# Does DARC Really Matter?: A Response to Wright & Moore

*Troy A. Rule*[*]

*ABSTRACT: Danaya Wright and Ethan Moore's Article,* DARC Matters: Repurposing Nineteenth-Century Property Law for the Twenty-First Century, *is a valuable contribution to a growing body of legal academic literature focused on property law obstacles to the deployment of commercial drone technologies. Wright and Moore rightly acknowledge landowners' long-held rights to exclude objects from the low airspace immediately above their land–rights that some major retailers have aggressively sought to weaken in recent years to facilitate drone delivery services. The Article is probably overly optimistic in its suggestion that using airspace above existing railroad and utility easements is "the most feasible path" to unleashing widespread drone delivery services in the United States. Still, the Article affirms landowners' airspace exclusion rights and highlights the potential to leverage existing easement rights in the drone age–observations that are likely to become increasingly relevant as drone technologies continue to advance in the coming years.*



[*] Joseph M. Feller Memorial Chair in Law & Sustainability and Professor of Law, Sandra Day O'Connor College of Law, Arizona State University. Many thanks to the 2022–23 *Iowa Law Review* editorial board for inviting me to read and respond to an excellent article contributing to the burgeoning field of drone law.

## INTRODUCTION

In *DARC Matters: Repurposing Nineteenth-Century Property Law for the Twenty-First Century* ("*DARC Matters*"), Danaya Wright and Ethan Moore aptly highlight how landowners' property rights are slowing the growth of the nation's commercial drone industry.[1] Unfortunately, their proposed approach to confronting this challenge—while creative—does not adequately address it in much of the country.

Leveraging Professor Wright's unparalleled expertise in railroad law,[2] *DARC Matters* envisions a future in which drones will travel through the low airspace immediately above railroad tracks and power lines to deliver packages to "local locker[s]" where customers could drop by and pick them up.[3] Wright and Moore call this "Drone Airspace in Railroad Corridors" or "DARC" project "the most feasible path" to widespread drone delivery services, given landowners' rights to exclude unwanted objects from the low airspace immediately above their land.[4] Accordingly, they advocate for courts to interpret the commercial easements in gross underlying many of the

1. Danaya Wright & Ethan Moore, *DARC Matters: Repurposing Nineteenth-Century Property Law for the Twenty-First Century*, 107 IOWA L. REV. 2247, 2258 (2022).

2. Professor Wright's writings on railroad law issues are extensive. *See generally* Danaya C. Wright, *Doing a Double Take: Rail-Trail Takings Litigation in the Post-*Brandt Trust *Era*, 39 VT. L. REV. 703 (2015) (critiquing takings analyses found in recent rails-to-trails cases); Danaya C. Wright, *Reliance Interests and Takings Liability for Rail-Trail Conversions:* Marvin M. Brandt Revocable Trust v. United States, 44 ENV'T L. REP. 10173 (2014) (arguing for a broader interpretation of easement rights under certain railroad easements across public lands); Danaya C. Wright, *The Shifting Sands of Property Rights, Federal Railroad Grants, and Economic History:* Hash v. U.S. *and the Threat to Rail-Trail Conversions*, 38 ENV'T L. 711 (2008) (analyzing a federal circuit case focused on railbanking policies); Scott Andrew Bowman & Danaya C. Wright, *Charitable Deductions for Rail-Trail Conversions: Reconciling the Partial Interest Rule and the National Trails System Act*, 32 WM. & MARY ENV'T L. & POL'Y REV. 581 (2008) (examining laws governing charitable deductions for donations of railroad corridors for conversion into recreational trails); Danaya C. Wright, *Eminent Domain, Exactions, and Railbanking: Can Recreational Trails Survive the Court's Fifth Amendment Jurisprudence?*, 26 COLUM. J. ENV'T L. 399 (2001) (analyzing federal railbanking laws under new regulatory takings doctrines); Danaya C. Wright & Jeffrey M. Hester, *Pipes, Wires, and Bicycles: Rails-to-Trails, Utility Licenses, and the Shifting Scope of Railroad Easements from the Nineteenth to the Twenty-First Centuries*, 27 ECOLOGY L.Q. 351 (2000) (proposing a theory for analyzing class action suits against railroads alleging the federal government's abandonment of easement rights)).

