# Learning from *Leaders*: Using *Carpenter* to Prohibit Law Enforcement Use of Mass Aerial Surveillance

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ABSTRACT

*In 2020, the Baltimore Police Department ("BPD") resurrected its dragnet aerial surveillance initiative—the Aerial Investigation Research ("AIR") program. Using a plane outfitted with high-definition cameras, BPD was able to observe the daily movements of hundreds of thousands of Baltimore residents. Sophisticated technology such as the AIR program poses significant conflict with Fourth Amendment rights guaranteeing protection against unreasonable searches. Although the Supreme Court already ruled on the constitutionality of aerial surveillance in the 1980s, the advanced capabilities of new aerial surveillance render these decisions inapplicable in modern society. Instead, the framework presented by the Supreme Court's decision in* Carpenter v. United States *provides a more workable test for considering cases of mass aerial surveillance. This Note argues that* Carpenter*'s privacy-protective approach to new technologies provides a better lens for analyzing modern mass aerial surveillance. This Note uses the AIR program and the Fourth Circuit's decision in* Leaders of a Beautiful Struggle v. Baltimore Police Department *as an emblematic example of how* Carpenter *should be applied to future instances of mass aerial surveillance.*

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## INTRODUCTION

Imagine you attend a protest in your city. Police officers recently shot and killed a Black man in your area, and you and your fellow neighbors take to the streets to demand racial justice and accountability. In between speakers and chants in front of the local courthouse, you look up to see a plane circling the area. You initially think nothing of it, but later learn that while you were exercising your First Amendment rights, law enforcement secretly conducted surveillance using that plane. This plane circled around the protest, taking high-quality, detailed photographs of you and your neighbors. Due to its high-tech capabilities, police were not only able to observe you at the protest, but also the route you took to and from the protest. In fact, the plane was able to surveil over thirty square miles during a ten-hour period. These images were broadcast to law enforcement on the ground in real time, and the footage was stored in a database for future use—allowing law enforcement to observe your movements days or even weeks later.

Although this scenario may sound like *1984*-eqsue paranoia, it was a reality for Baltimore residents beginning in 2016.[1] Through a contract with the private company Persistent Surveillance Systems LLC, the Baltimore Police Department ("BPD") outfitted a plane with a wide-angle camera capable of capturing images that cover over thirty square miles of the city every second.[2] Named the Aerial Investigation Research ("AIR") program,

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1 Monte Reel, *Secret Cameras Record Baltimore's Every Move From Above,* BLOOMBERG (Aug. 23 2016), https://www.bloomberg.com/features/2016-baltimore-secret-surveillance/ [https://perma.cc/F4LF-JFUT].

2 Alex Emmons, *Lawsuit Aims to Stop Baltimore Police From Using War-Zone Surveillance System to Spy on Residents*, THE INTERCEPT (Apr. 9, 2020, 12:57 PM) https://theintercept.com/2020/04/09/baltimore-police-aerial-surveillance/ [https://perma.cc/LR5Z-PJ8C]. Persistent Surveillance Systems has deployed their surveillance technology to multiple other cities, including Ciudad Juarez, Mexico; Compton, California; and Dayton, Ohio. *See* Craig Timberg, *New Surveillance Technology Can Track*

Baltimore implemented the technology to help the BPD's "strained police force" investigate crimes throughout the city.[3] The slow-motion reconstruction abilities of the spy plane allowed the BPD to view ninety percent of the city's outdoor movement.[4] The AIR program was discontinued in October 2020 after the city declined to renew the contract with Persistent Surveillance Systems.[5] During its operation, BPD used the AIR program to assist with about 200 cases.[6] Before the program's official discontinuance, however, a civil rights group sought an injunction to stop the program.[7] The

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*Everyone in an Area for Several Hours at a Time*, WASHINGTON POST (Feb. 5, 2014) http://www.washingtonpost.com/business/technology/new-surveillance-technology-can-track-everyone-in-an-area-for-several-hours-at-a-time/2014/02/05/82f1556e-876f-11e3-a5bd-844629433ba3_story.html [https://perma.cc/5ZEF-T4N6]; In January 2021 the company has considered a contract with law enforcement in St. Louis, Missouri, which was put on hold after funding was withdrawn. *See* Emily Opilo, *Texas Philanthropists Say They're Backing Out of Financing Surveillance Plane Technology that Flew Over Baltimore*, BALT. SUN (Jan. 26, 2021, 5:25 PM) https://www.baltimoresun.com/politics/bs-md-pol-baltimore-spy-plane-20210126-on26ewfmyvf2zo2bi6cxfb33au-story.html [https://perma.cc/W3HS-2H4H].

3 Ryan Tracy, *Baltimore Plans Controversial Aerial Surveillance Program*, WALL ST. J. (Apr. 10, 2020, 7:00 AM), https://www.wsj.com/articles/baltimore-plans-controversial-aerial-surveillance-program-11586516402 [https://perma.cc/7QDU-6AP3]. Originally, the technology was developed as a part of an Air Force program called the "Gorgon Stare" and was used by the military in Iraq to protect against roadside bombs planted by enemy combatants. This technology was first used in Baltimore to monitor the protests over the death of Freddie Grey, a Black man killed by a BPD officer. Texas billionaire philanthropists Laura and John Arnold privately funded the AIR program. *See* Rachel M. Cohen, *How Cops Have Turned Baltimore into a Surveillance State*, VICE (Sept. 13, 2016, 11:30 AM) https://www.vice.com/en/article/qbnkvv/psurveillance-baltimore-police-cops-reform [https://perma.cc/UFU4-KT47].

4 *See* Emmons, *supra* note 2. After initial outrage from the public over the 2016 surveillance operation was revealed, BPD resumed the program for its investigative work, which included tracking individuals over a period of a few days and watching the residences of suspects' family members. It was used by BPD to assist with about two hundred cases. *See* Todd Feathers, *Baltimore Police Lied About Almost Every Aspect of Its Spy Plane Program*, VICE (Dec. 10, 2020, 9:00 AM) https://www.vice.com/en/article/qjpjqd/baltimore-police-lied-about-almost-every-aspect-of-its-spy-plane-program [https://perma.cc/5PQE-QPZC].

5 *See* Emmons, *supra* note 2; Emily Opilo, *Baltimore Spending Board Votes Unanimously to Cancel Surveillance Plane Contract*, BALT. SUN (Feb. 3, 2021), https://www.baltimoresun.com/politics/bs-md-pol-plane-canceled-20210203-ha3ixtgiyfg4rpgmfftrsd6uwu-story.html [https://perma.cc/P87V-VUYQ].

6 *See* Leaders of a Beautiful Struggle v. Balt. Police Dep't, 2 F.4th 330, 336 (4th Cir. 2021).

7 *Id.* at 334–36. In an audit of Baltimore's AIR program, New York University School of Law's Policing Project found that the program significantly implicated associational liberty and racial justice. *See* POLICING PROJECT AT N.Y. UNIV. SCH. OF L., CIVIL RIGHTS AND CIVIL LIBERTIES AUDIT OF BALTIMORE'S AERIAL INVESTIGATION RESEARCH (AIR) PROGRAM 27–29 (2020) [hereinafter POLICING PROJECT REPORT], https://static1.squarespace.com/static/58a33e881b631bc60d4f8b31/t/5fc290577acac6192a14

Fourth Circuit, in a rehearing en banc, issued a preliminary injunction against the AIR program in *Leaders of a Beautiful Struggle v. Baltimore Police Department*.[8]

The Fourth Circuit's divided en banc opinion represents a conflict between the Supreme Court's previous aerial surveillance decisions and today's advanced technology.[9] In the rehearing, the majority recognized that since those cases were decided, modern aerial surveillance technology has reached unimaginable precision.[10] Technological advancement makes today's aerial surveillance distinct from earlier cases. Instead of relying on these earlier decisions, the Fourth Circuit in *Leaders* considered cases like *Carpenter v. United States*[11] and *United States v. Jones*,[12] which considered more privacy-invasive technologies, closer to AIR's invasive aerial surveillance. *Carpenter*'s focus on five central factors—intimacy, comprehensiveness, expense, retrospectivity, and voluntariness—were appropriate to evaluate the realities of modern mass aerial surveillance.[13] The dissenting judges in *Leaders* disagreed[14] and instead concluded that the Supreme Court's aerial surveillance precedent, although from the 1980s, should control a decision on the high-tech AIR program.[15]

Despite the discontinuation of the AIR program, the concerns about modern-day aerial surveillance have not disappeared.[16] For example, during the George Floyd protests in the summer of 2020, the Department of Homeland Security ("DHS") deployed a combination of helicopters, airplanes, and drones to survey protestors in fifteen cities.[17] Customs and

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2d61/1606586458141/AIR+Program+Audit+Report+vFINAL+%28reduced%29.pdf [https://perma.cc/KFD6-KM2H].

8 *Leaders*, 2 F.4th at 333.

9 *Compare id.* at 341, with Dow Chem. Co. v. United States, 476 U.S. 227, 227–28 (1986); California v. Ciraolo, 476 U.S. 207 (1986); and Florida v. Riley, 488 U.S. 445 (1989).

