cannon*, *Susan W. Wanat*, and *Ann Plunkett Sheldon*.

EPA did not inform Dow of this aerial photography, but when Dow became aware of it, Dow brought suit in the District Court alleging that EPA's action violated the Fourth Amendment and was beyond EPA's statutory investigative authority. The District Court granted Dow's motion for summary judgment on the ground that EPA had no authority to take aerial photographs and that doing so was a search violating the Fourth Amendment. EPA was permanently enjoined from taking aerial photographs of Dow's premises and from disseminating, releasing, or copying the photographs already taken. 536 F. Supp. 1355 (ED Mich. 1982).

The District Court accepted the parties' concession that EPA's "quest for evidence" was a "search," *id.*, at 1358, and limited its analysis to whether the search was unreasonable under *Katz v. United States*, 389 U. S. 347 (1967). Proceeding on the assumption that a search in Fourth Amendment terms had been conducted, the court found that Dow manifested an expectation of privacy in its exposed plant areas because it intentionally surrounded them with buildings and other enclosures. 536 F. Supp., at 1364-1366.

The District Court held that this expectation of privacy was reasonable, as reflected in part by trade secret protections restricting Dow's commercial competitors from aerial photography of these exposed areas. *Id.*, at 1366-1369. The court emphasized that use of "the finest precision aerial camera available" permitted EPA to capture on film "a great deal more than the human eye could ever see." *Id.*, at 1367.

The Court of Appeals reversed. 749 F. 2d 307 (CA6 1984). It recognized that Dow indeed had a subjective expectation of privacy in certain areas from *ground*-level intrusions, but the court was not persuaded that Dow had a subjective expectation of being free from *aerial* surveillance since Dow had taken no precautions against such observation, in contrast to its elaborate ground-level precautions. *Id.*, at 313. The court rejected the argument that it was not feasible to shield any of the critical parts of the exposed plant areas from aerial surveys. *Id.*, at 312-313. The Court of Appeals,

however, did not explicitly reject the District Court's factual finding as to Dow's subjective expectations.

Accepting the District Court finding of Dow's privacy expectation, the Court of Appeals held that it was not a reasonable expectation "[w]hen the entity observed is a multi-building complex, and the area observed is the outside of these buildings and the spaces in between the buildings." *Id.*, at 313. Viewing Dow's facility to be more like the "open field" in *Oliver v. United States*, 466 U. S. 170 (1984), than a home or an office, it held that the common-law curtilage doctrine did not apply to a large industrial complex of closed buildings connected by pipes, conduits, and other exposed manufacturing equipment. 749 F. 2d, at 313-314. The Court of Appeals looked to "the peculiarly strong concepts of intimacy, personal autonomy and privacy associated with the home" as the basis for the curtilage protection. *Id.*, at 314. The court did not view the use of sophisticated photographic equipment by EPA as controlling.

The Court of Appeals then held that EPA clearly acted within its statutory powers even absent express authorization for aerial surveillance, concluding that the delegation of general investigative authority to EPA, similar to that of other law enforcement agencies, was sufficient to support the use of aerial photography. *Id.*, at 315.

## II

The photographs at issue in this case are essentially like those commonly used in mapmaking. Any person with an airplane and an aerial camera could readily duplicate them. In common with much else, the technology of photography has changed in this century. These developments have enhanced industrial processes, and indeed all areas of life; they have also enhanced law enforcement techniques. Whether they may be employed by competitors to penetrate trade secrets is not a question presented in this case. Governments do not generally seek to appropriate trade secrets of the pri-

vate sector, and the right to be free of appropriation of trade secrets is protected by law.

Dow nevertheless relies heavily on its claim that trade secret laws protect it from any aerial photography of this industrial complex by its competitors, and that this protection is relevant to our analysis of such photography under the Fourth Amendment. That such photography might be barred by state law with regard to competitors, however, is irrelevant to the questions presented here. State tort law governing unfair competition does not define the limits of the Fourth Amendment. Cf. *Oliver v. United States*, *supra* (trespass law does not necessarily define limits of Fourth Amendment). The Government is seeking these photographs in order to regulate, not to compete with, Dow. If the Government were to use the photographs to compete with Dow, Dow might have a Fifth Amendment "taking" claim. Indeed, Dow alleged such a claim in its complaint, but the District Court dismissed it without prejudice. But even trade secret laws would not bar all forms of photography of this industrial complex; rather, only photography with an intent to use any trade secrets revealed by the photographs may be proscribed. Hence, there is no prohibition of photographs taken by a casual passenger on an airliner, or those taken by a company producing maps for its mapmaking purposes.

Dow claims first that EPA has no authority to use aerial photography to implement its statutory authority for "site inspection" under § 114(a) of the Clean Air Act, 42 U. S. C. § 7414(a);<sup>1</sup> second, Dow claims EPA's use of aerial photogra-

<sup>1</sup>Section 114(a)(2) provides:

"(2) the Administrator or his authorized representative, upon presentation of his credentials—

"(A) shall have a right of entry to, upon, or through any premises of such person or in which any records required to be maintained under paragraph (1) of this section are located, and

"(B) may at reasonable times have access to and copy any records, inspect any monitoring equipment or method required under paragraph (1),

phy was a "search" of an area that, notwithstanding the large size of the plant, was within an "industrial curtilage" rather than an "open field," and that it had a reasonable expectation of privacy from such photography protected by the Fourth Amendment.

