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New Heights, New Uses, and New Questions: Can Individuals Enforce Their Property Rights Against the Impending Rise of Low-Flying Civilian Drones?

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NEW HEIGHTS, NEW USES, AND NEW QUESTIONS: CAN INDIVIDUALS ENFORCE THEIR PROPERTY RIGHTS AGAINST THE IMPENDING RISE OF LOW-FLYING CIVILIAN DRONES?

Abstract: By 2020, there will be at least seven million civilian drones flying in the low-altitude airspace above the United States. Civilian drones include unmanned aerial vehicles operated by both private individuals for recreational and business entities for commercial purposes. While this budding technology has the potential to be a positive influence on society as a whole, civilian drone regulation at both the state and federal level lags behind growing drone usage across the country. As of now, the Federal Aviation Administration has administered a small rule that provides some regulation on the use of civilian drones. Many questions remain, however, as to the property rights that landowners on the ground have against drones and their operators flying in the low-altitude airspace above their property. This Note examines the common law torts of trespass and nuisance and analyzes how both doctrines would apply to a drone flying low above an individual's land. Furthermore, this Note argues that the federal government is best suited to regulate civilian drones used for commercial purposes, whereas individual states should regulate the use of drones by private individuals.

INTRODUCTION

On July 22, 2016, 7-Eleven became the first company in the United States to ever deliver its product to a consumer's home via an unmanned, autonomous drone under approval of the Federal Aviation Administration (FAA).¹ Similarly, in November 2016, Domino's Pizza completed its first delivery order by drone in a town just north of Auckland, New Zealand.² These two events are symbolic breakthroughs in global commerce and show that drones will revolutionize the way in which businesses and customers transact with

¹ *7-Eleven Teams with Flirtey for First Ever FAA-Approved Drone Delivery to Customer's Home*, 7-ELEVEN (July 22, 2016), <http://corp.7-eleven.com/corp-press-releases/07-22-2016-7-eleven-teams-with-flirtey-for-first-ever-faa-approved-drone-delivery-to-customer-s-home> [<https://perma.cc/2NY5-GRT9>] [hereinafter *7-Eleven Teams with Flirtey*]. The Federal Aviation Administration (FAA) is the executive agency responsible for regulating almost all aspects of civil aviation. *What We Do*, FAA, <https://www.faa.gov/about/mission/activities/> [<https://perma.cc/F5ZZ-5JRN>].

² Kevin Lui, *Watch Domino's Pull Off the World's First Commercial Pizza Delivery by Drone*, FORTUNE (Nov. 16, 2016), <http://fortune.com/2016/11/16/dominos-new-zealand-first-commercial-pizza-delivery-drone/> [<https://perma.cc/T4PV-APL8>].

each other.³ Applications of drone delivery, however, are not limited to food and beverage distribution.⁴ For example, Amazon CEO Jeff Bezos stated that the company is developing completely autonomous drones that will be able to deliver products within thirty minutes of the customer's order.⁵

Many other industries either already use civilian drones, or they have plans to use them in the near future.⁶ Some of these uses are conventional, such as realtors using drones to take aerial photos of prospective properties for their clients.⁷ At the other end of the spectrum, members of the technology industry are conceiving highly creative ways to put drones to use.⁸ Facebook CEO Mark Zuckerberg, for instance, is exploring the possibility of creating a drone that can provide Internet service to areas of the world without access.⁹

Given the demand to use drones by both private citizens and commercial entities, the FAA moved quickly in June 2016 to create a small rule that governs the operation of unmanned drones by individuals and businesses.¹⁰ The new rule includes many restrictions, such as limiting drone flight only to day-light hours, requiring the operator to be within the line-of-sight of the Unmanned Aircraft System ("UAS") at all times, and prohibiting the operation of

³ See, e.g., *7-Eleven Teams with Flirtey*, *supra* note 1 (stating that drone delivery provides maximum convenience for the customer and that 7-Eleven plans to make all of its products deliverable via drone in the future); *Amazon Prime Air*, <https://www.amazon.com/Amazon-Prime-Air/b?ie=UTF8&node=8037720011> [<https://perma.cc/E49P-EV79>] (detailing Amazon's planned use of drones to deliver packages to consumers in thirty minutes or less). Amazon is by far the world's largest online retailer in terms of online sales. Arthur Zaczekiewicz, *Amazon, Wal-Mart and Apple Top List of Biggest E-Commerce Retailers*, WWD (Apr. 7, 2017), <http://wwd.com/business-news/business-features/amazon-wal-mart-apple-biggest-e-commerce-retailers-10862796/> [<https://perma.cc/5TAF-JLK7>] (noting that Amazon's total sales in a twelve-month period from 2016 to 2017 were more than the next forty-nine online retailers' sales combined during that same period).