10 *See Leaders*, 2 F.4th at 342–43.

11 138 S. Ct. 2206, 2213 (2018).

12 565 U.S. 400, 406 (2012).

13 *See infra* Part I.E.

14 *See Leaders*, 2 F.4th at 360 (Wilkinson, J., dissenting).

15 *See id.* at 360–61.

16 *See, e.g.*, Opilo, *supra* note 2; Zolan Kanno-Youngs, *U.S. Watched George Floyd Protests in 15 Cities Using Aerial Surveillance*, N.Y. TIMES (June 19, 2020), https://www.nytimes.com/2020/06/19/us/politics/george-floyd-protests-surveillance.html?smid=tw-share [https://perma.cc/4NKW-EZJR].

17 Kanno-Youngs, *supra* note 16.

Border Patrol,[18] the California Highway Patrol,[19] and the United States Marshals[20] also engaged in mass aerial surveillance of protesters during the 2020 racial justice movement. Additionally, other cities—such as St. Louis, Missouri—have considered contracting with Persistent Surveillance Systems to implement an AIR program of their own.[21] As aerial surveillance expands, it is necessary for courts to have guidance over how to square such surveillance with Fourth Amendment protections.

This Note argues that courts should use the factors outlined in *Carpenter* to analyze modern aerial surveillance, as technological sophistication has rendered the Supreme Court's prior decisions on this issue incompatible with modern technology. Part I of this Note provides an overview of aerial surveillance technology and how it is used by law enforcement. It continues by delving into early Fourth Amendment doctrine, from its general guiding standards to how the Court has previously addressed warrantless aerial surveillance. Part I continues by exploring the shift in Fourth Amendment decisions beginning in the twenty-first century that have become more protective of privacy rights in the face of mass surveillance, ending with a discussion of the Court's decision in *Carpenter*. Part II argues that the modern realities of aerial technology make the principles delineated in early decisions of the Court less applicable to the current state of aerial surveillance. Using guidance from *Carpenter* is more appropriate for modern cases because it better accounts for the realities of high-tech surveillance.

## I. AERIAL SURVEILLANCE AND THE FOURTH AMENDMENT

Before analyzing how *Carpenter* applies to modern-day aerial surveillance, it is important to discuss how law enforcement uses such technology, as well as how Fourth Amendment doctrine developed over the past century. This section first provides an overview of police technological surveillance capabilities. Next, it considers the Supreme Court's previous aerial surveillance decisions. Finally, this section discusses how the Court

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18 Rebecca Heilweil, *Members of Congress Want to Know More About Law Enforcement's Surveillance of Protestors*, VOX (June 10, 2020) https://www.vox.com/recode/2020/5/29/21274828/drone-minneapolis-protests-predator-surveillance-police [https://perma.cc/YS3V-2FCM].

19 Andres Picon, *'Extremely Troubling': ACLU Questions CHP's Use of Aerial Surveillance During 2020 Racial Justice Demonstrations*, S.F. CHRONICAL (Nov. 17, 2020) https://www.sfchronicle.com/bayarea/article/Extremely-troubling-ACLU-questions-CHP-s-16627231.php [https://perma.cc/J4TG-THJG].

20 Sam Biddle, *U.S. Marshals Used Drones to Spy on Black Lives Matter Protestors in Washington, D.C.*, THE INTERCEPT (Apr. 22, 2021) https://theintercept.com/2021/04/22/drones-black-lives-matter-protests-marshals/ [https://perma.cc/LQ6S-BAWX].

21 *See* Opilo, *supra* note 2.

has dealt with modern technology in a way that allows for more comprehensive surveillance than past aerial techniques.

### *A. Law Enforcement Use of Aerial Surveillance*

Modern aerial surveillance encompasses a wide range of technologies. In the mid-to-late twentieth century, aerial surveillance occurred through manual observation from aircrafts like helicopters or private planes.[22] Technology at the time only permitted observers to use camera equipment or naked-eye observation to gather information.[23] But as society has improved technology designed for observation, so has law enforcement.[24] According to the Electronic Privacy Information Center ("EPIC"), modern surveillance drones are equipped with technology that enables users to "obtain detailed photographs of terrain, people, homes, and even small objects."[25] Surveillance aircraft can be outfitted with other types of advanced technology, such as signal interception, thermal imaging, and license plate readers.[26] Privacy scholars and experts predict that drones employed with sophisticated biometric collectors, such as facial recognition technology, are likely to appear in the near future.[27]

Law enforcement's use of unmanned aerial vehicles ("UAVs") as surveillance tools has increased dramatically in the past decade.[28] In 2018, over six hundred law enforcement agencies had some sort of drone in their possession.[29] Although at least eighteen states require a warrant for law

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22 *See e.g.*, Dow Chem. Co. v. United States, 476 U.S. 227, 229–30 (1986); California v. Ciraolo, 476 U.S. 207, 207 (1986).

23 *See* Leaders of a Beautiful Struggle v. Balt. Police Dep't, 2 F.4th 330, 340 (4th Cir. 2021).

24 *See, e.g.*, Faine Greenwood, *Can a Police Drone Recognize Your Face?*, NEW AM. (July 8, 2020) https://www.newamerica.org/weekly/can-police-drone-recognize-your-face/ [https://perma.cc/R3C7-2GB9]; ANDREW GUTHRIE FERGUSON, THE RISE OF BIG DATA POLICING: SURVEILLANCE, RACE, AND THE FUTURE OF LAW ENFORCEMENT (2017).

25 *Drones and Aerial Surveillance*, ELECTRONIC PRIV. INFO. Ctr. https://epic.org/privacy/drones/ [https://perma.cc/N5WK-RJUC].

26 Rachel Levinson-Waldman, *Hiding in Plain Sight: A Fourth Amendment Framework for Analyzing Government Surveillance in Public*, 66 EMORY L.J. 527, 542 (2017).

27 *Id.*

28 *See* Matthew Guariglia, *How are Police Using Drones?*, ELECTRONIC FRONTIER FOUND. (Jan. 6, 2022) https://www.eff.org/deeplinks/2022/01/how-are-police-using-drones [https://perma.cc/E46G-R3W4]. *See also* Chris Francescani & Aaron Katersky, *The NYPD, the Nation's Largest Police Department, Puts Its Eyes in the Skies with New Drone Program*, ABC NEWS (Dec. 4, 2018, 4:00 PM) https://abcnews.go.com/Technology/nypd-nations-largest-police-department-puts-eyes-skies/story?id=59599207 [https://perma.cc/XHF7-38BG].

29 *Id. See also* Jason Koebler, *Police Used a Drone to Chase Down and Arrest Four DUI Suspects in a Cornfield*, VICE (Oct. 2, 2014, 2:00 PM) https://www.vice.com/en/article/kbzywn/police-used-a-drone-to-chase-down-and-arrest-

enforcement use of drones,[30] others have explicitly rejected this requirement.[31] Flight path records reveal that police fly drones in areas including apartment complexes, residential neighborhoods, and even playgrounds.[32] While some law enforcement agencies have revealed their reasons for using aerial surveillance, there are many unknown details about these programs.[33]

Law enforcement have also used aerial observation to surveil mass protests.[34] During the George Floyd protests in the summer of 2020, DHS logged over 270 hours of surveillance from spy planes, predator drones, and helicopters during protests across the country.[35] DHS collected the footage in a digital network, referred to as "Big Pipe."[36] Other federal and local law enforcement agencies can access this network for "use in future investigations."[37] Another operation in Minneapolis occurring during the

four-dui-suspects-in-a-cornfield [https://perma.cc/2GNT-2RBD]. Recently, the Oakland Police Department received an $80,000 privately-funded grant to purchase high-tech drones. Andres Picon, *Oakland Police Get $80,000 Grant to Buy Drone Fleet. Here's What They Plan to Use Them For*, S.F. CHRONICLE (Mar. 14, 2022, 7:02 PM) https://www.sfchronicle.com/eastbay/article/Oakland-police-are-buying-an-80-000-drone-fleet-17001909.php [https://perma.cc/3UH7-L5J3].

30 *E.g.*, VA. CODE ANN. § 19.2-60.1 B–D (2019); OR. REV. STAT. ANN. § 837.310 (2016).

31 *See* Phil Willon & Melanie Mason, *Governor Vetoes Bill That Would Have Limited Police Use of Drones*, L.A. TIMES (Sept. 28, 2014, 7:09 PM), https://www.latimes.com/local/political/la-me-ln-governor-vetoes-bill-to-limit-police-use-of-drones-20140928-story.html [https://perma.cc/L8Q9-8V3Z]. *See also* Dave Maass & Mike Katz-Lacabe, *Alameda and Contra Costa County Sheriffs Flew Drones Over Protests*, ELECTRONIC FRONTIER FOUND. (Dec. 5, 2018), https://www.eff.org/deeplinks/2018/12/alameda-and-contra-costa-county-sheriffs-flew-drones-over-protests [https://perma.cc/73RT-E59A]; Koebler, *supra* note 29.