### III

Congress has vested in EPA certain investigatory and enforcement authority, without spelling out precisely how this authority was to be exercised in all the myriad circumstances that might arise in monitoring matters relating to clean air and water standards. When Congress invests an agency with enforcement and investigatory authority, it is not necessary to identify explicitly each and every technique that may be used in the course of executing the statutory mission. Aerial observation authority, for example, is not usually expressly extended to police for traffic control, but it could hardly be thought necessary for a legislative body to tell police that aerial observation could be employed for traffic control of a metropolitan area, or to expressly authorize police to send messages to ground highway patrols that a particular over-the-road truck was traveling in excess of 55 miles per hour. Common sense and ordinary human experience teach that traffic violators are apprehended by observation.

Regulatory or enforcement authority generally carries with it all the modes of inquiry and investigation traditionally employed or useful to execute the authority granted. Environmental standards such as clean air and clean water cannot be enforced only in libraries and laboratories, helpful as those institutions may be.

Under § 114(a)(2), the Clean Air Act provides that "upon presentation of . . . credentials," EPA has a "right of entry to, upon, or through any premises." 42 U. S. C. § 7414(a)(2)(A). Dow argues this limited grant of authority to enter does not

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and sample any emissions which such person is required to sample under paragraph (1)."

authorize any aerial observation. In particular, Dow argues that unannounced aerial observation deprives Dow of its right to be informed that an inspection will be made or has occurred, and its right to claim confidentiality of the information contained in the places to be photographed, as provided in §§ 114(a) and (c), 42 U. S. C. §§ 7414(a) and (c). It is not claimed that EPA has disclosed any of the photographs outside the agency.

Section 114(a), however, appears to expand, not restrict, EPA's general powers to investigate. Nor is there any suggestion in the statute that the powers conferred by this section are intended to be exclusive. There is no claim that EPA is prohibited from taking photographs from a ground-level location accessible to the general public. EPA, as a regulatory and enforcement agency, needs no explicit statutory provision to employ methods of observation commonly available to the public at large: we hold that the use of aerial observation and photography is within EPA's statutory authority.<sup>2</sup>

#### IV

We turn now to Dow's contention that taking aerial photographs constituted a search without a warrant, thereby violating Dow's rights under the Fourth Amendment. In making this contention, however, Dow concedes that a simple flyover with naked-eye observation, or the taking of a photograph from a nearby hillside overlooking such a facility, would give rise to no Fourth Amendment problem.

In *California v. Ciraolo*, ante, p. 207, decided today, we hold that naked-eye aerial observation from an altitude of

<sup>2</sup> Assuming the Clean Air Act's explicit provisions for protecting trade secrets obtained by EPA as the result of its investigative efforts is somehow deemed inapplicable to the information obtained here, see 42 U. S. C. § 7414(c), Dow's fear that EPA might disclose trade secrets revealed in these photographs appears adequately addressed by federal law prohibiting such disclosure generally under the Trade Secrets Act, 18 U. S. C. § 1905, and the Freedom of Information Act, 5 U. S. C. § 552(b)(4). See *Chrysler Corp. v. Brown*, 441 U. S. 281 (1979).

1,000 feet of a backyard within the curtilage of a home does not constitute a search under the Fourth Amendment.

In the instant case, two additional Fourth Amendment claims are presented: whether the common-law "curtilage" doctrine encompasses a large industrial complex such as Dow's, and whether photography employing an aerial mapping camera is permissible in this context. Dow argues that an industrial plant, even one occupying 2,000 acres, does not fall within the "open fields" doctrine of *Oliver v. United States* but rather is an "industrial curtilage" having constitutional protection equivalent to that of the curtilage of a private home. Dow further contends that any aerial photography of this "industrial curtilage" intrudes upon its reasonable expectations of privacy. Plainly a business establishment or an industrial or commercial facility enjoys certain protections under the Fourth Amendment. See *Marshall v. Barlow's, Inc.*, 436 U. S. 307 (1978); *See v. City of Seattle*, 387 U. S. 541 (1967).

Two lines of cases are relevant to the inquiry: the curtilage doctrine and the "open fields" doctrine. The curtilage area immediately surrounding a private house has long been given protection as a place where the occupants have a reasonable and legitimate expectation of privacy that society is prepared to accept. See *Ciraolo, supra*.

As the curtilage doctrine evolved to protect much the same kind of privacy as that covering the interior of a structure, the contrasting "open fields" doctrine evolved as well. From *Hester v. United States*, 265 U. S. 57 (1924), to *Oliver v. United States*, 466 U. S. 170 (1984), the Court has drawn a line as to what expectations are reasonable in the open areas beyond the curtilage of a dwelling: "open fields do not provide the setting for those intimate activities that the [Fourth] Amendment is intended to shelter from governmental interference or surveillance." *Oliver*, 466 U. S., at 179. In *Oliver*, we held that "an individual may not legitimately demand privacy for activities out of doors in fields, except in the area

immediately surrounding the home." *Id.*, at 178. To fall within the "open fields" doctrine the area "need be neither 'open' nor a 'field' as those terms are used in common speech." *Id.*, at 180, n. 11.