3. Wright & Moore, *supra* note 1, at 2249.

4. *Id.* at 2254.

nation's rail corridors to be broad enough to also accommodate commercial drone flight paths.[5]

*DARC Matters* is a high-quality piece of legal scholarship and a valuable contribution to the growing academic field of drone law—in part because of its unflinching acknowledgement of the common law's longstanding legal rules governing low airspace. For centuries, landowners have held rights to exclude unwanted objects from the low airspace immediately above their land.[6] In the past decade, however, as politically powerful retailers—such as Amazon—have sought federal permission to ignore or extinguish those property rights to make way for commercial drones, landowners' airspace rights have come under attack.[7] Fortunately, Wright and Moore seem to recognize the inaccuracy of those narratives and instead embrace the reality that landowners' exclusion rights within four hundred feet of the ground are a clear "matter of state law."[8]

Regrettably, although *DARC Matters* accurately characterizes landowners' rights in the low airspace above their land,[9] the Article ultimately advocates an incomplete way of overcoming that obstacle to widespread drone delivery services. In particular, the Article suggests that routing drones above railroad and utility easements will create enough airspace corridors across the country to support a mature and profitable drone delivery industry.[10] Although the

---

5. *See id.* ("We argue that commercial easements in gross provide an opportunity to completely redesign the commercial marketplace and relieve the nightmarish logistics and environmental harms involved in the transportation of goods via internal combustion engines.").

6. The doctrine "[c]*ujus est solum, ejus est usque ad coelum*," or "[t]o whomsoever the soil belongs, he owns also to the sky . . ." was included in the commentaries of Coke and Blackstone and thereby solidly integrated into American law hundreds of years ago. *See* 1 EDWARD COKE, THE FIRST PART OF THE INSTITUTES OF THE LAWS OF ENGLAND; OR, A COMMENTARY UPON LITTLETON: NOT THE NAME OF THE AUTHOR ONLY, BUT OF THE LAW ITSELF L.1 C.1 § 1 (4a) (London, James & Luke G. Hansard & Sons, 19th ed. 1832); 2 WILLIAM BLACKSTONE, COMMENTARIES ON THE LAWS OF ENGLAND: BOOK II: OF THE RIGHTS OF THINGS *18 (Simon Stern ed., 2016) (1765); ROBERT R. WRIGHT, THE LAW OF AIRSPACE 35 (1968) ("*Blackstone's Commentaries* . . . reiterated Coke's viewpoint on ownership of airspace. These *Commentaries* burst upon the scene practically on the eve of American independence, and were accepted as 'quasi authority' in America.") (footnotes omitted); *see also* United States v. Causby, 328 U.S. 256, 264–65 (1946) ("[A] landowner owns at least as much of the space above the ground as he can occupy or use in connection with the land" and that intrusions of that space "are in the same category as invasions of the surface.").

7. *See, e.g.*, *Drones: The Next Generation of Commerce?: Hearing Before the Comm. on Oversight and Gov't Reform*, 114th Cong. 31 (2015) (testimony of Paul E. Misener, former vice president for global public policy at Amazon.com, arguing that states and municipal governments should not be allowed to restrict the flights of FAA-authorized drones "[g]iven the interstate nature of commercial [drone] operations"); *see also* Troy Rule, *Amazon and Walmart Want the FAA to Let Them Use Part of Your Property. Here's How Drone Delivery Companies Are Coming For Your Airspace*, FORTUNE (Sept. 2, 2022), https://fortune.com/2022/09/02/amazon-walmart-drone-faa-delivery-prope rty-law-tech-troy-rule/ [https://perma.cc/AH9G-RBZR].

8. Wright & Moore, *supra* note 1, at 2259–60.

9. *Id.*

10. *See id.* at 2254 (calling "the commercial easement in gross and the pre-existing infrastructure of railroad and utility corridors" "the most feasible path" to widespread drone delivery services).

low airspace above railroad tracks and power lines could potentially serve valuable uses in the drone era, retailers will ultimately need much more airspace to make even a fraction of their billions of deliveries by drone instead of by truck.[11] One of the primary practical advantages of replacing ground-based delivery vehicles with drones is drones' ability to travel in a beeline from their launching point to their destination. Routing delivery drones above railroad tracks and power lines to deposit goods in local lockers may be legally feasible, but I am skeptical that a model built around those limited routes and lockers will appeal to many retailers and their customers.[12] Alternative approaches exist that could similarly respect landowners' airspace rights, but place far fewer constraints on where drones may go.[13]

This Response seeks to underscore the many valuable contributions of *DARC Matters* to the scholarly discussion on drones and airspace while simultaneously challenging some of the Article's conclusions about the legal structures and airspace resources needed to support widespread commercial drone delivery operations across the United States. Part I of this Response delineates several specific aspects of *DARC Matters* with which I agree and offers some additional thoughts on those issues. Part II focuses on arguments I disagree with and defends my own positions on those matters. In Part III, I conclude.