32 Joseph Cox, *Exposed Data Shows Where Police Departments Fly Their Drones*, VICE (Dec. 10, 2019, 1:31 PM), https://www.vice.com/en/article/qjdddp/data-shows-where-police-fly-drones-dronesense [https://perma.cc/F3NN-ZP8L]. The *New York Times* highlighted another concerning example of drones invading personal privacy, describing an instance where a couple's "intimate moment" on a New York City rooftop was filmed with a police helicopter recording video surveillance of the area. *See* Jim Dwyer, *Police Video Caught a Couple's Intimate Movement on a Manhattan Rooftop*, N.Y. TIMES (Dec. 22, 2005), https://www.nytimes.com/2005/12/22/nyregion/police-video-caught-a-couples-intimate-moment-on-a-manhattan.html [https://perma.cc/JC6V-VXMS].

33 *See* Jay Stanley, *Protests, Aerial Surveillance, and Police Defunding*, ACLU (June 24, 2020), https://www.aclu.org/news/national-security/protests-aerial-surveillance-and-police-defunding/ [https://perma.cc/4AJT-TY2P].

34 Kanno-Youngs, *supra* note 16.

35 *Id.*; Lucas Ropek, *CBP Releases Video From Predator Drone Deployed Over George Floyd Protests*, GIZMODO (Apr. 19, 2021) https://gizmodo.com/cbp-releases-video-from-predator-drone-deployed-over-ge-1846712785 [https://perma.cc/S66Z-M2QM].

36 Kanno-Youngs, *supra* note 16.

37 *Id.*

Derek Chauvin trial—"Operation Safety Net"—used aerial surveillance as the "hallmark" of the program.[38] Helicopters flew at high altitudes to remain undetectable, circling the protests to take footage of the protestors.[39] Other local police departments have used this technology as well, for protest surveillance and other public safety efforts.[40]

### *B. Fourth Amendment Doctrine*

The Fourth Amendment protects persons from unreasonable search and seizure.[41] The Framers included this amendment to protect individual privacy from "arbitrary invasions by governmental officials."[42] In *Katz v. United States*,[43] the Court developed the test for what qualifies as a Fourth Amendment search[44] and found that the Fourth Amendment protected a defendant's conversation in a phone booth from a warrantless wiretap.[45] This formulation of the Fourth Amendment departed from the Supreme Court's earlier decisions, which only protected physical intrusions into a constitutionally protected area.[46] *Katz*, therefore, extended the Fourth Amendment's protections to all constitutionally protected areas regardless of whether there was a physical intrusion.[47]

Justice Harlan's concurrence in this case established what is now known as the *Katz* test.[48] The test establishes that a search occurs if it violates a person's reasonable expectation of privacy.[49] Courts must first consider whether an individual has an expectation of privacy.[50] And second, whether this expectation is "one that society is prepared to recognize as

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38 Tate Ryan-Mosley & Sam Richards, *The Secret Police: Cops Built a Shadowy Surveillance Machine in Minnesota After George Floyd's Murder*, MIT TECHNOLOGY REVIEW (Mar. 3, 2022) https://www.technologyreview.com/2022/03/03/1046676/police-surveillance-minnesota-george-floyd/ [https://perma.cc/PB67-YLVX].

39 *Id.*

40 Aerial surveillance has also been used to track and observe protestors exercising their First Amendment rights. *See*, *e.g.,* Maass & Katz-Lacabe, *supra* note 31. Aerial protest surveillance has also been used to support the arrest of BLM protestors in 2020. *See* Kanno-Youngs, *supra* note 16.

41 U.S. CONST. amend. IV.

42 Carpenter v. United States, 138 S. Ct. 2206, 2213 (2018).

43 389 U.S. 347 (1967).

44 *Id.* at 359. Although early Fourth Amendment doctrine tied privacy expectations to common law trespass, this perspective changed with *Katz's* pronouncement that the Fourth Amendment protects "people, not places."

45 *Id.* at 348–51.

46 *See* Olmstead v. United States, 277 U.S. 438 (1928).

47 *See Katz*, 389 U.S. at 352–53.

48 *See id.* at 360–62 (Harlan, J., concurring).

49 *See Katz*, 389 U.S. at 361.

50 *Id.*

'reasonable.'"[51] Since *Katz*, courts use this test as the framework for evaluating whether a search occurred under the Fourth Amendment.[52]

### *C. Early Aerial Surveillance Cases*

Although the Supreme Court has decided three cases related to aerial surveillance, it has yet to consider the issue since 1989.[53] In *Dow Chemical Co. v. United States*, the Court considered a chemical company's suit against the government for using aerial surveillance to photograph manufacturing equipment on its property.[54] In the decision, the Court discussed different expectations of privacy for different areas on a property it had previously articulated—namely the curtilage doctrine and the open fields doctrine.[55] Where the curtilage doctrine governs the area "immediately surrounding the home," the open fields doctrine controls the area outside of the home and nearby area.[56] Within the curtilage of the home, an individual has a reasonable expectation of privacy.[57] In an open field, however, no such expectation of privacy exists because "open fields do not provide the setting for those intimate activities that the [Fourth] Amendment is intended to shelter . . . ."[58] Considering Dow Chemical Plant as a place of business, the Court determined that this complex was closer to that of an open field, and thus a warrant was not required for aerial observation.[59] In coming to this conclusion, the Court emphasized that the use of publicly accessible airways and commonly used photograph technology supported the finding that there was not a reasonable expectation of privacy.[60]

On the same day as *Dow*, the Court decided a similar case called *California v. Ciraolo* that found another instance of aerial surveillance constitutional.[61] In *Ciraolo*, law enforcement flew a helicopter one thousand

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51 *Id.*

52 *Id.* The *Katz* test was originally formulated as a two-pronged test. As the doctrine has progressed, many courts collapse these two inquiries into one—asking solely whether the action violates a person's reasonable expectation of privacy. *See* Orin S. Kerr, Katz *Has Only One Step: The Irrelevance of Subjective Expectations*, 82 U. CHI. L. REV. 113, 113–14 (2015).

53 *See* Florida v. Riley, 488 U.S. 445, 445 (1989).

54 Dow Chem. Co. v. United States, 476 U.S. 227 (1986).

55 *Id.* at 228.

56 *Id.* at 235–36.

57 *Id.* at 235.

58 *Id.* at 235 (alteration in original); Oliver v. United States, 466 U.S. 170, 179 (1984).

59 *Dow Chem. Co*., 476 U.S. at 239.

60 *Id.* at 231. In his concurring opinion, Justice Powell expressed concern over Court's consideration of whether the technology in question was accessible to the public. *Id.* at 240 (Powell, J., concurring) ("Such an inquiry will not protect Fourth Amendment rights, but rather will permit their gradual decay as technology advances.")

61 *See* California v. Ciraolo, 476 U.S. 207, 207–09 (1986).

feet over a private home where officers suspected that the homeowners were growing marijuana.[62] Viewing the conduct as "simple visual observations from a public place," the Court held that this instance of naked-eye aerial observation did not violate the Fourth Amendment.[63] Even though the area observed by the helicopter was within the curtilage of the home, the defendant still did not have a reasonable expectation of privacy under the *Katz* test.[64] The Court reasoned that there is no legitimate expectation of privacy that protects a person from surveillance that takes place in publicly navigable airways.[65] Therefore, no search occurred.[66]

Lastly, in *Florida v. Riley*, the Court rejected the argument that police helicopters flown over a property constituted a search.[67] In *Riley*, the police department flew a helicopter 400 feet above Riley's home in an attempt to view a greenhouse to see if he was growing marijuana.[68] Through naked-eye observation, officers were able to identify marijuana plants growing in the greenhouse and obtain a search warrant.[69] The plurality found that even though the defendant may not have anticipated that his home would be subject to public inspection from the sky, the fact that parts of his property were visible by public airways meant that he could not reasonably expect it to be private.[70]

### *D. Modern Shift in Fourth Amendment Doctrine*

Leading up to *Carpenter*, modern Fourth Amendment doctrine moved towards a more privacy-protective approach. This shift began with the Court's decision in *Kyllo v. United States*.[71] In *Kyllo*, the Court found that the use of thermal imaging technology to detect heat patterns in a suspect's home was a violation of the suspect's reasonable expectation of privacy.[72] In contrast to earlier cases, the Court explicitly addressed the ability of

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62 *Id.* at 209.

63 *Id.* at 207, 214.

64 *Id.* at 213.

65 *Id.* at 214. In his dissent, Justice Powell mentioned that this represented the exact circumstances that Justice Harlan warned about in his *Katz* concurrence when he warned "any decision to construe the Fourth Amendment as proscribing only physical intrusions by police onto private property 'is, in the present day, bad physics as well as bad law, for reasonable expectations of privacy may be defeated by electronic as well as physical invasion.'" *Id.* at 215–16 (quoting Katz v. United States, 389 U.S. 347, 362 (1967)).

66 *See id.* at 214.

67 *See* Florida v. Riley, 488 U.S. 445, 450 (1989).

68 *Id.* at 447–48.

69 *Id.* at 448.

70 *Id.* at 450–51.

71 533 U.S. 27 (2001).