Dow plainly has a reasonable, legitimate, and objective expectation of privacy within the interior of its covered buildings, and it is equally clear that expectation is one society is prepared to observe. *E. g.*, *See v. City of Seattle, supra*. Moreover, it could hardly be expected that Dow would erect a huge cover over a 2,000-acre tract. In contending that its entire enclosed plant complex is an "industrial curtilage," Dow argues that its exposed manufacturing facilities are analogous to the curtilage surrounding a home because it has taken every possible step to bar access from ground level.

The Court of Appeals held that whatever the limits of an "industrial curtilage" barring *ground*-level intrusions into Dow's private areas, the open areas exposed here were more analogous to "open fields" than to a curtilage for purposes of aerial observation. 749 F. 2d, at 312-314. In *Oliver*, the Court described the curtilage of a dwelling as "the area to which extends the intimate activity associated with the 'sanctity of a man's home and the privacies of life.'" 466 U. S., at 180 (quoting *Boyd v. United States*, 116 U. S. 616, 630 (1886)). *See California v. Ciraolo, supra*. The intimate activities associated with family privacy and the home and its curtilage simply do not reach the outdoor areas or spaces between structures and buildings of a manufacturing plant.

Admittedly, Dow's enclosed plant complex, like the area in *Oliver*, does not fall precisely within the "open fields" doctrine. The area at issue here can perhaps be seen as falling somewhere between "open fields" and curtilage, but lacking some of the critical characteristics of both.<sup>3</sup> Dow's inner

<sup>3</sup>In *Oliver*, we observed that "for most homes, the boundaries of the curtilage will be clearly marked; and the conception defining the curtilage—as the area around the home to which the activity of home life extends—is a familiar one easily understood from our daily experience." 466

manufacturing areas are elaborately secured to ensure they are not open or exposed to the public from the ground. Any actual physical entry by EPA into any enclosed area would raise significantly different questions, because "[t]he businessman, like the occupant of a residence, has a constitutional right to go about his business free from unreasonable official entries upon his private commercial property." See *v. City of Seattle, supra*, at 543. The narrow issue raised by Dow's claim of search and seizure, however, concerns aerial observation of a 2,000-acre outdoor manufacturing facility *without* physical entry.<sup>4</sup>

We pointed out in *Donovan v. Dewey*, 452 U. S. 594, 598–599 (1981), that the Government has "greater latitude to conduct warrantless inspections of commercial property" because "the expectation of privacy that the owner of commercial property enjoys in such property differs significantly

U. S., at 182, n. 12. While we did not attempt to definitively mark the boundaries of what constitutes an open field, we noted that "[i]t is clear . . . that the term 'open fields' may include any unoccupied or undeveloped area outside of the curtilage." *Id.*, at 180, n. 11. As *Oliver* recognized, the curtilage surrounding a home is generally a well-defined, limited area. In stark contrast, the areas for which Dow claims enhanced protection cover the equivalent of a half dozen family farms.

<sup>4</sup>We find it important that this is *not* an area immediately adjacent to a private home, where privacy expectations are most heightened. Nor is this an area where Dow has made any effort to protect against aerial surveillance. Contrary to the partial dissent's understanding, *post*, at 241–242, the Court of Appeals emphasized:

"Dow did not take *any* precautions against aerial intrusions, even though the plant was near an airport and within the pattern of planes landing and taking off. If elaborate and expensive measures for ground security show that Dow has an actual expectation of privacy in ground security, as Dow argues, then taking *no* measure for aerial security should say something about its actual privacy expectation in being free from aerial observation." 749 F. 2d 307, 312 (CA6 1984) (emphasis added).

Simply keeping track of the identification numbers of any planes flying overhead, with a later followup to see if photographs were taken, does not constitute a "procedur[e] designed to protect the facility from aerial photography." *Post*, at 241.

from the sanctity accorded an individual's home." We emphasized that unlike a homeowner's interest in his dwelling, "[t]he interest of the owner of commercial property is not one in being free from any inspections." *Id.*, at 599. And with regard to regulatory inspections, we have held that "[w]hat is observable by the public is observable without a warrant, by the Government inspector as well." *Marshall v. Barlow's, Inc.*, 436 U. S., at 315 (footnote omitted).

*Oliver* recognized that in the open field context, "the public and police lawfully may survey lands from the air." 466 U. S., at 179 (footnote omitted). Here, 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 mapmaking. The Government asserts it has not yet enlarged the photographs to any significant degree, but Dow points out that simple magnification permits identification of objects such as wires as small as 1/2-inch in diameter.