## I. AN OPEN-EYED VIEW OF THE AIRSPACE-RELATED OBSTACLES TO COMMERCIAL DRONE OPERATIONS

In my view, the most valuable portions of *DARC Matters* appear in Part II of the Article, where Wright and Moore accurately outline the current state of airspace law as it relates to civilian drones.[14] It is not uncommon for legal scholars to skim the introductory sections of law journal articles written in their field of expertise because those background materials tend to be relatively familiar to them and non-controversial. However, reciting such basics is uniquely important for academic writers in the drone law setting, where special interests have stridently campaigned for nearly a decade to

11. Wright and Moore emphasize the mind-boggling volume of potential drone deliveries in their Article. *See id.* at 2266 (("Amazon Logistics . . . ships 2.5 billion packages a year; FedEx ships 3 billion, and UPS ships 4.7 billion. Over the next few years all these numbers are expected to go up significantly . . . .") (footnote omitted)).

12. Concededly, remote rural areas are the one setting in which heavy reliance on railroad and transmission easements for drone routing might add significant net value. Wright and Moore seem to recognize the considerably greater usefulness of their idea in rural areas but never fully acknowledge its inadequacy in most urban or suburban areas. *See id.* at 2269–70 (describing the greater potential usefulness of "long-range drones" in rural areas).

13. I recently described an alternative approach to drone routing that would both respect landowners' airspace rights and allow for more direct drone flight paths. *See generally* Troy A. Rule, *Drones, Airspace, and the Sharing Economy*, 84 OHIO STATE L.J. (forthcoming 2023), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4159741 [https://perma.cc/SUgJ-WX69] (describing the potential use of digital platforms, smart contracts, and distributed ledger technologies to help landowners license their airspace to drone users).

14. Wright & Moore, *supra* note 1, at 2254–72.

promulgate misleading narratives and mischaracterize certain property law principles in their effort to advance the ambitions of commercial drone companies.[15] It was heartening to see that Wright and Moore remain unfazed by that messaging and continue to unequivocally sustain many longstanding property doctrines and drone related facts that are under attack today.

### *A. AFFIRMING THE REALITY OF LANDOWNERS' LOW AIRSPACE RIGHTS*

Most notably, *DARC Matters* is commendable for its realistic characterization of the scope and nature of landowners' rights to exclude unwanted objects from the low airspace above their land.[16] In an age when drone industry allies are seeking to delegitimize or weaken landowners' low airspace rights, scholarly voices emphasizing the reality and legitimacy of these rights are needed now more than ever.

A sort of David versus Goliath dynamic has emerged in the debate over landowners' rights to preclude unwanted drones from flying above their land. Standing on Goliath's side are some of the world's largest and most powerful corporations—Amazon, Walmart, and Alphabet, to name a few—who hope to soon offer drone-assisted delivery in cities and towns across the country.[17] Because commercial drones are intended to operate within the layer of airspace situated within four hundred feet of the ground, landowner exclusion rights within that space create a potential obstacle for these companies.[18] Accordingly, in recent years, the Federal Aviation Administration ("FAA") has argued that it should preempt state property laws and disregard landowners' airspace rights over airspace to make way for commercial drones.[19]

---

15. *See, e.g.*, Troy A. Rule, *Drone Zoning*, 95 N.C. L. REV. 133, 185 (2016) (describing Amazon Prime Air's proposed model for federal airspace zoning that would have effectively eliminated landowners' authority to exclude drone overflights).

16. *See, e.g.*, Wright & Moore, *supra* note 1, at 2261.

17. *See, e.g.*, Christopher Mims, *Amazon, Alphabet and Others Are Quietly Rolling Out Drone Delivery Across America*, WALL ST. J. (Apr. 4, 2022, 12:33 PM), https://www.wsj.com/articles/amazon-alphabet-and-others-are-quietly-rolling-out-drone-delivery-across-america-11648872022 [https://perma.cc/5GQN-WQ4V].

18. The Federal Aviation Administration's own regulations require that civilian drones operate within four hundred feet of the ground. 14 C.F.R. § 107.51 (2022).