⁴ See, e.g., Nathaniel Mott, *Jeff Bezos Offers New Details on Amazon's Delivery Drones*, INVERSE (Oct. 25, 2016), <https://www.inverse.com/article/22719-jeff-bezos-new-details-amazon-delivery-drones> [<https://perma.cc/E8BA-AAR7>] (discussing Amazon's planned use of drones to deliver packages to customers within thirty minutes of their order).

⁵ *Id.* The drones Amazon plans to use will fly at speeds greater than fifty miles per hour and be able to fly twenty miles round-trip and carry packages up to five pounds in weight. *Id.*

⁶ See Kevin D. Trost, *Up, Up, and Away: Rising Legal Regulation of Drone Operation*, WIS. LAW., Sept. 2016, at 16 (providing examples of the commercial uses of drones, including by realtors, photographers, television news stations, and factory farms).

⁷ See *id.* (describing drone use as a way to assist in ordinary business activities).

⁸ See *id.* (discussing Facebook CEO Mark Zuckerberg's plan to use drones to bring Internet service to remote parts of the world).

⁹ *Id.* Zuckerberg envisions using solar-powered drones that can fly for multiple years straight and has already purchased a company that creates drones. *Id.*

¹⁰ Bryan Wynne & Tim Day, *Commercial Drones Are Cleared for Take Off*, FORBES (Oct. 28, 2016), <https://www.forbes.com/sites/realspin/2016/10/28/commercial-drones-are-cleared-for-take-off/#55cf5c32145c> [<https://perma.cc/V5PZ-VMJL>]. Small Rule 107 is a federal regulation created by the FAA in order to regulate the operation of drones by both commercial operators and private citizens. 14 C.F.R. § 107.1 (2016).

a UAS over individuals not involved in the flight.¹¹ Almost all of the restrictions created by the rule, however, are waivable so long as the applicant can demonstrate that he or she can still operate the UAS safely.¹² It seems that such waivers are not difficult to obtain—the FAA granted seventy-six waivers to applicants on the first day that the small rule came into effect.¹³

In light of the FAA's decision to minimally regulate UAS, property owners will be left with many questions as to their rights with respect to drones occupying the low-altitude airspace over their homes.¹⁴ This Note argues that property owners should have a concrete way to enforce their property rights—either through private causes of action or federal regulation—against UAS that enter the low-altitude airspace above their parcels.¹⁵ Part I provides an overview of the rise of civilian drones within the United States, an explanation of common law trespass and nuisance doctrines, and further information about current efforts to regulate drones.¹⁶ Part II examines how the common law causes of action of trespass and nuisance could apply to a drone flying in the low-altitude airspace above an individual's property.¹⁷ Part III argues that, while a property owner could succeed in a trespass or nuisance suit against a drone operator, such an approach would be impractical and inadequate.¹⁸ Part III further argues that comprehensive federal regulation is the best solution to limit the impact of commercial drones on individual property rights and that

¹¹ See generally FAA, SUMMARY OF SMALL UNMANNED AIRCRAFT RULE (PART 107) (2016), https://www.faa.gov/uas/media/Part_107_Summary.pdf [<https://perma.cc/4DEL-AMGR>] (stating that an operator cannot fly their drone over anyone on the ground who is not participating in the operation of the Unmanned Aircraft System (“UAS”), unless that person is under the cover of a structure or inside a motor vehicle).