It may well be, as the Government concedes, that 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. But the photographs here are not so revealing of intimate details as to raise constitutional concerns. Although they undoubtedly give EPA more detailed information than naked-eye views, they remain limited to an outline of the facility's buildings and equipment. The mere fact that human vision is enhanced somewhat, at least to the degree here, does not give rise to constitutional problems.<sup>5</sup>

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<sup>5</sup>The partial dissent emphasizes Dow's claim that under magnification power lines as small as 1/2-inch in diameter can be observed. *Post*, at 243. But a glance at the photographs in issue shows that those power lines are observable only because of their stark contrast with the snow-white background. No objects as small as 1/2-inch in diameter such as a class ring, for example, are recognizable, nor are there any identifiable human faces or

An electronic device to penetrate walls or windows so as to hear and record confidential discussions of chemical formulae or other trade secrets would raise very different and far more serious questions; other protections such as trade secret laws are available to protect commercial activities from private surveillance by competitors.<sup>6</sup>

We conclude that the open areas of an industrial plant complex with numerous plant structures spread over an area of 2,000 acres are not analogous to the "curtilage" of a dwelling for purposes of aerial surveillance;<sup>7</sup> such an industrial complex is more comparable to an open field and as such it is open to the view and observation of persons in aircraft lawfully in the public airspace immediately above or sufficiently near the area for the reach of cameras.

We hold that the taking of aerial photographs of an industrial plant complex from navigable airspace is not a search prohibited by the Fourth Amendment.

*Affirmed.*

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secret documents captured in such a fashion as to implicate more serious privacy concerns. Fourth Amendment cases must be decided on the facts of each case, not by extravagant generalizations. "[W]e have never held that potential, as opposed to actual, invasions of privacy constitute searches for purposes of the Fourth Amendment." *United States v. Karo*, 468 U. S. 705, 712 (1984). On these facts, nothing in these photographs suggests that any reasonable expectations of privacy have been infringed.

<sup>6</sup>The partial dissent relies heavily on Dow's claim that aerial photography of its facility is proscribed by trade secret laws. *Post*, at 248-249, and n. 11. While such laws may protect against use of photography by competitors in the same trade to advance their commercial interests, in no manner do "those laws constitute society's express determination" that *all* photography of Dow's facility violates reasonable expectations of privacy. *Post*, at 249. No trade secret law cited to us by Dow proscribes the use of aerial photography of Dow's facilities for law enforcement purposes, let alone photography for private purposes unrelated to competition such as map-making or simple amateur snapshots. See *supra*, at 232.

<sup>7</sup>Our holding here does not reach the issues raised by the Court of Appeals for the Seventh Circuit's holding regarding a "business curtilage" in *United States v. Swart*, 679 F. 2d 698 (CA7 1982); that case involved actual physical entry onto the business premises.

JUSTICE POWELL, with whom JUSTICE BRENNAN, JUSTICE MARSHALL, and JUSTICE BLACKMUN join, concurring in part, and dissenting in part.

The Fourth Amendment protects private citizens from arbitrary surveillance by their Government. For nearly 20 years, this Court has adhered to a standard that ensured that Fourth Amendment rights would retain their vitality as technology expanded the Government's capacity to commit unsuspected intrusions into private areas and activities. Today, in the context of administrative aerial photography of commercial premises, the Court retreats from that standard. It holds that the photography was not a Fourth Amendment "search" because it was not accompanied by a physical trespass and because the equipment used was not the most highly sophisticated form of technology available to the Government. Under this holding, the existence of an asserted privacy interest apparently will be decided solely by reference to the manner of surveillance used to intrude on that interest. Such an inquiry will not protect Fourth Amendment rights, but rather will permit their gradual decay as technology advances.

## I

Since the 1890's, petitioner Dow Chemical Company (Dow) has been manufacturing chemicals at a facility in Midland, Michigan. Its complex covers 2,000 acres and contains a number of chemical process plants. Many of these are "open-air" plants, with reactor equipment, loading and storage facilities, transfer lines, and motors located in the open areas between buildings. Dow claims that the technology used in these plants constitutes confidential business information, and that the design and configuration of the equipment located there reveal details of Dow's secret manufacturing processes.<sup>1</sup>

<sup>1</sup>The record establishes that Dow used the open-air design primarily for reasons of safety. Dow determined that, if an accident were to occur and hazardous chemicals were inadvertently released, the concentration of toxic

Short of erecting a roof over the Midland complex, Dow has, as the Court states, undertaken "elaborate" precautions to secure the facility from unwelcome intrusions. *Ante*, at 229. In fact, Dow appears to have done everything commercially feasible to protect the confidential business information and property located within the borders of the facility. Security measures include an 8-foot-high chain link fence completely surrounding the facility that is guarded by security personnel and monitored by closed-circuit television, alarm systems that are triggered by unauthorized entry into the facility, motion detectors that indicate movement of persons within restricted areas, a prohibition on use of camera equipment by anyone other than authorized Dow personnel, and a strict policy under which no photographs of the facility may be taken or released without prior management review and approval.<sup>2</sup> In addition to these precautions, the open-air plants were placed within the internal portion of the 2,000-acre complex to conceal them from the view of members of the public outside the perimeter fence.

Dow's security program also includes procedures designed to protect the facility from aerial photography. Dow has instructed its employees that it is "concerned when other than commercial passenger flights pass over the plant property." App. 14. When "suspicious" overflights occur, such as where a plane makes several passes over the facility, employees try to obtain the plane's identification number and de-

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and explosive fumes within enclosed plants would constitute an intolerable risk to employee health and safety. Moreover, as the Court correctly observes, Dow found that the cost of enclosing the facility would be prohibitive. *Ante*, at 229, 236. The record reflects that the cost of roofing just one of the open-air plants would have been approximately \$15 million in 1978. The record further shows that enclosing the plants would greatly increase the cost of routine maintenance. App. 74-75.