72 *Id.* at 40.

technological advances to alter what is considered a reasonable expectation of privacy.[73] The Court centered on two central factors—that the thermal imaging technology was not widely available to the public and that it was "sense-enhancing."[74] The Court found significance in these factors because it would have been "foolish to contend that the degree of privacy secured to citizens by the Fourth Amendment has been entirely unaffected by the advance of technology."[75]

Part of this shift towards a privacy-protective approach is centered in the Court's opinion in *United States v. Jones*. In *Jones*, the Court found that placing a GPS tracking device on a suspect's vehicle to monitor its movements was a physical intrusion that violated the defendant's Fourth Amendment rights.[76] The Court distinguished this case from its earlier decisions, holding that GPS tracking taking place over a prolonged period of time violated a person's reasonable expectations of privacy.[77] Even though the suspect's movements were technically on "public streets," the longer monitoring of these public movements was a point of concern for a plurality of the justices.[78]

Justice Alito's concurrence highlighted that *Jones* represented a change in how the Court began to adapt its reasonable expectation of privacy analysis in light of modern technology capable of mass surveillance.[79] In the concurrence, Justice Alito discussed the need for the Court to address twenty-first century surveillance capabilities.[80] He thought the increased ability of technology to observe one's aggregate movements raised significant Fourth Amendment concerns.[81] Specifically, technology capable of mass surveillance raised concerns under the original understanding of the Fourth Amendment's reasonable expectation of privacy—guarding against tactics that would traditionally be too costly for law enforcement to undertake.[82]

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73 *See id.* at 33–34 ("It would be foolish to contend that the degree of privacy secured to citizens by the Fourth Amendment has been entirely unaffected by the advance of technology.")

74 *Id.* at 34.

75 *Id.* at 33–34; *see also* United States v. Karo, 468 U.S. 705, 712 (1984) ("It is the exploitation of technological advances that implicates the Fourth Amendment, not their mere existence.").

76 United States v. Jones, 565 U.S. 400, 404–05 (2012).

77 *See id.* at 408–10.

78 *Id.* at 402.

79 *See id.* at 418–31 (Alito, J., concurring).

80 *See id.* at 428–30.

81 *Id.* at 429.

82 *Id.* at 430.

*Kyllo* and *Jones* lead to the Court's decision in *Carpenter v. United States*, which "reinvent[ed] the reasonable expectation of privacy test," creating a privacy-protective approach more compatible with modern technology.[83] In *Carpenter*, the Court considered whether access to an individual's cell-site location information ("CSLI") constituted a search under the Fourth Amendment.[84] In an investigation for armed robbery, the FBI used CSLI obtained from a telecommunications provider that showed the date, time, and location of calls to the defendant's cellphone.[85] Because of CSLI's ability to provide an "all-encompassing record of the holder's whereabouts," obtaining a person's CSLI can easily reveal "familial, political, professional, religious, and sexual associations."[86] Law enforcement's ability to collect an accurate, comprehensive picture of a person's movements led to the Court's central holding—"individuals have a reasonable expectation of privacy in the whole of their physical movements."[87] CSLI breaches a person's reasonable expectation of privacy because of its "deeply revealing nature[,] . . . depth, breadth, and comprehensive reach, and the inescapable and automatic nature of its collection."[88] Within this holding, the Court set forth a new method of determining whether accessing similar data constitutes a Fourth Amendment search.

Both *Jones* and *Carpenter* represent a shift to what is referred to as the mosaic theory of the Fourth Amendment.[89] First introduced by the D.C. Circuit in *United States v. Maynard*[90]—later renamed *Jones* when it reached the Supreme Court—the mosaic theory analyzes searches collectively instead of reviewing a search as a series of individual steps.[91] Therefore, a search may exist even if the individual steps do not qualify as a Fourth

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83 Paul Ohm, *The Many Revolutions of* Carpenter, 32 HARV. J. L. & TECH. 357, 358, 370–78 (2019); Carpenter v. United States, 138 S. Ct. 2206, 2216–19 (2018).

84 *Carpenter*, 138 S. Ct. at 2212–23.

85 *Id.* at 2212.

86 *Id.* at 2217.

87 *Id. Carpenter* also held that the reasonable expectation of privacy in one's movements creates an exception to what is referred to as "the third party doctrine." The third party doctrine dictates that a person does not maintain a reasonable expectation of privacy in information given to third parties. Whether the third party doctrine applies to aerial surveillance is beyond the scope of this Note. *Carpenter*'s interpretation of the reasonable expectation of privacy test, however, remains relevant to aerial surveillance with or without the implications of the third party doctrine.

88 *Id.* at 2223.

89 *See, e.g.*, Orin S. Kerr, *The Mosaic Theory of the Fourth Amendment*, 111 MICH. L. REV. 311 (2012).

90 615 F.3d 544 (D.C. Cir. 2010), *aff'd sub nom.* United States v. Jones, 565 U.S. 400 (2012).

91 *See* Kerr, *supra* note 89, at 313.

Amendment search, as long as in the aggregate the surveillance extends over a long period of time or collects an abnormally large amount of information.[92] The Court, however, has neither explicitly adopted nor rejected this approach.[93] Despite this uncertainty, both *Jones* and *Carpenter* find that the aggregate effect of the surveillance is significant in its analysis while explicitly not deciding "whether there is a limited period for which the Government may obtain an individual's [data] free from Fourth Amendment scrutiny, and . . . how long that period might be."[94]

As lower courts grappled with how to interpret *Jones* and *Carpenter*, the Fourth Circuit in *Leaders* broadly applied *Carpenter's* holding.[95] In evaluating the constitutionality of Baltimore's AIR program, the Fourth Circuit found that *Carpenter* was more applicable than the Court's precedents in *Dow*, *Riley*, and *Ciraolo*.[96] The Fourth Circuit reversed the district court and the preliminary Fourth Circuit panel, finding that these decisions were made through a "misapprehen[sion of] the AIR program's capabilities."[97] The Fourth Circuit instead found that the AIR program's capabilities mirrored the far-reaching abilities of CSLI, violating a person's reasonable expectation of privacy in their everyday movements.[98] Similar to *Carpenter*, the AIR program allowed BPD to "travel back in time" to observe a suspect's movements,[99] essentially "attach[ing] an ankle monitor" to every resident of Baltimore.[100] Although the AIR program did not provide perfect coverage, neither did the surveillance in *Jones* and *Carpenter*.[101] In fact, the Fourth Circuit found that the AIR program provided even more precise location tracking than CSLI data.[102]

*Leaders* illustrates the potential for a divide on whether *Carpenter* is applicable to cases of aerial surveillance, and more broadly whether the Supreme Court has implicitly adopted the mosaic theory of the Fourth Amendment. *Leaders* was close, as the en banc panel was divided 8-7.[103] Just

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92 *See id.*

93 *See* United States v. Jones, 565 U.S. 400, 412 (2012); Carpenter v. United States, 138 S. Ct. 2206, 2220 (2018).

94 *Carpenter*, 138 S. Ct. at 2217 n.3.

95 Leaders of a Beautiful Struggle v. Balt. Police Dep't, 2 F.4th 330, 340–41 (4th Cir. 2021).

96 *Id.* at 360–361 (Wilkinson, dissenting) (expressing disdain for the majority's application of *Carpenter* over the existing precedents in *Dow*, *Riley*, and *Ciraolo*).

97 *Id.* at 340.

98 *Id.*

99 *Id.*

100 *Id.* (quoting Carpenter v. United States, 138 S. Ct. 2206, 2218 (2018)).

101 Leaders of a Beautiful Struggle v. Balt. Police Dep't, 2 F.4th 330, 342 (4th Cir. 2021).

102 *Id.* at 343.

103 *Id.* at 332.

as the original panel found that the early aerial surveillance cases controlled the outcome, other courts considering this issue may find that *Carpenter* is not applicable. Differing opinions of whether to apply *Carpenter* suggests that this issue is likely to resurface.[104]

### *E. Identifying the* Carpenter *Factors*

Five factors may be distilled from the Court's opinion in *Carpenter*. In his dissent, Justice Kennedy describes the five *Carpenter* factors as: "intimacy, comprehensiveness, expense, retrospectivity, and voluntariness."[105] Although scholars differ on what the exact *Carpenter* factors are,[106] Justice Kennedy's articulation of the five factors appropriately summarizes *Carpenter*'s impact on the reasonable expectation of privacy test.

#### *1. First Factor—Intimacy*

First, the Court looks at the level of intimacy implicated by the information collected by law enforcement.[107] In *Carpenter*, the Court found that possessing CSLI that could identify a person's daily movements was "deeply revealing" because it allowed law enforcement to observe a person's "familial, political, professional, religious, and sexual associations."[108] Therefore, under *Carpenter*, law enforcement violates the intimateness factor if the information collected allows them to peer into an "intimate window" that holds the "privacies of life" for Americans.[109] This factor was discussed at length in Justice Sotomayor's concurrence in *Jones*.[110] Connecting this factor to what constitutes a reasonable expectation of privacy, Justice Sotomayor articulated that people do not reasonably expect the government to track their movements in a manner that "enables the

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104 Not long after Baltimore's AIR program was terminated, local authorities in St. Louis, Missouri, contemplated using the same technology for their crime-fighting strategy. *See* Opilo, *supra* note 2. Other courts have expressed hesitancy over whether *Leaders* was an accurate decision. *See* United States v. Bowers, No. 2:18-CR-00292-DWA, 2021 WL 4775977, at *4 (W.D. Pa. Oct. 11, 2021).