¹² *Id.* at 2; see 14 C.F.R. § 107.200(a) (“The Administrator may issue a certificate of waiver authorizing a deviation from any regulation specified in [14 C.F.R.] § 107.205 if the Administrator finds that a proposed small UAS operation can safely be conducted under the terms of that certificate of waiver.”). The waiver request must fully describe the proposed drone operation, and the requestor must demonstrate how “the operation can safely be conducted under the terms of a certificate of waiver.” 14 C.F.R. § 107.200(b). If approved, someone who receives a waiver may deviate from the restrictions set forth in the small rule as specified in the waiver and must also follow any conditions noted in the waiver as well. *Id.* § (d)(1)–(2).

¹³ See Wynne & Day, *supra* note 10 (noting the number of waivers granted on the first day of Small Rule 107's enactment and arguing that these waivers are indicative of the FAA's desire to regulate drones flexibly).

¹⁴ See SUMMARY OF SMALL UNMANNED AIRCRAFT RULE (PART 107), *supra* note 11, at 1 (stating that UAS must generally fly at a maximum altitude of four-hundred feet); Troy A. Rule, *Airspace in an Age of Drones*, 95 B.U. L. REV. 155, 165 (2015) (noting that current property law, as it is understood today, is not clear in establishing what rights a property owner has to keep drones or other low-flying objects out of the airspace directly over their parcel).

¹⁵ See *infra* notes 166–210 and accompanying text.

¹⁶ See *infra* notes 20–122 and accompanying text.

¹⁷ See *infra* notes 123–165 and accompanying text.

¹⁸ See *infra* notes 171–186 and accompanying text.

states are in the best position to protect landowners' property rights and privacy against private drone operators.¹⁹

I. DRONES, TRESPASS, AND NUISANCE

Under common law, courts allow a property owner to bring a cause of action for trespass against an individual who enters his or her land without prior approval by the owner.²⁰ To succeed in a suit for trespass, the plaintiff must not have invited the defendant onto his or her property; the plaintiff also cannot sue if the defendant was carrying out a duty owed to the property owner.²¹ Such a duty would likely arise, for instance, when a landowner contracts with another party to perform work on their land.²² Furthermore, a trespasser can be someone who "does so out of curiosity, or for his own purposes or convenience."²³ Over time, however, courts have used common law trespass doctrine to determine whether a property owner is entitled to compensation for all kinds of bizarre intrusions, many of which a layperson would not envision as a potential trespass.²⁴ Recently, the growing use of private and commercial drones has raised questions as to what rights property owners have against drones flying relatively low in the airspace over their property.²⁵ This Part details the rise

¹⁹ See *infra* notes 187–210 and accompanying text.

²⁰ See, e.g., *Heller v. New York, N.H. & H.R. Co.*, 265 F. 192, 194 (2d Cir. 1920) (holding that the plaintiff's son, who passed away after touching electrically-charged wire on the defendant's property, was a trespasser). The child's trespass was not reasonably foreseeable by the defendant; therefore, the defendant did not act negligently in the child's unfortunate death. *Id.* at 198–99.

²¹ *Id.* at 194.

²² See RESTATEMENT (SECOND) OF TORTS § 168 cmt. b (AM. LAW INST. 1965) (providing that a landowner can create a specific, conditional privilege for another party to enter the land but that the party upon which the privilege was conferred cannot be on the land for any purpose other than the one for which the privilege was granted).

²³ *Heller*, 265 F. at 194. In *Heller*, the plaintiff's son was exploring the defendant's property and accidentally killed himself after touching electric wire on the premises. *Id.* at 193. Thus, when stating that a trespasser can be someone who "does so out of curiosity, or for his own purposes or convenience," the court is making clear that a trespasser does not need to have nefarious intentions when making an unauthorized entry onto the plaintiff's land in order for that entry to be a trespass. *Id.* at 194.

²⁴ See, e.g., *Herrin v. Sutherland*, 241 P. 328, 331 (Mont. 1925) (holding that the defendant committed trespass when, standing on a neighboring parcel, he fired a shotgun over the plaintiff's property); *Ivancic v. Olmstead*, 488 N.E.2d 72, 74–75 (N.Y. 1985) (holding that a landowner's allowance of a rather large tree to naturally grow across her property line and into the airspace of her neighbor's property did not constitute common law trespass); *Butler v. Frontier Tel. Co.*, 79 N.E. 716, 718 (N.Y. 1906) (holding that a telephone wire hung thirty feet above the plaintiff's property by the defendant constituted a trespass).