<sup>2</sup>On these and other security measures protecting the Midland facility, the District Court found that Dow has "spent at least 3.25 million dollars in each of the last ten years" preceding this litigation. 536 F. Supp. 1355, 1365 (ED Mich 1982).

scription. Working with personnel from the State Police and local airports, Dow employees then locate the pilot to determine if he has photographed the facility. If Dow learns that he has done so, Dow takes steps to prevent dissemination of photographs that show details of its proprietary technology.<sup>3</sup>

The controversy underlying this litigation arose out of the efforts of the Environmental Protection Agency (EPA) to check emissions from the power houses located within Dow's Midland complex for violations of federal air quality standards. After making one ground-level inspection with Dow's consent, and obtaining schematic drawings of the power houses from Dow, EPA requested Dow's permission to conduct a second inspection during which EPA proposed to photograph the facility. Dow objected to EPA's decision to take photographs and denied the request. EPA then informed Dow that it was considering obtaining a search warrant to gain entry to the plant. Inexplicably, EPA did not follow that procedure, but instead hired a private firm to take aerial photographs of the facility.

Using a sophisticated aerial mapping camera,<sup>4</sup> this firm took approximately 75 color photographs of various parts of

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<sup>3</sup>When Dow discovers that aerial photographs have been taken, it requests the photographer to turn over the film. Dow then develops the film and reviews the photographs. If the photographs depict private business information, Dow retains them and the negatives. In the event that the photographer refuses to cooperate, Dow commences litigation to protect its trade secrets.

<sup>4</sup>The District Court believed it was "important to an understanding of this case to provide a description of the highly effective equipment used" in photographing Dow's facility. *Id.*, at 1357, n. 2. "The aircraft used was a twin engine Beechcraft," which is "able to 'provide photographic stability, fast mobility and flight endurance required for precision photography.'" *Ibid.* (citation omitted). The camera used "cost in excess of \$22,000.00 and is described by the company as the 'finest precision aerial camera available.' . . . The camera was mounted to the floor inside the aircraft and was capable of taking several photographs in precise and rapid succession." *Ibid.* (citation omitted). This technique facilitates stereoscopic examination, a type of examination that permits depth perception.

the plant. The District Court found that "some of the photographs taken from directly above the plant at 1,200 feet are capable of enlargement to a scale of 1 inch equals 20 feet or greater, without significant loss of detail or resolution. When enlarged in this manner, and viewed under magnification, it is possible to discern equipment, pipes, and power lines as small as  $\frac{1}{2}$  inch in diameter." 536 F. Supp. 1355, 1357 (ED Mich. 1982) (emphasis in original). Observation of these minute details is, as the District Court found, "a near physical impossibility" from anywhere "but *directly above*" the complex. *Ibid.* (emphasis in original). Because of the complicated details captured in the photographs, the District Court concluded, "the camera saw a great deal more than the human eye could ever see," even if the observer was located directly above the facility.<sup>5</sup> *Id.*, at 1367.

Several weeks later, Dow learned about the EPA-authorized overflight from an independent source. Dow filed this lawsuit, alleging that the aerial photography was an unreasonable search under the Fourth Amendment and constituted an inspection technique outside the scope of EPA's authority under the Clean Air Act, 42 U. S. C. §§ 7413, 7414.<sup>6</sup> The District Court upheld Dow's position on both issues and entered a permanent injunction restraining EPA from conducting future aerial surveillance and photography of the Midland facility. The Court of Appeals for the Sixth Circuit reversed. 749 F. 2d 307 (1984). It concluded that, while Dow had a reasonable expectation of privacy with respect to

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<sup>5</sup> As the District Court explained, when a person is "flying at 1,200 or 5,000 feet, [his] eye can discern only the basic sizes, shapes, outlines, and colors of the objects below." *Id.*, at 1367. The aerial camera used in this case, on the other hand, "successfully captured vivid images of Dow's plant which EPA could later analyze under enlarged and magnified conditions." *Ibid.*

<sup>6</sup> Dow also claimed that the aerial photography constituted a "taking" of its property without due process of law in violation of the Fifth Amendment. The District Court dismissed that claim without prejudice, and it is not before us.

ground-level intrusion into the enclosed buildings within its facility, it did not have such an expectation with respect to aerial observation and photography.<sup>7</sup> The court also held that EPA's use of aerial photography did not exceed its authority under § 114 of the Clean Air Act, 42 U. S. C. § 7414. We granted certiorari to review both of these holdings. 472 U. S. 1007 (1985).

The Court rejects Dow's constitutional claim on the ground that "the taking of aerial photographs of an industrial plant complex from navigable airspace is not a search prohibited by the Fourth Amendment." *Ante*, at 239.<sup>8</sup> The Court does not explicitly reject application of the reasonable expectation of privacy standard of *Katz v. United States*, 389 U. S. 347 (1967), in this context; nor does it explain how its result squares with *Katz* and its progeny. Instead, the Court relies on questionable assertions concerning the manner of the surveillance, and on its conclusion that the Midland facility more closely resembles an "open field" than it does the "curtilage" of a private home. The Court's decision marks a drastic reduction in the Fourth Amendment protections previously afforded to private commercial premises under our decisions. Along with *California v. Ciraolo*, *ante*, p. 207, also decided today, the decision may signal a significant retreat from the rationale of prior Fourth Amendment decisions.