19. *See, e.g.*, Nicholas Cody, Comment, *Flight and Federalism: Federal Preemption of State and Local Drone Laws*, 93 WASH. L. REV. 1495, 1509–11 (2018) (noting that it is clear that "the FAA considers Part 107 [its 2016 drone regulation] to preempt many state and local laws"); OFF. CHIEF COUNS., FED. AVIATION ADMIN., STATE AND LOCAL REGULATION OF UNMANNED AIRCRAFT SYSTEMS (UAS) FACT SHEET 2 (Dec. 17, 2015), https://www.faa.gov/sites/faa.gov/files/uas/resources/policy_library/UAS_Fact_Sheet_Final.pdf [https://perma.cc/BB8E-4CCG] ("If one or two municipalities enacted ordinances regulating [drones] in the navigable airspace and a significant number of municipalities followed suit, fractionalized control of the navigable airspace could result. In turn, this 'patchwork quilt' of differing restrictions could severely limit the flexibility of FAA in controlling the airspace and flight patterns, and ensuring safety and an efficient air traffic flow.").

By contrast, on David's side in this policy battle over drones and airspace, stand millions of individual landowners whose airspace exclusion rights are under unprecedented threat. Even though centuries of established property law is on their side,[20] these numerous stakeholders face practical difficulties in defending their rights against some very large and politically powerful foes.[21] Continued pronouncements of landowners' airspace rights in academic journals—such as is seen in *DARC Matters*—helps to combat ongoing efforts to erode these valuable rights.[22]

### *B. IMPORTANT NON-LEGAL OBSERVATIONS ABOUT DELIVERY DRONES*

In addition to appropriately characterizing existing laws regarding landowners' airspace rights, Wright and Moore also make several other important observations in *DARC Matters* related to drones and low airspace. Among them is the fact that a transition to drone-assisted deliveries could greatly reduce the total carbon dioxide emissions and other harmful emissions associated with goods delivery.[23] As Wright and Moore noted, drones could likewise do much to aid the delivery of medical supplies and fresh food to food deserts and other disadvantaged areas.[24] At the same time, the authors correctly acknowledge the potential for delivery drones to create legitimate noise or privacy concerns that materially disrupt landowners' quiet enjoyment of their land.[25]

One other valuable factual point Wright and Moore highlight is that the commercial drone industry has not advanced in the United States nearly as rapidly as the industry had repeatedly asserted it would.[26] This is important because it underscores another crucial fact Wright and Moore point out: the reality that legal and political obstacles—not technological ones—are stalling

---

20. *See supra* note 6 and accompanying text.

21. Public choice theorists have long recognized the tendency for policy actions to favor special interests who have concentrated costs or benefits at stake over the diffused broader interests of citizens. *See, e.g.*, James Q. Wilson, *The Politics of Regulation*, *in* THE POLITICS OF REGULATION 357, 366–72 (James Q. Wilson ed., 1980).

22. *See* Wright & Moore, *supra* note 3, at 2259 ("After *Causby*, the rule was clear enough: All air traffic simply needed to stay above 500 feet to avoid actions for trespass and the government bought out the airspace rights below 500 feet in the landing and take-off zones of airports."); *see also id.* at 2260 ("[t]he FAA . . . has ceded the airspace below 400 feet to state law regulation.").

23. *See id.* at 2269–70 (describing the potential environmental benefits of replacing retail goods delivery trucks with drones).

24. *Id.* at 2272 ("Riding the bus to the grocery store for high-caloric foods or waiting an extra day for a much-needed prescription or medical supply could be a relic of the past in a drone-mediated future.").

25. *See id.* at 2264–65 (noting the potential for "a phalanx of buzzing drones 200 feet over one's home all night [to] be deemed a significant harm" and noting that many state drone laws "were passed in response to citizens' privacy concerns").

26. *Id.* at 2249–50 (noting that "corporate internet marketers" "have taunted us with visions of drones dropping your new iPad on your front porch within a few hours" but that "it has not happened—it has not even come close").

the nation's fledgling drone delivery industry.[27] In light of these ongoing challenges, ideally, drone companies will accept their federal preemption-based plan to acquire free access to landowners' low airspace is untenable and thus come to the table willing to consider more workable policy approaches.[28]

## II. POINTS OF DISAGREEMENT

Although *DARC Matters* makes several useful observations about the nation's growing commercial drone industry and the property-law-related obstacles it faces, the Article's optimism about the potential for railroad and utility easements to address those obstacles goes a bit too far. To be clear: my critiques of the Article are mostly minor and should not detract from my overall appreciation for its valuable contributions. That said, the following are a few constructive comments regarding the Article and some of its claims.

### *A. IN MANY SETTINGS, RAILROAD AND UTILITY EASEMENTS WILL NOT BE ENOUGH*

In *DARC Matters*, Wright and Moore advocate a "drone highway" approach to routing commercial delivery drones that would route the drones through the airspace above rail and utility corridors.[29] Although expanding existing rail and power line easements and implementing this "drone highway" approach may avert many property-related obstacles to drone delivery service in rural areas, it is unlikely to be enough to support profitable drone delivery activities in most urban and suburban settings.