²⁵ See, e.g., Rule, *supra* note 14, at 165 (noting that current property law, as it is understood today, is not clear in establishing what rights a property owner has to keep drones or other low-flying objects out of the airspace directly over their parcel). Property rights on the ground and at high altitude, where airplanes travel, are far more clear-cut. *Id.* The Supreme Court has held that landowners do not have property rights in the high altitude airspace above their land. *United States v. Causby*, 328 U.S. 256, 260–61 (1946). Similarly, it is well established that a landowner can impose trespass liability

of civilian drones and how this new technology intersects with common law property rights and FAA regulations.²⁶ Section A provides background information about drones and their potential uses and government responses.²⁷ Section B explains trespass at common law and provides examples of cases in which parties used common law trespass doctrine to enforce their air rights.²⁸ Section C examines the tort of nuisance, including privacy principles, at common law and analyzes how courts apply this doctrine to different sets of facts.²⁹

A. The Rise of Civilian Drones in the Modern World and Government Response

Unmanned drones are poised to explode in use by both private citizens and business entities.³⁰ Congress passed the Federal Aviation Administration Modernization and Reform Act in 2012 which required the FAA to create regulations that will assimilate the flight of drones in U.S. airspace.³¹ The FAA predicts drone sales to increase from 2.5 million in 2016 to at least seven million in 2020.³² Although drone technology originated in the military, technological advancements in recent years have made production for civilian purposes inexpensive and operation simpler.³³

ity on one who intentionally enters his or her land without permission, regardless of whether any damage is caused. RESTATEMENT (SECOND) OF TORTS § 158.

²⁶ See *infra* notes 30–122 and accompanying text.

²⁷ See *infra* notes 30–53 and accompanying text.

²⁸ See *infra* notes 54–98 and accompanying text.

²⁹ See *infra* notes 99–122 and accompanying text.

³⁰ See, e.g., Lui, *supra* note 2 (using Domino’s Pizza’s delivery of pizza via drone as an example of how businesses will eventually make regular use of drones to deliver their products to consumers in a more cost-effective, timely manner).

³¹ Federal Aviation Administration Modernization and Reform Act, Pub. L. No. 112-95, § 332(a)(1), 126 Stat. 11, 73 (2012) (codified at 49 U.S.C. § 40101). The purpose of the Federal Aviation Administration Modernization and Reform Act is to “streamline programs, create efficiencies, reduce waste, and improve aviation safety and capacity, to provide stable funding for the national aviation system, and for other purposes.” *Id.* It specifically requires relevant government and industry parties to create a plan to “safely accelerate the integration of civil unmanned aircraft systems into the national airspace system.” *Id.*

³² See A. Michael Froomkin & Ryan Calo, *Should You Be Allowed to Prevent Drones from Flying Over Your Property?*, WALL ST. J. (May 22, 2016), <http://www.wsj.com/articles/should-you-be-allowed-to-prevent-drones-from-flying-over-your-property-1463968981> [<https://perma.cc/QX74-MYME>] (describing how the FAA predicts at least seven million drones will be flying in U.S. skies by 2020).

³³ See Hillary B. Farber, *Eyes in the Sky: Constitutional and Regulatory Approaches to Domestic Drone Deployment*, 64 SYRACUSE L. REV. 1, 12–14 (2014) (stating that, in as early as 2012, approximately fifty companies were producing numerous drone models and that some UAS models designed for civilian use can be controlled via smartphone or tablet); Ben Zimmer, *The Flight of “Drone” from Bees to Planes*, WALL ST. J., July 27, 2013, at C4 (discussing the use of drones by the U.S. Navy in the years leading up to World War II); see also Julia L. Chen, Note, *Restoring Constitutional Balance: Accommodating the Evolution of War*, 53 B.C. L. REV. 1767, 1788–90 (2012) (providing a history of the rise of drones in the U.S. military).