105 Carpenter v. United States, 138 S. Ct. 2206, 2234 (2018) (Kennedy, J., dissenting).

106 For an alternative articulation of the *Carpenter* factors, *see* Ohm, *supra* note 82 at 361 (identifying the *Carpenter* factors as (1) deeply revealing nature, (2) depth, breadth, and comprehensive reach, and (3) inescapable and automatic nature). For a more in-depth discussion of the above-mentioned factors, *see generally* Laura Hecht-Felella, *The Fourth Amendment in the Digital Age*, BRENNAN CTR. FOR JUST. (2021).

107 *Carpenter*, 138 S. Ct. at 2217.

108 *Id.* at 2217, 2223.

109 *Id.* at 2217 (quoting Riley v. California, 573 U.S. 373, 403 (2014)).

110 *Id.* at 2215; *see* United States v. Jones, 565 U.S. 400, 415 (2012).

government to ascertain . . . their political and religious beliefs, sexual habits, and so on."[111]

*2. Second Factor—Comprehensiveness*

Second, *Carpenter* directs courts to consider the comprehensiveness of the data collection.[112] In *Carpenter*, the Court emphasized the ability of CSLI to provide a comprehensive picture of a person's movements as a reason for concluding that accessing this technology violated a person's reasonable expectation of privacy.[113] Because the CSLI provided a "detailed, encyclopedic, and effortlessly compiled" record of a person's movements, it was comprehensive enough to constitute a search under the Fourth Amendment.[114] The Court's analysis considers both the amount of information collected and the length of time the surveillance occurs.[115] For example, the Court found it significant that the CSLI could provide a record of a person's location for a period of seven days.[116] The Court also indicated that the amount of people reached by the surveillance is an important consideration in evaluating comprehensiveness.[117] Because nearly every American adult has a cell phone regularly on their person, precise information of nearly any person's location could be available to officers.[118] As Professor Paul Ohm noted in his analysis of *Carpenter*, this consideration is particularly significant because police are not required to know in advance who the surveillance must target.[119] Although this also touches on the retrospectivity factor, the number of people traced is what allows police to conduct retrospective searches.[120] Together, the comprehensiveness factor indicates that if technology allows for "near perfect surveillance," through the amount information is collected, the length of time it is record, and the amount of people it reaches, then its use violates a person's reasonable expectation of privacy.[121]

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111 *Jones*, 565 U.S. at 416 (Sotomayor, J., concurring).

112 *Carpenter*, 138 S. Ct. at 2223.

113 *See id.* at 2216–17.

114 *Id.*

115 *Id.* at 2218.

116 *Id.* at 2217 n.3. The Court has not yet given guidance on what length of time would amount to an appropriate use of surveillance technology and declined to do so in *Carpenter*.

117 *Id.* at 2218.

118 *Id.*

119 Ohm, *supra* note 82, at 372.

120 *Carpenter*, 138 S. Ct. at 2217–18; Ohm, *supra* note 82, at 375–76.

121 *Carpenter*, 138 S. Ct. at 2217–18.

*3. Third Factor—Expense*

Third, courts are directed to consider the expense of surveillance technology.[122] In *Carpenter*, the Court found it significant that "[w]ith just the click of a button, the Government can access each carrier's deep repository of historical location information at practically no expense."[123] This factor derives from the Court's opinion in *Jones*, which noted the limitations that factored into one's reasonable expectation of privacy.[124] In *Jones*, the Court distinguished the long-term GPS tracking of the defendant's vehicle from *Knotts*,[125] which upheld short-term GPS tracking.[126] In Justice Alito's concurrence, cited by the Court in *Carpenter*, he noted that the distinguishing point is society's expectation of law enforcement.[127] In the case of *Jones*, society would not expect that law enforcement could "secretly monitor and catalogue every single movement" for a long period of time because doing so would come at great expense beyond the budgetary limits of police departments.[128]

*4. Fourth Factor—Retrospectivity*

Fourth, courts evaluate the retrospective abilities of the data collected.[129] The ability to "travel back in time" to trace one's movements is a key distinguishing factor between earlier Fourth Amendment cases and those that have developed regarding advanced technology.[130] *Carpenter* found that the retrospective quality of CSLI was significant in that it gave law enforcement "access to a category of information otherwise unknowable."[131] This element was compounded with the fact that CSLI records were kept for up to five years.[132] Therefore, whoever is identified as a suspect will have effectively

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122 *See id.* at 2217–18.

123 *Id.*

124 United States v. Jones, 565 U.S. 400, 412–13, 429 (2012).

125 *Id.* at 408. Although *Knotts* found that placing a location-tracking beeper in a container being transported to a suspect's home did not violate the Fourth Amendment, the Court noted that if "dragnet-type law enforcement practices" allowed for twenty-four-hour surveillance, "there will be time enough then to determine whether different constitutional principles may be applicable." United States v. Knotts, 460 U.S. 276, 284 (1983).

126 *See Jones*, 565 U.S. at 408–09.

127 *Carpenter*, 138 S. Ct. at 2217.

128 *Jones*, 565 U.S. at 430 (Alito, J., concurring). Although Justice Alito noted that the four-week time period in which law enforcement tracked the vehicle "surely" crossed a constitutional line, he declined to "identify with precision the point at which the tracking of this vehicle became a search." *Id.*

129 *Carpenter*, 138 S. Ct. at 2218.

130 *Id.*

131 *Id.*

132 *Id.*

had their everyday movements surveilled by the government for this entire time period.[133]

*5. Fifth Factor—Voluntariness*

Lastly, courts are to consider the voluntariness of the data produced by the technology in question.[134] This factor was closely analyzed with the fourth factor of retrospectivity, as the Court in *Carpenter* noted that the ability to retrospectively trace a suspect's whereabouts was available for nearly every American adult.[135] Because very few people did not possess a cell phone—thanks to the modern realities of a technologically-dependent society—there was little ability to meaningfully opt out of such data recording.[136] Professor Ohm frames the inquiry as asking whether, based on the circumstances, the individual intentionally "relinquish[es] their Fourth Amendment rights when they assume the risk of surveillance."[137] When data collection is inescapable, however, a person is less likely to assume the risk of surveillance.[138]

## II. APPLYING *CARPENTER* TO MASS AERIAL SURVEILLANCE

*Carpenter* set forth a new test for evaluating whether the Fourth Amendment protects individuals from high-tech government surveillance.[139] This section explores the reasons why *Carpenter* should be applied to modern aerial surveillance. It then proceeds to use Baltimore's AIR program and the Fourth Circuit's decision in *Leaders* as an emblematic example of how applying *Carpenter* to mass aerial surveillance is the most appropriate approach for future cases raising these concerns.

### *A. Why* Carpenter*?*

There are many reasons why *Carpenter* provides the best approach to address cases of mass aerial surveillance. First, applying *Carpenter* aligns more closely with the original meaning of the Fourth Amendment. Although *Carpenter* focused on CSLI, the capabilities of modern-day aerial surveillance pose a similar—or even more invasive—threat to the Fourth Amendment's prohibition on unreasonable searches. Second, the capabilities of modern aerial surveillance are so distinct from the Supreme Court's older

133 *Id.*

134 *Id.* at 2218, 2220.

135 *Id.* at 2218.

136 *Id.*

137 Ohm, *supra* note 82, at 376.

138 *See Carpenter*, 138 S. Ct. at 2218, 2223.

139 *Id.* at 2223.

aerial surveillance cases that they are no longer applicable. Third, applying *Carpenter* in this context does not conflict with previous cases. And finally, using the more privacy-protective approach illustrated by *Carpenter* better serves interests of free speech, racial justice, and police accountability.

*1. Meaning of the Fourth Amendment*

There are several factors that favor applying *Carpenter* to modern aerial surveillance instead of the Court's previous aerial surveillance cases. First, using *Carpenter* aligns more closely with the meaning of the Fourth Amendment. The Fourth Amendment was a direct response to colonial fears of a tyrannical government and invasive surveillance.[140] As noted by Justice Sotomayor in her concurrence in *Jones*, the Fourth Amendment intends to guard against "arbitrary exercises of police power," like those carried out under the reign of King George III.[141] At the time, colonists were subject to indiscriminate searches that allowed British officers to enter homes, businesses, and other private areas to find evidence of criminal activity.[142] The Fourth Amendment puts in place obstacles to prevent such arbitrary enforcement of police power.[143] In the context of mass aerial surveillance, the fear of oppressive government surveillance persists.[144] Such surveillance targets nearly every person in its range.[145] Just as CSLI data could be collected to reflect the movements of every American with a cellphone, aerial surveillance equally implicates the concern for wholesale and indiscriminate searches that lead to the drafting of the Fourth Amendment.