A major premise underlying the drone routing approach touted in *DARC Matters* is that long-range deliveries—meaning deliveries of more than twelve miles—will eventually comprise a large proportion of the drone delivery market.[30] This premise seems crucial to the Article's thesis because routing delivery drones above rail corridors will be a commercially viable approach only if long-range deliveries will truly dominate the future drone delivery landscape. Unfortunately, as outlined in the next paragraph, it is more likely that drones will ultimately be most useful for much shorter deliveries.[31] Assuming this ultimately proves correct, routing drones primarily over rail and power line easements will not fully address airspace rights obstacles because most consumers want drones delivered directly to their homes and businesses.

---

27. *Id.* at 2257 ("[T]he roadblocks [to widespread deployment of delivery drones] are not technological but rather political and legal.").

28. To read about one such alternative approach, see generally Rule, *supra* note 13 (describing the possibility of using an airspace sharing system supported by a digital platform and distributed ledger technologies to more efficiently and equitably coordinate drone routing in low airspace).

29. Wright & Moore, *supra* note 1 at 2261.

30. *Id.* at 2269. Wright and Moore even contemplate drones needing to routinely "transport goods across state lines." *Id.* at 2262.

31. *See infra* notes 33–36 and accompanying text.

Given how heavily *DARC Matters* relies on the premise that a large proportion of drone deliveries will eventually be long-range deliveries for which rail and power lines are well suited,[32] Wright and Moore provide surprisingly thin support for this crucial claim. Indeed, the Article appears to support this premise with only one website article describing a single research report touting the projected growth of "[l]ong range drone delivery" markets.[33] This singular source left me unconvinced—in part because the source itself notes that "Walmart, Amazon, [Alphabet's] Wing, and UPS" are all actively doing short-range "drone delivery trials," but only mentions Walmart's partnership with Zipline as a major long-range trial.[34] In fact, even Wright and Moore expressly acknowledge the retailers' hope that drones could address the industry's "last mile problem"—the high cost of delivering goods the last mile or two from retail or distribution centers to customers.[35] They likewise indirectly concede that routing drones solely above railroad tracks will not fully unleash the nation's drone-assisted delivery industry.[36] Given these concessions, it is difficult to understand the Article's push for heavy reliance on expanded railroad easements to propel the drone delivery industry forward.

### *B. "Common Law Adjustments" Versus Shifting a Property Entitlement*

Another aspect of *DARC Matters* that makes me uneasy is its casual attitude about modifying landowners' long-held property entitlements vis-à-vis rail and utility easement holders. Because *DARC Matters* advocates materially expanding the scope of those existing easements with no new compensation to servient owners,[37] Wright and Moore exert considerable effort trying to characterize property rights as adaptable to the changing needs of society. At one point in the Article, they declare that "[t]he lesson of a thousand years of common law property is that the law must adapt or, like feudalism itself, it will be washed away in the relentless march of progress."[38]

---

32. *See* Wright & Moore, *supra* note 1, at 2269.

33. *Id.* at 2269 n.110; *see also* Miriam McNabb, *Autonomous Delivery: Long Range Drone Delivery Emerges as Fast Growing Segment*, DRONE LIFE (Oct. 12, 2020), https://dronelife.com/2020/10/12/autonomous-delivery-long-range-drone-delivery-emerges-as-fast-growing-segment/ [https://perma.cc/5XSV-MMJJ] (cited as support by Wright and Moore).

34. McNabb, *supra* note 33.

35. Wright & Moore, *supra* note 1, at 2256 (noting that "[d]rone delivery promises to alleviate some of this last-mile traffic, as well as the second-to-last mile . . . which are currently the least energy-efficient stages" in the retail goods delivery process).

36. *See id.* at 2290 (admitting that drone corridors above utility easements could "help fill in the gaps between railroad corridors, thereby offering better connectivity and continuity for the drone highway and perhaps enabling delivery of most packages directly to a consumer's doorstep").

37. *See id.* at 2254.