Drones have become affordable for many private citizens.³⁴ Their capabilities have also increased, as drones available for private use can fly for well over an hour and are able to take high quality picture and video.³⁵ If drones available for civilian use continue to follow in the footsteps of military-grade drones, future models available to the public will fly for much longer periods of time and will be able to take even higher quality photographs and videos.³⁶

The use of drones for non-commercial purposes by private citizens has already begun to cause problems that raise questions about their legality.³⁷ Private drone operators have, for example, flown their UAS above professional baseball games, directly outside the windows of private, high-rise apartment buildings, and even near fireworks shows.³⁸ Even the use of drones by law enforcement for surveillance has led to questions about the legality of such tactics.³⁹

³⁴ See Farber, *supra* note 33, at 14 (noting that a private individual could purchase a drone for as little as \$300 in 2014); *Holy Stone HSI170 Mini RC Predator Mini RC Helicopter Drone 2.4Ghz 6-Axis Gyro 4 Channels Quadcopter Good Choice for Drone Training*, <https://www.amazon.com/Holy-Stone-Predator-Helicopter-Quadcopter/dp/B0157IHJMQ> [<https://perma.cc/DZ6E-296V>] [hereinafter *Holy Stone HSI170 Mini RC Predator*] (selling, at the time of publication, a drone for under \$50).

³⁵ See Farber, *supra* note 33, at 14 (providing an example of a drone equipped with a high-quality camera in 2014); *Holy Stone HSI170 Mini RC Predator*, *supra* note 34 (providing an example of an inexpensive drone that can fly for at least sixty minutes after a six to eight minute charge time).

³⁶ See Farber, *supra* note 33, at 15–16 (detailing the multiple drones used by the U.S. military and various law enforcement agencies, one of which can fly for forty-eight hours uninterrupted and another equipped with a 1.8 gigapixel color camera).

³⁷ See Rule, *supra* note 14, at 163–64 (providing numerous examples where current property law was unclear in determining whether drone operators could be held liable, criminally or civilly, for operating their machines in airspace above private land).

³⁸ See Heidi Hall, *Nashville Entrepreneur Flies Drone to Film Fireworks*, TENNESSEAN (July 6, 2014), <http://www.tennessean.com/story/news/local/2014/07/05/nashville-fireworks-drone-video/12245831/> [<https://perma.cc/T3SY-WFTS>] (describing how a man in Nashville, Tennessee, flew his drone into the middle of the city's Fourth of July fireworks show, which caused a potentially dangerous situation that was not prohibited by state law or FAA regulations at the time); Colleen Wright, *Regulatory Vacuum Exposed After 'Peeping Drone' Incident*, SEATTLE TIMES (July 7, 2014), <http://www.seattletimes.com/seattle-news/regulatory-vacuum-exposed-after-isoquopeeping-dronersquo-incident/> [<https://perma.cc/62TG-62JM>] (discussing a situation in which a drone operator, who was attempting to take pictures of a residential high-rise building in Seattle for a developer, accidentally took pictures of a female resident while she was changing and arguing that the drone operator's actions fell within an undeveloped area of the law); see also Editorial Board, *Drones Are Coming: PNC Park's Aerial Visitor Is a Warning for the Future*, PITTSBURGH POST-GAZETTE (July 6, 2014), <http://www.post-gazette.com/opinion/2014/07/06/Drones-are-coming/> stories/201407030106?pgpageversion=pgevoke [<https://perma.cc/G3BA-AVAG>] (reporting on a drone owned by a private citizen that flew over a Major League Baseball game in Pittsburgh, Pennsylvania, and arguing that, while the drone flight in this instance was harmless, the incident demonstrates how easily a drone could cause serious harm to people in a crowded area).

³⁹ See Rule, *supra* note 14, at 164 (stating that, while drones can be incredibly valuable to local law enforcement due to their reasonable size and ability to survey the land from the air at a low cost, questions such as whether a warrant must be obtained to use a drone for surveillance purposes and the admissibility of footage obtained without a warrant or a private landowner's permission to fly above their land remain unsettled in most jurisdictions). Some states have passed their own statutes that limit

The commercial sector, however, will likely be the largest source of the coming influx of drones in the United States.⁴⁰ Massive companies that make direct deliveries to consumers, such as Amazon, spend as much as eleven percent of their revenue on traditional shipping costs via airplane or ground delivery.⁴¹ If these companies can begin to make a majority of their deliveries by drone, their shipping costs will decrease drastically.⁴² As such, they will likely want to ramp up the production of drone fleets as soon as possible.⁴³ Drones will not only be used in commerce for delivery purposes.⁴⁴ They are also being used, or will be used, in areas ranging from film production to disaster relief efforts.⁴⁵