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<sup>7</sup>The Court of Appeals' holding rested in part on its erroneous observation that Dow had taken no steps to protect its privacy from aerial intrusions. See 749 F. 2d, at 312-313. Moreover, the court apparently assumed that Dow would have to build some kind of barrier against aerial observation in order to have an actual expectation of privacy from aerial surveillance. *Ibid.* The court did not explain the basis for this assumption or discuss why it disagreed with the District Court's conclusion that commercial overflights posed virtually no risk to Dow's privacy interests.

<sup>8</sup>I agree with the Court's determination that the use of aerial photography as an inspection technique, absent Fourth Amendment constraints, does not exceed the scope of EPA's authority under the Clean Air Act, 42 U. S. C. § 7414(a), and to this extent I join Part III of the Court's opinion.

## II

Fourth Amendment protection of privacy interests in business premises "is . . . based upon societal expectations that have deep roots in the history of the Amendment." *Oliver v. United States*, 466 U. S. 170, 178, n. 8 (1984). In *Marshall v. Barlow's, Inc.*, 436 U. S. 307 (1978), we observed that the "particular offensiveness" of the general warrant and writ of assistance, so despised by the Framers of the Constitution, "was acutely felt by the merchants and businessmen whose premises and products were inspected" under their authority. *Id.*, at 311. Against that history, "it is untenable that the ban on warrantless searches was not intended to shield places of business as well as of residence." *Id.*, at 312. Our precedents therefore leave no doubt that proprietors of commercial premises, including corporations, have the right to conduct their business free from unreasonable official intrusion. See *G. M. Leasing Corp. v. United States*, 429 U. S. 338, 353 (1977); See *v. City of Seattle*, 387 U. S. 541, 543 (1967).

In the context of administrative inspections of business premises, the Court has recognized an exception to the Fourth Amendment rule that warrantless searches of property not accessible to members of the public are presumptively unreasonable. Since the interest of the owner of commercial property is "in being free from *unreasonable* intrusions onto his property by agents of the government," not in being free from any inspections whatsoever, the Court has held that "the assurance of regularity provided by a warrant may be unnecessary under certain inspection schemes." *Donovan v. Dewey*, 452 U. S. 594, 599 (1981) (emphasis in original). Thus, where Congress has made a reasonable determination that a system of warrantless inspections is necessary to enforce its regulatory purpose, and where "the federal regulatory presence is sufficiently comprehensive and defined that the owner of commercial property cannot help but be aware that his property will be subject to periodic in-

spections," warrantless inspections may be permitted. *Id.*, at 600. This exception does not apply here. The Government does not contend, nor does the Court hold, that the Clean Air Act authorizes a warrantless inspection program that adequately protects the privacy interests of those whose premises are subject to inspection.

Instead, the Court characterizes our decisions in this area simply as giving the Government "greater latitude to conduct warrantless inspections of commercial property" because privacy interests in such property differ significantly from privacy interests in the home. *Ante*, at 237 (citation omitted). This reasoning misunderstands the relevant precedents. The exception we have recognized for warrantless inspections, limited to pervasively regulated businesses, see *Donovan v. Dewey*, *supra*; *United States v. Biswell*, 406 U. S. 311 (1972); *Colonnade Catering Corp. v. United States*, 397 U. S. 72 (1970), is not founded solely on the differences between the premises occupied by such businesses and homes, or on a conclusion that administrative inspections do not intrude on protected privacy interests and therefore do not implicate Fourth Amendment concerns. Rather, the exception is based on a determination that the reasonable expectation of privacy that the owner of a business does enjoy may be adequately protected by the regulatory scheme itself. *Donovan v. Dewey*, *supra*, at 599. We have never held that warrantless intrusions on commercial property generally are acceptable under the Fourth Amendment. On the contrary, absent a sufficiently defined and regular program of warrantless inspections, the Fourth Amendment's warrant requirement is fully applicable in the commercial context. *Marshall v. Barlow's, Inc.*, *supra*, at 312-315, 324; *G. M. Leasing Corp. v. United States*, *supra*, at 358; *See v. City of Seattle*, *supra*, at 543-546.

### III

Since our decision in *Katz v. United States*, the question whether particular governmental conduct constitutes a

Fourth Amendment "search" has turned on whether that conduct intruded on a constitutionally protected expectation of privacy. *Smith v. Maryland*, 442 U. S. 735 (1979); *United States v. United States District Court*, 407 U. S. 297 (1972). In the context of governmental inspection of commercial property, the Court has relied on the standard of *Katz* to determine whether an inspection violated the Fourth Amendment rights of the owner of the property. See *Marshall v. Barlow's, Inc.*, *supra*, at 313, 315. Today, while purporting to consider the Fourth Amendment question raised here under the rubric of *Katz*, the Court's analysis of the issue ignores the heart of the *Katz* standard.