38. *Id.*

In support of this view, Wright and Moore point to the expansive amount of takings litigation that slowed the nationwide rails-to-trails movement.[39] Specifically, they claim that "[w]hat many thought was a sensible program to recycle abandoned railroad corridors to recreational trails turned into a nightmare of takings litigation, millions of dollars spent in class-action challenges and compensation, and the ultimate loss of thousands of miles of priceless railroad corridor."[40] Multiple parts of this statement give me pause. As socially beneficial as public bike trails may be, those potential benefits do not warrant the forced transfer of new easement rights for such trails to governments without compensation to burdened landowners. A court decision effectuating such a transfer would be more than an innocent "[c]ommon [l]aw [a]djustment[;]"[41] it would be a concerning shift of valuable property entitlement from the landowners to drone users.[42]

Property theorists have long emphasized the value and importance of respecting existing property entitlements, even in instances when ignoring them might deliver some enticing public policy benefits.[43] Laws and policies that ignore existing property entitlements are potentially unconstitutional, tend to generate uncertainty and other costs, and should thus generally be avoided.[44] Most of the railroad commercial easements in gross the Article focuses on were granted for railroad uses—not as public bike paths or as drone corridors—and were intended to "revert [to the servient owners] upon abandonment or forfeiture of the railroad altogether."[45] That is why many claimants were entitled to new compensation when rails were converted to public trails.[46] A similar argument seemingly applies if the rails are converted into drone flight pathways as well.[47]

Wright and Moore clearly disdain modern takings laws and how they have historically been applied to railroad easements, but that disdain does not change the reality of those laws.[48] *DARC Matters*' labeling of landowners'

39. *Id.* at 2254, 2279.

40. *Id.* at 2254.

41. *Id.* at 2305.

42. *See generally* Troy A. Rule, *Entitlement-Shifting Rules*, 62 B.C. L. REV. 1193, 1204–18 (2021) (describing entitlement-shifting rules and their justification).

43. *See, e.g.*, Frank I. Michelman, *Property, Utility, and Fairness: Comments on the Ethical Foundations of "Just Compensation" Law*, 80 HARV. L. REV. 1165, 1214–15 (1967) (describing the "demoralization costs" associated with transferring property entitlements without compensation).

44. For a more detailed discussion of the potential costs of ignoring property entitlements, see generally Rule, *supra* note 42 (explaining property entitlements).

45. Wright & Moore, *supra* note 3, at 2277.

46. *Id.* at 2283–84.

47. *See id.* at 2284 (in instances when the "railroad only had easements" and "the landowner held the servient fee" the landowner "was presumably entitled to compensation for the new, recreational trail use").

48. *See, e.g.*, *id.* at 2279 ("In the 1980s, the private property rights movement began its unwavering mission to use the Takings Clause to resurrect some mythical conception of sanctified private property, and they found adherents in the Supreme Court appointments of Justices Scalia, Thomas, and Alito.").

takings claims defending their constitutional rights against such confiscations in the rails-to-trails context as a "nightmare" feels unusually dismissive of landowners' property interests—particularly given that much of the litigation discussed ultimately vindicated landowners' rights to some degree.[49] Since there is no reason to believe takings laws or the nature of landowners' property rights will radically change anytime soon, a strategy of trying to persuade courts to expand railroad easements to accommodate drones seems at least somewhat tenuous so it might be more worthwhile for policymakers to focus on other approaches.[50]

### *C. Private Versus Public Uses of a Commercial Easement in Gross*

In its effort to make routing drones over rail corridors seem like a more plausible strategy, *DARC Matters* embraces an optimistic view of the expandability of most existing railroad commercial easements in gross. In particular, Wright and Moore try to distinguish drone corridors from bike trails by asserting that a "drone highway . . . is a similar private commercial use" rather than a public recreational use.[51] Consequently, they argue that in many instances drone activities above rail lines "should be permissible as part of 'the apportionability of . . . [commercial] easement[s] in gross.'"[52] Unfortunately, a drone highway above a rail line could be a "private commercial use" if rights to it were given to a single entity such as Amazon or Walmart, which seems unlikely in many communities given the large number of retailers hoping to eventually deliver by drone.[53] Indeed, drone corridors are more likely to operate like public roads—or bike trails!

### *D. Two Other Quibbles*

In addition to the more substantial critiques of *DARC Matters* outlined above, a couple minor critiques are also worthy of mention. One is the suggestion that high volumes of drone crashes are inevitable unless delivery drones are contained in certain designated corridors—such as above rail and power lines.[54] In truth, the sense-and-avoid capabilities that are likely to be a

49. *See id.* ("[T]he public treasury was forced to pay hundreds of millions of dollars to landowners" because "[s]hifting from railroad to recreational trail use was seen as a taking of private property[.]").

50. Enacting legal and policy structures that support the development of digital airspace sharing platforms described later in this Response is one such alternative approach. *See infra* notes 61–65 and accompanying text.

51. *See* Wright & Moore, *supra* note 1, at 2287.