*2. Modern Technology Requires Modern Analysis*

Second, applying *Carpenter* is more appropriate for instances of dragnet aerial surveillance because this technology is more similar to the technology considered in *Jones* and *Carpenter* than the prior instances of aerial surveillance analyzed by the Court. *Carpenter* announced that new technology may not "fit neatly under existing precedents."[146] Dragnet aerial surveillance is exactly the kind of surveillance technology that cannot easily fit within existing precedents. Technology like Baltimore's AIR program

140 Andrew Guthrie Ferguson, *Surveillance and the Tyrant Test*, 110 GEO. L.J. 205, 264 (2021).

141 *See* United States v. Jones, 565 U.S. 400, 416–17 (2012) (Sotomayor, J., concurring).

142 Ferguson, *supra* note 139, at 266 n.378.

143 *See Jones*, 565 U.S. at 414 (Sotomayor, J., concurring); *see also* Ferguson, *supra* note 140, at 264.

144 *See* Leaders of a Beautiful Struggle v. Balt. Police Dep't, 2 F.4th 330, 339–40 (4th Cir. 2021).

145 *See id.* at 334.

146 Carpenter v. United States, 138 S. Ct. 2206, 2214 (2018).

implicates distinct factors when compared to *Dow*, *Riley*, and *Ciraolo*.[147] One essential difference is the comprehensive detail this type of surveillance technology gives law enforcement.[148] For example, in *Riley*, the police flew a helicopter over the defendant's home one time to view marijuana growing in the backyard.[149] In contrast, the AIR program is able to observe a person's movements for twelve hours a day, seven days a week.[150] Prolonged observation has the ability to reveal intimate information that a single hour or two would not.[151] This was the exact problem *Carpenter* warned about when it focused on the ability of CSLI to reveal the intimate details of a person's life.[152] As noted by the D.C. Circuit when considering *Jones*, "[p]rolonged surveillance reveals types of information not revealed by short-term surveillance, such as what a person does repeatedly, what he does not do, and what he does ensemble."[153] The surveillance in *Dow*, *Riley*, and *Ciraolo* could not reveal anything more than what was observed in that moment.[154] The AIR program, however, was able to reach far beyond a singular instance.[155] Ultimately, the level of comprehensive detail implicated by dragnet aerial surveillance is one of the reasons why such cases are more similar to *Carpenter* than *Dow*, *Riley*, and *Ciraolo*.

The Court's previous aerial surveillance decisions are further inapplicable because these cases lack the element of retroactivity.[156] Instead of limiting surveillance to *after* law enforcement determines it is needed, modern aerial surveillance allows law enforcement to go back in time to observe suspects.[157] This stands in stark contrast to the prior line of aerial surveillance cases.[158] In each earlier case, a suspect was first identified before law enforcement used an aircraft to gather more information.[159] Yet, it is the nature of dragnet aerial surveillance that each person's movements are

147 *Compare Leaders*, 2 F.4th at 340; *with* Dow Chem. Co. v. United States, 476 U.S. 227, 229 (1986); California v. Ciraolo, 476 U.S. 207, 209–10 (1986); Florida v. Riley, 488 U.S. 445, 448–49 (1989).

148 *See Leaders*, 2 F.4th at 341–43.

149 *See Riley*, 488 U.S. at 448–49.

150 *Leaders*, 2 F.4th at 334.

151 *See id.* at 342.

152 Carpenter v. United States, 138 S. Ct. 2206, 2217 (2018).

153 United States v. Maynard, 615 F.3d 544 (D.C. Cir. 2010), *aff'd sub nom.* United States v. Jones, 565 U.S. 400 (2012).

154 Dow Chem. Co. v. United States, 476 U.S. 227, 229 (1986); California v. Ciraolo, 476 U.S. 207, 209–10 (1986); Florida v. Riley, 488 U.S. 445, 448–49 (1989).

155 *See Leaders*, 2 F.4th at 336–38.

156 *See supra*, note 154.

157 *Leaders*, 2 F.4th at 343.

158 *See supra*, note 154.

159 *See supra*, note 154.

automatically chronicled and stored.[160] Therefore, law enforcement does not have to have a suspect in mind—or a crime committed—to conduct surveillance on a specific person.[161] Society, as demonstrated in *Carpenter*, is not prepared to embrace retrospective surveillance capable of tracing one's historical movements and associations as reasonable.[162]

Additionally, using the previous aerial surveillance cases would contradict the Court's shift towards using the mosaic theory to analyze modern technology.[163] *Jones* and *Carpenter* are the first instances of dragnet surveillance heard by the Court.[164] In *Jones*, concurrences by Justices Sotomayor and Alito indicated that long-term monitoring of one's movements would violate a person's reasonable expectation of privacy.[165] Similarly, the *Carpenter* factors reflect the Court's unofficial embrace of the mosaic theory, listing key factors such as comprehensiveness and intimacy as crucial in its analysis.[166] Applying prior aerial surveillance cases to modern technology would not properly consider the aggregation factors that the Court has found fairly significant in its analysis. As the Court moves towards the mosaic theory in considering modern technology and the Fourth Amendment, the most natural progression is to apply this anti-aggregation principle to modern aerial surveillance.

### *3. Compatibility of Previous Aerial Surveillance Cases with* Carpenter

Third, the Court's prior aerial surveillance decisions can work together with *Carpenter* in modern cases. In *Leaders*, both the district court and Fourth Circuit panel found that *Dow*, applying *Carpenter* as employed by the Fourth Circuit en banc, reflects a division over how to handle existing aerial surveillance caselaw.[167] Ultimately, the district court and the Fourth Circuit panel did not take the correct approach.[168] This can be demonstrated by distinguishing how *Carpenter* applies to earlier Supreme Court cases in comparison to modern-day aerial surveillance. In fact, *Carpenter* can be used

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160 *See Leaders*, 2 F.4th at 333–35.

161 *See id.* at 341–42.

162 *See* Katz v. United States, 389 U.S. 347, 360–61 (1967).; Carpenter v. United States, 138 S. Ct. 2206, 2216–17 (2018).

163 *See generally* United States v. Jones, 565 U.S. 400, 412–14 (2012); *Carpenter*, 138 S. Ct. at 2216–17.

164 See *Jones*, 565 U.S. at 412–14; *Carpenter*, 138 S. Ct. at 2216–17.

165 *See Jones*, 565 U.S. at 413–31.

166 *Carpenter*, 138 S. Ct. at 2223.

167 *Compare* Leaders of a Beautiful Struggle v. Balt. Police Dep't, 2 F.4th 330, 340 (4th Cir. 2021), *with* Leaders of a Beautiful Struggle v. Balt. Police Dep't, 979 F.3d 219, 228–29 (4th Cir. 2020), *rev'd en banc*, 2 F.4th 330 (4th Cir. 2021).

168 *See Leaders*, 2 F.4th at 341.

to validate both the Supreme Court's decisions in earlier cases as well as to invalidate surveillance like the AIR program.[169]

*Carpenter's* first factor—intimacy—is the most difficult of the five to fit within the precedent of the Court's earlier cases. The level of overlap, however, differs between *Dow* and *Ciraolo*.[170] As acknowledged in the original decision, *Dow* did not involve much personal information because the company's facilities were more akin to an open field and did not disclose any individual's personal information.[171] *Ciraolo*, in contrast, involved a more intimate surveillance operation.[172] By closely hovering over the defendant's backyard, law enforcement officers were able to observe the defendant's marijuana plants.[173] Observing one's backyard is certainly more invasive, but it does not necessarily reach the level of intimacy implicated in *Carpenter*.[174] Surveillance through technology like the AIR program is much more likely to reveal information of one's "familial, political, professional, religious, and sexual associations," especially when compared to the momentary observation from the helicopter in *Ciraolo*.[175] Ultimately, the information collected in *Dow*, *Ciraolo*, and *Riley*, was not as revealing as the CSLI in *Carpenter* or the AIR program in *Leaders*.[176]

*Carpenter's* second factor—comprehensiveness—fits squarely with the decisions of the Court's prior aerial surveillance decisions.[177] *Carpenter* was concerned with technology that formed a "detailed, encyclopedic, and effortlessly compiled" record of one's movements.[178] CSLI's ability to trace a person's movements for years stands in contrast to the information collected by a one-off surveillance operation that lasts for a couple of hours at most.[179] Furthermore, the surveillance occurring in the prior aerial surveillance cases was also geographically limited.[180] For instance, in

169 *See id.*

170 *See* Dow Chem. Co. v. United States, 476 U.S. 227, 231 (1986); California v. Ciraolo, 476 U.S. at 207, 209–10 (1986).

171 *See Dow Chem.*, 476 U.S. at 231.

172 *See Ciraolo*, 476 U.S. at 209–10.

173 *Id.*

174 *See id.*; Carpenter v. United States, 138 S. Ct. 2206, 2217 (2018).

175 *Carpenter*, 138 S. Ct. at 2217.

176 *See, e.g.*, *Ciraolo*, 476 U.S. at 213–14.

177 *See Carpenter*, 138 S. Ct. at 2217.

178 *Id.* at 2216.