## A

The Court correctly observes that Dow has an expectation of privacy in the buildings located on the Midland property and that society is prepared to recognize that expectation as reasonable. *Ante*, at 236. Similarly, in view of the numerous security measures protecting the entire Dow complex from intrusion on the ground, the Court properly concludes that Dow has a reasonable expectation in being free from such intrusion. *Ante*, at 236-237. Turning to the issue presented in this case, however, the Court erroneously states that the Fourth Amendment protects Dow only from "actual physical entry" by the Government "into any enclosed area." *Ibid.*

This statement simply repudiates *Katz*. The reasonable expectation of privacy standard was designed to ensure that the Fourth Amendment continues to protect privacy in an era when official surveillance can be accomplished without any physical penetration of or proximity to the area under inspection. Writing for the Court in *Katz*, Justice Stewart explained that Fourth Amendment protections would mean little in our modern world if the reach of the Amendment "turn[ed] upon the presence or absence of a physical intrusion into any given enclosure." 389 U. S., at 353. Thus, the Court's observation that the aerial photography was not accompanied by a physical trespass is irrelevant to the analysis

of the Fourth Amendment issue raised here, just as it was irrelevant in *Katz*. Since physical trespass no longer functions as a reliable proxy for intrusion on privacy, it is necessary to determine if the surveillance, whatever its form, intruded on a reasonable expectation that a certain activity or area would remain private.

## B

An expectation of privacy is reasonable for Fourth Amendment purposes if it is rooted in a "source outside of the Fourth Amendment, either by reference to concepts of real or personal property law or to understandings that are recognized and permitted by society."<sup>9</sup> *Rakas v. Illinois*, 439 U. S. 128, 143-144, n. 12 (1978). Dow argues that, by enacting trade secret laws, society has recognized that it has a legitimate interest in preserving the privacy of the relevant portions of its open-air plants. As long as Dow takes reasonable steps to protect its secrets, the law should enforce its right against theft or disclosure of those secrets.<sup>10</sup>

As discussed above, our cases holding that Fourth Amendment protections extend to business property have expressly relied on our society's historical understanding that owners

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<sup>9</sup> Our decisions often use the words "reasonable" and "legitimate" interchangeably to describe a privacy interest entitled to Fourth Amendment protection. See *California v. Ciraolo*, *ante*, at 219-220, n. 4 (POWELL, J., dissenting).

<sup>10</sup> As the District Court observed: "Society has spoken in this area through Congress, the State Legislatures, and the courts. Federal law, under the Trade Secrets Act, 18 U. S. C. § 1905, makes it a crime for government employees to disclose trade secret information. The Clean Air Act itself, in Section 114(c), 42 U. S. C. § 7414(c), addresses this concern for [proprietary] information. Moreover, EPA has adopted regulations providing for protection of trade secrets. 40 CFR 2.201-2.309. Michigan law, in addition to recognizing a tort action, also makes it a crime to appropriate trade secrets, M. C. L. A. § 752.772, as well as to invade one's privacy by means of surveillance. M. C. L. A. §§ 750.539a-539b. These legislative and judicial pronouncements are reflective of a societal acceptance of Dow's privacy expectation as reasonable." 536 F. Supp., at 1367.

of such property have a legitimate interest in being free from unreasonable governmental inspection. *Marshall v. Barlow's, Inc.*, 436 U. S., at 311-313; see *Oliver v. United States*, 466 U. S., at 178, n. 8. Moreover, despite the Court's misconception of the nature of Dow's argument concerning the laws protecting the trade secrets within its open-air plants,<sup>11</sup> Dow plainly is correct to argue that those laws constitute society's express determination that commercial entities have a legitimate interest in the privacy of certain kinds of property. Dow has taken every feasible step to protect information claimed to constitute trade secrets from the public and particularly from its competitors. Accordingly, Dow has a reasonable expectation of privacy in its commercial facility in the sense required by the Fourth Amendment. EPA's conduct in this case intruded on that expectation because the aerial photography captured information that Dow had taken reasonable steps to preserve as private.

## C

In this case, the Court does not claim that Dow's expectation of privacy is unreasonable because members of the public fly in airplanes. Whatever the merits of this position in *California v. Ciraolo*, *ante*, p. 207, it is inapplicable here, for it is not the case that "[a]ny member of the public flying in this airspace who cared to glance down" could have obtained the information captured by the aerial photography of Dow's facility. *California v. Ciraolo*, *ante*, at 213. As the District Court expressly found, the camera used to photograph the facility "saw a great deal more than the human eye could

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<sup>11</sup> Contrary to the Court's assertion, Dow does not claim that Fourth Amendment protection of its facility is coextensive with the scope of trade secret statutes. *Ante*, at 232. Rather, Dow argues that the existence of those statutes provides support for its claim that society recognizes commercial privacy interests as reasonable.

ever see."<sup>12</sup> 536 F. Supp., at 1367. See *supra*, at 242-243, and n. 5. Thus, the possibility of casual observation by passengers on commercial or private aircraft provides no support for the Court's rejection of Dow's privacy interests.