52. *Id.*

53. *See, e.g.*, Dawn Kawamoto, *12 Drone Delivery Companies to Know*, BUILT IN (Sept. 15, 2022), https://builtin.com/drones/drone-delivery-companies [https://perma.cc/2GDX-4K2T] (listin g twelve companies that are actively pursuing drone delivery plans and citing a report's estimate that "[t]he commercial drone market is expected to soar from $8.15 billion this year to nearly $47.4 billion by 2029").

54. *See* Wright & Moore, *supra* note 1, at 2267 ("mid-air collisions would be almost inevitable").

standard feature in modern licensed commercial drones should be able to generally prevent such collisions.[55] Moreover, if the FAA were to permit municipal governments to adopt drone zoning laws, such laws could restrict hobbyist drone activities to certain areas and certain times of the day or month and thereby greatly reduce the risks of such accidents.[56]

Another very small quiddity for me is the marked distinction *DARC Matters* makes between the safety risks of routing drone flights over roads and the safety risks of drone flights over active rail lines.[57] To quote the Article:

> [O]f course, a drone flying above a railroad track—even one still in use—is unlikely to cause significant damage or any loss of life in the event of a crash. In the "rock, paper, scissors" of drone accidents, a 200-ton locomotive beats a 50-pound drone 100 percent of the time.[58]

Although such conclusions make some intuitive sense, they are at least somewhat misguided: A fifty-five-pound drone on a railroad track could indeed create a potential derailment risk for oncoming trains.[59] It would be tragic if the Article's dismissive treatment of derailment or projectile risks leads any readers to discount the dangers to themselves—or others—associated with attempting to place objects on active railroad tracks.[60]

### *E. A More Promising Solution: Broad Airspace Licensing Platforms*

My final constructive comment on *DARC Matters* is that I wish its authors fully explored alternative means of unleashing drone deliveries that do not require courts to expand railroad easements in gross beyond their original terms. Wright and Moore make this noteworthy concession toward the end of their Article:

> [I]f governments cannot work it out, the demand for legal drone airspace might find enterprising suppliers who can leverage the

---

55. *See* Harry McNabb, *Sense and Avoid for Drones: New Algorithm Allows Drones to React in 3.5 Milliseconds, Avoiding Fast Moving Obstacles*, DRONE LIFE (Jun. 26, 2020), https://dronelife.com/2020/06/26/sense-and-avoid-for-drones/ [https://perma.cc/A25W-NWN4] (describing a new method that will allow drones to "more reliably detect and avoid relatively fast-moving obstacles").

56. *See generally* Rule, *supra* note 15 (discussing the FAA's broad regulatory authority over civilian drone activity, despite the value of state and local regulation).

57. Wright & Moore, *supra* note 1, at 2272.

58. *Id.*

59. *See, e.g.*, David Bird, *Metal Objects Put on Track Derail IND Train*, N.Y. TIMES (Mar. 7, 1984), https://www.nytimes.com/1984/03/07/nyregion/metal-objects-put-on-track-derail-ind-train.html [https://perma.cc/ULU7-9VMU] (describing derailments caused by 30-pound metal objects placed on tracks).

60. *See* OPERATION LIFESAVER, SAFETY GUIDE–TRESPASSING (2013), https://community.oli.org/flash/media/pdf/Safety_Guide_Trespassing#:~:text=People%20have%20been%20struck%20by,a%20train%20on%20another%20track.&text=Small%20objects%2C%20like%20coins%2C%20sometimes,shoot%20out%20with%20deadly%20force [https://perma.cc/4GP5-7C8U] ("People have been struck by trains while placing objects on the rails" and "[s]mall objects" can "get pinched by the wheel of the train and shoot out with deadly force").

> property rights in a profitable manner. With global GPS mapping software and online property records, companies could leverage AI capacity to simply compensate all affected landowners for each drone trip through or adjacent to their airspace.[61]

As my own Article describes in significant detail, it is economically and technologically feasible to leverage market forces and property rights to support a more efficient and equitable drone routing system.[62] In particular, digital platforms could enable millions of landowners to enter bids in a "reverse-auction" format to temporarily license their low airspace to commercial drone users with manageable transaction costs.[63] Drone users could then use a retailer-facing side of the same platform to route delivery drones from stores and distribution hubs to homes and businesses.[64] Such a structure would sidestep many of the disadvantages of the *DARC Matters* approach.

Among other things, this process could enable drones to travel not just over rail and power lines but also more directly "as the crow flies" over nearly any parcel. Wright and Moore concede in their Article that allowing third party drones to routinely fly above transmission line easement areas may well exceed the scope of the utility easement and thus require additional compensation.[65] Accordingly, without compensation payments, even if courts did stretch railroad easements to allow for drones, those drones would be confined to the space above rail lines—a constraint that seems likely to greatly limit retail drone deliveries.