179 *Compare id.* at 2217 (explaining that CSLI provides a complete record of a cell phone owner's movements) *with* Dow Chem. Co. v. United States, 476 U.S. 227, 229 (1986) (observing that the EPA only took photographs of the plant); *Ciraolo*, 476 U.S. at 209–10 (noting that officers surveilled a home and took photographs once); Florida v. Riley, 488 U.S. 445, 448–49 (1989) (explaining that an officer circled over the respondent's property twice on one occasion to make the necessary observations).

180 *See, e.g.*, *Ciraolo*, 476 U.S. at 209–10.

*Ciraolo*, the Santa Clara Police were primarily observing the defendant's backyard.[181] The department did not trace Ciraolo beyond this location to, for example, his place of work or his partner's house.[182] Both the temporal and geographical limitations suggest that this type of surveillance does not reach the level of comprehensiveness considered in *Carpenter*.[183]

Expense is also unlikely to be implicated in the prior line of cases. *Carpenter* was concerned with types of easily accessible and cheap surveillance technology that would augment law enforcement's capabilities beyond what society would expect.[184] This factor also stands in contrast with the early aerial surveillance cases. All three cases involved law enforcement using either an airplane or helicopter to surveil a single suspect.[185] In contrast to the government's ability to uncover private location information "[w]ith just the click of a button," law enforcement's use of private planes or helicopters is a large expense.[186] Not only does this limit the actual abilities of law enforcement, but it also does not similarly threaten society's expectations surrounding what police can and cannot do.[187]

Although *Carpenter's* fourth factor—retrospectivity—does not create a conflict between these cases,[188] the fifth factor—voluntariness—poses a similarly close call to the intimacy factor. Technically, the surveillance in *Dow*, *Ciraolo*, and *Riley* was not voluntary, as none of the defendants consented.[189] This, however, was not the main concern of *Carpenter* when evaluating this factor.[190] Instead, the *Carpenter* court was looking toward the far-reaching aspects of the technology—as CSLI was available for nearly every American adult.[191] The limitations of one-off surveillance are not

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181 *Id.*

182 *See id.*

183 *See id.*; *Carpenter*, 138 S. Ct. at 2217.

184 *Carpenter*, 138 S. Ct. at 2218.

185 *See* Dow Chem. Co. v. United States, 476 U.S. 227, 229 (1986); *Ciraolo*, 476 U.S. at 209–10; Florida v. Riley, 488 U.S. 445, 448–49 (1989).

186 *Carpenter*, 138 S. Ct. at 2218.

187 *See id.* at 2217.

188 Both *Riley* and *Ciraolo* involved naked-eye observation, which does not allow law enforcement to "travel back in time" like CSLI. Although *Dow* contained more of a retrospective element because it involved using photography, it does still not reach the level of retrospectivity that worried the Court in *Carpenter*. Most of what concerned the Court was the ability of law enforcement to collect data from someone who was not a suspect of a crime at the time, or before the crime was even committed. In all three prior cases, law enforcement conducted surveillance *after* a suspect was identified.

189 *See Dow Chem.*, 476 U.S. at 229; California v. Ciraolo, 476 U.S. at 207, 209–10 (1986); *Riley*, 488 U.S. at 448–49.

190 Carpenter v. United States, 138 S. Ct. 2206, 2210 (2018).

191 *Id.* at 2218, 2223.

comparable to data collected from millions of people.[192] Additionally, the *Carpenter* court was concerned about the automatic nature of the data collection, which was not at issue in the early aerial surveillance cases because they required great effort from investigators to execute.[193]

*4. Free Speech and Racial Justice Implications*

Fourth, permitting such broad-reaching surveillance risks significant free expression and racial justice concerns.[194] Large-scale surveillance risks chilling the expressive and associational freedoms guaranteed by the First Amendment.[195] This concern is especially clear in the context of the AIR program, which was used to surveil the protests in response to Freddie Grey's murder.[196] Law enforcement's use of aerial surveillance technology during the George Floyd protests further illustrates how such technology can impact associational liberties.[197] Hyper-surveillance of First Amendment activity can create a chilling effect due to the awareness that the government is observing one's movements and associations.[198] Even if aerial surveillance programs were not targeting First Amendment assemblies, it still can impact whether protestors feel safe in expressing speech.[199]

Furthermore, there are significant racial justice concerns regarding the use of this technology.[200] Use of law enforcement technology to perpetuate

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192 *See id.* at 2217–18.

193 *Id.* at 2223.

194 *See, e.g.*, Malkia Devich-Cyril, *Defund Facial Recognition*, THE ATLANTIC (July 5, 2020) https://www.theatlantic.com/technology/archive/2020/07/defund-facial-recognition/613771/ [https://perma.cc/F33U-7KE6] (discussing the racial justice implications of facial recognition technology and its use against Black protestors); Wendi C. Thomas, *The Police Have Been Spying on Black Reporters and Activists for Years. I Know Because I'm One of Them*, PROPUBLICA (June 9, 2020) https://www.propublica.org/article/the-police-have-been-spying-on-black-reporters-and-activists-for-years-i-know-because-im-one-of-them [https://perma.cc/J4L9-BUXA].

195 *See generally* J.D. Schnepf, *Unsettling Aerial Surveillance: Surveillance Studies After Standing Rock*, 17 SURVEILLANCE & SOCIETY 747 (2019).

196 *See* Emmons, *supra* note 2.

197 Kanno-Youngs, *supra* note 16; POLICING PROJECT REPORT, *supra* note 7, at 27–28, 30, 41.

198 POLICING PROJECT REPORT, *supra* note 7, at 27–28, 32, 41.

199 *See* POLICING PROJECT REPORT, *supra* note 7, at 27–28.

200 *See generally* VIRGINIA EUBANKS, AUTOMATING INEQUALITY: HOW HIGH-TECH TOOLS PROFILE, POLICE, AND PUNISH THE POOR 12 (2018) (arguing that high-tech surveillance often operates in "low rights environments" that disproportionality impact marginalized communities with little accountability); Engy Abdelkader, *High Tech Can Heighten Discrimination; Here Are Some Policy Recommendations for Its Ethical Use*, ABA JOURNAL (Mar. 23, 2021, 9:08 AM), https://www.abajournal.com/columns/article/high-tech-can-heighten-discrimination-here-are-some-policy-recommendations-for-its-ethical-use [https://perma.cc/D6WN-3BTT] (discussing how use of "smart tech" by federal law

oversurveillance of Black and brown communities has persisted throughout the history of the United States from "freed slaves, poor workers, civil rights activists, [to] dissenting voices in American history."[201] In regard to the AIR program, it is important to acknowledge that BPD has a significant history of racially discriminatory policing.[202] Mass surveillance programs, operating under the perpetual history of racially motivated police programs, will likely result in even more distrust of the government.[203] Crime-fighting justifications offered by law enforcement often disproportionately target Black and brown communities, leading to significantly more privacy violations in these areas as opposed to white, wealthier neighborhoods.[204] This is especially true if aerial surveillance is combined with other technologies.[205] For example, the AIR program surveillance was supplemented with security cameras that are more prevalent in Black neighborhoods than wealthier, white neighborhoods.[206] In the background of historically race-based surveillance, it is even more important to adopt a more privacy-protective rule in order to fully protect Fourth Amendment rights.[207]

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enforcement amplifies unwarranted suspicion and harassment of people of color); SIMONE BROWNE, DARK MATTERS: ON THE SURVEILLANCE OF BLACKNESS (2015) (arguing that the use of contemporary surveillance technology is informed by the history of policing practices targeting Black slaves); Chaz Arnett, *Race, Surveillance, Resistance*, 81 OHIO ST. L.J. 1103 (2020).

201 Guthrie Ferguson, *supra* note 140, at 231.

202 POLICING PROJECT REPORT, *supra* note 7, at 29–32. For a longer discussion on the racial implications of Baltimore's AIR program, *see generally* Arnett, *supra* note 200.

203 *See* Arnett, *supra* note 200, at 1106.

204 *See id.* at 1110. For a discussion of the disproportionate connection between "high-crime areas" and predominately Black neighborhoods, *see* Elise C. Boddie, *Racially Territorial Policing in Black Neighborhoods*, 89 U. CHI. L. REV. 477, 477–48 (2022) (discussing how police criminalize Black spaces through flawed notions of "high crime areas"); Reshaad Shirazi, *It's High Time to Dump the High-Crime Area Factor*, 21 BERKELEY J. CRIM. L. 76, 79 (2016) (arguing that one of the central causes of high-crime areas is because of systemic racism and over-policing of these neighborhoods); Lincoln Quillian and Devah Pager, *Black Neighborhoods, Higher Crime? The Role of Racial Stereotypes in Evaluations of Neighborhood Crime*, 107 AM. J. SOCIOLOGY 717, 747–48 (2001) (finding that the percentage of young Black men within a neighborhood is positively correlated with residents' perceived crime rates within the area); Stephen Lurie, *There's No Such Thing as a Dangerous Neighborhood*, BLOOMBERG (Feb. 25, 2019) (noting that police focus on notions of "dangerous neighborhoods" despite the fact that serious crimes are concentrated in less than one percent of any given city's population).