The Court nevertheless asserts that Dow has no constitutionally protected privacy interests in its open-air facility because the facility more closely resembles an "open field" than a "curtilage." Of course, the Dow facility resembles neither. The purpose of the curtilage doctrine is to identify the limited outdoor area closely associated with a home. See *Oliver v. United States, supra*, at 180. The doctrine is irrelevant here since Dow makes no argument that its privacy interests are equivalent to those in the home. Moreover, the curtilage doctrine has never been held to constitute a limit on Fourth Amendment protection. Yet, the Court applies the doctrine, which affords heightened protection to homeowners, in a manner that eviscerates the protection traditionally given to the owner of commercial property. The Court offers no convincing explanation for this application.

Nor does the open field doctrine have a role to play in this case. Open fields, as we held in *Oliver*, are places in which people do not enjoy reasonable expectations of privacy and therefore are open to warrantless inspections from ground

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<sup>12</sup>The Court disregards the fact that photographs taken by the sophisticated camera used in this case can be significantly enlarged without loss of acuity. As explained in n. 4, *supra*, the technique used in taking these pictures facilitates stereoscopic examination, which provides the viewer of the photographs with depth perception. Moreover, if the photographs were taken on transparent slides, they could be projected on a large screen. These possibilities illustrate the intrusive nature of aerial surveillance ignored by the Court today. The only Fourth Amendment limitation on such surveillance under today's decision apparently is based on the *means* of surveillance. The Court holds that Dow had no reasonable expectation of privacy from surveillance accomplished by means of a \$22,000 mapping camera, but that it does have a reasonable expectation of privacy from satellite surveillance and photography. This type of distinction is heretofore wholly unknown in Fourth Amendment jurisprudence.

and air alike. *Oliver v. United States, supra*, at 180–181. Here, the Court concedes that Dow was constitutionally protected against warrantless intrusion by the Government on the ground. The complex bears no resemblance to an open field either in fact or within the meaning of our cases.

The other basis for the Court's judgment—assorted observations concerning the technology used to photograph Dow's plant—is even less convincing. The Court notes that EPA did not use “some unique sensory device that, for example, could penetrate the walls of buildings and record conversations.” *Ante*, at 238. Nor did EPA use “satellite technology” or another type of “equipment not generally available to the public.” *Ibid*. Instead, as the Court states, the surveillance was accomplished by using “a conventional, albeit precise, commercial camera commonly used in mapmaking.” *Ibid*. These observations shed no light on the antecedent question whether Dow had a reasonable expectation of privacy. *Katz* measures Fourth Amendment rights by reference to the privacy interests that a free society recognizes as reasonable, not by reference to the method of surveillance used in the particular case. If the Court's observations were to become the basis of a new Fourth Amendment standard that would replace the rule in *Katz*, privacy rights would be seriously at risk as technological advances become generally disseminated and available in our society.<sup>13</sup>

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<sup>13</sup> With all respect, the Court's purported distinction—for purposes of Fourth Amendment analysis—between degrees of sophistication in surveillance equipment simply cannot be supported in fact or by the reasoning of any prior Fourth Amendment decision of this Court. The camera used by the firm hired by EPA is described by the Court as a “conventional” camera commonly used in mapmaking. *Ante*, at 238. The Court suggests, if not holds, that its decision would have been different if EPA had used “satellite technology” or other equipment not “available to the public.” *Ibid*. But the camera used in this case was highly sophisticated in terms of its capability to reveal minute details of Dow's confidential technology and equipment. The District Court found that the photographs revealed details as “small as ½ inch in diameter.” See *supra*, at 243. Satel-

## IV

I would reverse the decision of the Court of Appeals. EPA's aerial photography penetrated into a private commercial enclave, an area in which society has recognized that privacy interests legitimately may be claimed. The photographs captured highly confidential information that Dow had taken reasonable and objective steps to preserve as private. Since the Clean Air Act does not establish a defined and regular program of warrantless inspections, see *Marshall v. Barlow's, Inc.*, 436 U. S. 307 (1978), EPA should have sought a warrant from a neutral judicial officer.<sup>14</sup> The Court's holding that the warrantless photography does not constitute an unreasonable search within the meaning of the Fourth Amendment is based on the absence of any physical trespass—a theory disapproved in a line of cases beginning with the decision in *Katz v. United States*. *E. g.*, *United States v. United States District Court*, 407 U. S. 297 (1972). These cases have provided a sensitive and reasonable means of preserving interests in privacy cherished by our society. The Court's decision today cannot be reconciled with our precedents or with the purpose of the Fourth Amendment.

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lite photography hardly could have been more informative about Dow's technology. Nor are "members of the public" likely to purchase \$22,000 cameras.

<sup>14</sup> Our cases have explained that an administrative agency need not demonstrate "[p]robable cause in the criminal law sense" to obtain a warrant to inspect property for compliance with a regulatory scheme. *Marshall v. Barlow's, Inc.*, 436 U. S., at 320. Rather, an administrative warrant may issue "not only on specific evidence of an existing violation but also on a showing that 'reasonable legislative or administrative standards for conducting an . . . inspection are satisfied with respect to a particular [establishment].'" *Ibid.* (footnote omitted; quoting *Camara v. Municipal Court*, 387 U. S. 523, 538 (1967)).