Contrary to what Wright and Moore suggest, a broader approach to drone routing that does not rely solely on rail and utility corridors could also produce more equitable impacts on affected landowners and the wider citizenry. The following statement near the end of *DARC Matters* aptly summarizes its authors' general view on this question:

> If drone deliveries [above rail and utility lines] cause minimal interference with property rights, create no nuisances or trespasses, and yet can get goods to a wider swath of the population at lower cost without the belching fumes of the UPS and FedEx trucks, then everyone is a winner, even the adjacent landowners.[66]

Unfortunately, this seems like a very big "if." As set forth above, a strategy of routing drone deliveries solely over rail and utility lines will likely interfere

---

61. Wright & Moore, *supra* note 1, at 2307–08.

62. *See generally* Rule, *supra* note 13, at 4 ("[S]trengthening and clarifying landowners' airspace rights would facilitate the development of airspace-sharing platforms capable of accelerating the deployment of commercial drone technologies in the United States.").

63. *Id.* at 19–22.

64. *Id.* at 20–21.

65. Wright & Moore, *supra* note 3, at 2290 ("[U]tility corridors may require compensation or an exercise of eminent domain against servient fee owners.").

66. *Id.* at 2296.

with property rights unless servient landowners receive new compensation. Even then, high-volume drone traffic through some of these corridors could ultimately create nuisances for other nearby landowners.[67] Additionally, the "everyone is a winner" claim is perhaps the most unrealistic of all. It is difficult to believe that most landowners who live close to Amazon drone delivery hubs will consider themselves "winners" when drones start incessantly flying behind their home, yet they receive no compensation for this new, more intense, and totally different, use of a nearby railroad easement.

When combined with municipal drone zoning ordinances,[68] the use of digital platforms would be a much more equitable, democratic, and efficient way to coordinate the use of low airspace in the drone age. Under such a system, landowners would continue to possess their long-held rights to exclude unwanted tangible objects—including drones—from the low airspace immediately above their land. Accordingly, landowners would be empowered to control when—if at all—drones flew above their land and to collect licensing fees for drone overflights. Because every landowner would have such rights—and an additional income source under such an approach—many more "winners" will result than with Wright and Moore's *DARC Matters* vision.

Further, under a broader approach, drones would not be constrained to rail and power lines, which would allow for far more drone deliveries made directly to the doorsteps or backyards of retail customers. Of course, opportunities to potentially use the space above rail lines and power lines when routing drones would continue to exist—either through judicial expansion of some commercial easements in gross or through the exercise of eminent domain authority. However, drones would not be confined *only* to that space and, thus, would more successfully travel "as the crow flies" from their delivery hubs to their final destinations.

## CONCLUSION

In *DARC Matters*, Danaya Wright and Ethan Moore effectively describe how a particular set of low airspace resources—those above rail and utility lines—could aid in accelerating the spread of drone delivery services across the United States.[69] Indeed, that space has valuable potential in the context of drone routing, and the authors' outlining of potential legal theories and obstacles related to marshalling use of the space are timely and commendable. The Article's open-eyed recognition of landowners' rights to exclude drones from the low airspace above their land is also important and

67. Wright and Moore seem to acknowledge this reality in their Article as well. *See id.* at 2286 (noting that landowners living near drone corridors created through their scheme "are likely to be unhappy that the strip of land behind their homes is now home to a whizzing army of drones").

68. *See generally* Rule, *supra* note 15 (predicting the need for local drone ordinances and furnishing a variety of potential zoning schemes).

69. Wright & Moore, *supra* note 1, at 2252–54.

notable in this era when powerful companies and the FAA are aggressively working to erode and undermine those rights.

All of that said, for a variety of reasons, rail and utility corridors likely do not hold the panacea needed to get the country's commercial drone industry off the ground. The low airspace highlighted in *DARC Matters* could be a good start, but commercial drone users will likely need much more space than that to fully leverage drone technologies and advance goods delivery in the coming decades. Convincing courts to expand the scope of existing rail and utility easements to open up the space above them for drone use will likely be difficult and expensive, as the rail-to-trails controversies highlighted in the Article aptly describes.[70]

In light of all the strengths and limitations described above, *DARC Matters* is an appreciated—albeit imperfect—contribution to today's continuing debate over drones and airspace. By reaffirming the property-law-related obstacles to widespread drone delivery and highlighting one set of airspace resources that could ultimately provide part of a solution, the Article advances the ongoing academic discussion on a topic that is likely to continue to challenge policymakers, courts, and legal scholars for decades to come.

70. *Id.* at 2279–80.