205 *See* POLICING PROJECT REPORT, *supra* note 7, at 14–15, 31–32.

206 Arnett, *supra* note 200, at 1110.

207 *See id.* at 1110–20.

### *B. Applying* Carpenter *to Aerial Surveillance*

The Fourth Circuit's consideration of Baltimore's AIR program provides an illustrative example of how *Carpenter* better serves the modern realities of aerial surveillance.[208] Generally, *Carpenter* stands for the proposition that an individual's privacy is invaded when law enforcement collects data that, as a whole, allows for the deduction of the individual's movements.[209] This section discusses how the *Carpenter* factors apply in this situation, drawing upon the Fourth Circuit's analysis in *Leaders*.[210]

#### *1. First Factor—Intimacy*

Through the AIR program's ability to aggregate a large quantity of data, the first *Carpenter* factor is easily satisfied.[211] Like CSLI, the sophistication of the AIR program can reveal intimate details of a person's daily life.[212] BPD's investigation reports based on AIR program images include observations of driving patterns and driving behaviors, locations people visited, and the subsequent locations of the people the original person visited.[213] The aggregation of AIR data allows law enforcement to trace a suspect's long-term movements, and thus, the movements of all persons with whom they associate.[214] Such detailed tracing of one's movements certainly implicates the same level of intimacy discussed in *Carpenter*.

Importantly, the utility of the AIR program is not limited to photographs.[215] BPD used other tools to supplement the information gathered by the AIR program, including via security cameras and automated license plate readers ("ALPRs").[216] Even if the AIR program alone did not disclose extensive details about a person's everyday movements, it certainly does when combined with other technology.

While still technologically limited, the AIR program is nevertheless able to reveal private information.[217] Through its ability to trace a person's movements every day for forty-five days, the AIR program could essentially track every person in the city.[218] Even though the surveillance mostly

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208 *See* Leaders of a Beautiful Struggle v. Balt. Police Dep't, 2 F.4th 330, 341 (4th Cir. 2021) (citing Carpenter v. United States, 138 S. Ct. 2206, 2215–19 (2018)).

209 *See Carpenter*, 138 S. Ct. at 2218–19.

210 *See Leaders*, 2 F.4th at 330.

211 *See id.* at 334.

212 *Id.*

213 *See id.* at 334.

214 *Id.*

215 *Id.*

216 *See id.*

217 *See id.* at 342.

218 *See id.* at 341 (quoting Carpenter v. United States, 138 S. Ct. 2206, 2218 (2018)).

releases data into blocks of several hours—not the full twelve hours the program operates—this is more than enough information to permit the type of deductive reasoning seen in *Carpenter*.[219]As the Fourth Circuit panel noted, "many people start and end most days at home."[220] Law enforcement is able to reliably determine a person's identity based on their daily movements despite data gaps.[221] In fact, this is the purpose of the AIR program—to act as a tool to supplement law enforcement investigations.[222] This ability to trace a person's daily movements is exactly the sort of information collecting warned about in *Carpenter*.[223]

*2. Second Factor—Comprehensiveness*

Unlike earlier Supreme Court decisions, the AIR program provides a significant amount of comprehensive data.[224] As mentioned, the AIR program provides detailed photographs, captured once per second, of over 90% of the city, forty hours per week.[225] Even though the program is limited to daylight hours, it still provides a significant amount of detail.[226] Images are limited to one pixel per person or vehicle, but as the Fourth Circuit noted, this is not a required restriction and the technology could be altered to take photographs at a greater definition.[227] BPD, because of the AIR program's data storage, can analyze the photographs for up to forty-five days.[228] The AIR program's depth and breadth, resulting from the program's ability to precisely track an individual's movements, invades the reasonable expectation of privacy in one's everyday movements as supported by *Carpenter*.[229]

The AIR program is even more comprehensive than CSLI.[230] Although CSLI can provide location information that is similarly as detailed as the record supplied by AIR photographs, the AIR program also allows police to uncover information, such as a person's physical appearance, when coupled with other surveillance mechanisms.[231] *Carpenter* also analyzed CSLI

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219 *Id.* at 342.

220 *Id.* at 343.

221 *Id.*

222 *See id.*

223 *Carpenter*, 138 S. Ct. at 2217.

224 *See Leaders*, 2 F.4th at 334.

225 *Id.*

226 *Id.*

227 *Id.*

228 *Id.*

229 Carpenter v. United States, 138 S. Ct. 2206, 2217 (2018).

230 *Compare Leaders*, 2 F.4th at 341–43, *with Carpenter*, 138 S. Ct. at 2212.

231 *Leaders*, 2 F.4th at 345; *see supra* Part I.A.

through this lens, acknowledging the ability of the police to use deductive analysis through the information CSLI originally produced.[232] Because of the expansiveness of the AIR program, it easily meets the second factor.

*3. Third Factor—Expense*

As noted by the Fourth Circuit, the AIR program "transcends mere augmentation of ordinary police capabilities."[233] Part of *Carpenter's* third factor of expense goes towards what society would reasonably expect are the limitations of police observation.[234] While like in *Knotts*, a person would typically understand that law enforcement had the ability to trace their location during a momentary stake-out, they would not expect the police to do so for a period of forty-five days.[235] Part of the reason why this is not an expected limitation is due to the expense it would normally take to collect this type of information.[236] One would not typically imagine law enforcement could have the resources to follow every person in the city for twelve hours each day.[237] Therefore, this factor is also met.

*4. Fourth Factor—Retrospectivity*

The AIR program contains elements of retrospective analysis that allow law enforcement to "travel back in time" to follow a targeted individual.[238] This is a significant factor emphasized by the court in *Carpenter*, and a key point of distinction with the earlier cases.[239] In the AIR program, retaining forty-five days' worth of information allows law enforcement to trace all daylight movements of a person for over six weeks before they were identified, or before an investigation began.[240] Without this technology, such information would be "unknowable" because it encompasses information that would have only been able to be collected by law enforcement after a crime occurred.[241] This is identical to the retrospective capabilities identified

232 *Carpenter*, 138 S. Ct. at 2219.

233 *Leaders*, 2 F.4th at 345.

234 *Carpenter*, 138 S. Ct. at 2217.

235 *See* United States v. Knotts, 460 U.S. 276, 281–82 (1983); *see also* United States v. Maynard, 615 F.3d 544, 563 (D.C. Cir. 2010), *aff'd sub nom.* United States v. Jones, 565 U.S. 400 (2012).

236 *See Jones*, 565 U.S. at 429 (Alito, J., concurring) ("Traditional surveillance for any extended period of time was difficult and costly and therefore rarely undertaken").

237 *Leaders*, 2 F.4th at 341–342.

238 *See id.* at 341 (quoting *Carpenter*, 138 S. Ct. at 2218).

239 *Carpenter*, 138 S. Ct. at 2218.

240 *See Leaders*, 2 F.4th at 341–342.

241 *See id.* at 341 (quoting *Carpenter*, 138 S. Ct. at 2218).

in *Carpenter*, which similarly allowed law enforcement to uncover a suspect's everyday movements before they were ever identified.[242]

*5. Fifth Factor—Voluntariness*

The AIR program meets the last *Carpenter* factor of voluntariness. The AIR program surveys the entire city.[243] If one is outdoors at any point during daylight, AIR will surveil them.[244] There is no way to opt-out of this program, unless a person stays indoors at all times during the day.[245] This factor is even more significantly impacted by the AIR program than the cell-phone location data in *Carpenter*, of which a person could theoretically opt-out by not carrying a cell phone.[246]

Taken together, the level of detail captured by the AIR program certainly rises above a reasonable expectation of privacy. *Leaders* correctly used the *Carpenter* factors to analyze whether the use of the AIR program without a warrant violated the Fourth Amendment. Similar to CSLI, the aerial surveillance was sufficiently detailed, comprehensive, and inescapable. Its additional elements of retroactivity and cost-efficiency invite further comparison. Ultimately, *Carpenter*'s five factors demonstrate that the AIR program violates society's reasonable expectation of privacy.

## CONCLUSION

Constitutional law is struggling to keep up with rapidly advancing technology. *Carpenter* was a step in the right direction of applying Fourth Amendment principles to invasive technology that surpasses society's reasonable expectation of privacy. Yet, since *Carpenter* was decided, there has been little indication of how this case can be applied to other contexts like persistent aerial surveillance. Applying *Carpenter* to the AIR program is just one illustration of how the *Carpenter* test can expand the principles articulated in *Katz* to incorporate modern aerial surveillance technology. Moving away from the prior caselaw of *Dow*, *Riley*, and *Ciraolo*—and towards application of *Carpenter* to mass aerial surveillance—is the best method of honoring the longstanding principles of the Fourth Amendment.

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242 *Id.* at 341–42 (quoting *Carpenter*, 138 S. Ct. at 2218).

243 *Id.* at 341.

244 *See id.* at 333–35.

245 *See id.*

246 *See Carpenter*, 138 S. Ct. at 2220 (finding that cell phones are an indispensable part of modern life, and there is no meaningful ability for the user to opt-out of data collection).