The FAA enacted a small rule in June 2016 to regulate the flight of drones for both commercial and private purposes.⁴⁶ An administration within the U.S.

law enforcement's ability to use drones for surveillance. *See, e.g.*, FLA. STAT. § 934.50(3)(a) (2013) (stating that law enforcement agencies in Florida "may not use a drone to gather evidence or other information"). There are usually exceptions to this far-reaching rule against police use of drones for surveillance. *See, e.g., id.* § 934.50(4)(a)–(c) (listing the criteria for when law enforcement agencies can use drones for surveillance). For example, Florida law enforcement can use drones for surveillance if (1) there is a credible, high risk of an impending terrorist attack, as determined by the U.S. Secretary of Homeland Security; (2) the law enforcement agency in question obtains a search warrant, signed by a judge, for the use of a drone; or (3) the law enforcement agency reasonably believes that a drone is needed to take rapid measures against looming, serious danger to life or property, to prevent the escape of a suspect or the destruction of evidence, or to search for a missing person. *Id.*

⁴⁰ *See* Juan Plaza, *The Impact of Commercial UAVs on Corporate America Part 1*, COM. UAV NEWS (Oct. 27, 2016), <http://www.expouav.com/news/latest/impact-commercial-uavs-corporate-america-part-1/> [<https://perma.cc/97FT-CJ4M>] (stating that numerous large corporations are planning to eventually make most of their deliveries by drone so drone production and, therefore, use will explode in the near future).

⁴¹ *Id.*

⁴² *See id.* (standing for the proposition that, in the long term, the cost of transporting goods via a fleet of autonomous drones will be less than the cost of paying for employees and the maintenance of delivery vehicles). The use of autonomous drones to deliver packages directly from Amazon's warehouse to the customer's home would help the company to save costs during the very expensive "last mile," where a delivery driver must exit the vehicle and deliver the package to the customer's home. *Id.* The last mile is the most expensive part of a delivery because of the time needed for the driver to deliver each individual package along his or her route; it is a highly inefficient process that accounts for a significant portion of each package's shipping cost. *Id.* An autonomous drone fleet owned by Amazon that can deliver packages directly to consumers would eliminate the high costs associated with the last mile for all deliveries to consumers living close enough to a distribution center, which in turn would allow Amazon to focus its use of expensive ground transportation on customers that are inaccessible by drone. *Id.*

⁴³ *See* Plaza, *supra* note 40 (demonstrating the incentive for companies to expand drone usage).

⁴⁴ *See* Rule, *supra* note 14, at 160–62 (discussing the application of domestic drone usage in numerous other industries).

⁴⁵ *Id.* In addition to their use in the movie industry and disaster relief efforts, utility companies, pipeline companies, border control agencies, firefighters, volcano researchers, severe weather experts, agribusiness, journalists, and real estate agents have already used drones to make their work easier. *Id.*

⁴⁶ *See generally* SUMMARY OF SMALL UNMANNED AIRCRAFT RULE (PART 107), *supra* note 11 (detailing all of the major provisions included within the FAA small rule). As a federal agency created by Congress, the FAA has the power to create and implement regulations like Small Rule 107 for a

Department of Transportation, the FAA is responsible for overseeing and regulating almost all aspects of civil aviation safety.⁴⁷ Because the FAA does everything from implementing policies that promote the safest, most efficient use of U.S. airspace to creating hiring criteria and training for air traffic controllers, the administration has a massive amount of control over civil aeronautics in the United States.⁴⁸

When creating regulations that govern the flight of aircraft in the United States, the FAA is statutorily required to, among other factors, “[protect] individuals and property on the ground.”⁴⁹ While FAA Small Rule 107 certainly protects the physical safety of people on the ground by prohibiting drones from flying over individuals not involved with the flight, it does not guard against invasions of an individual’s privacy or interference with his or her property rights.⁵⁰

Some municipalities and states have enacted their own laws regulating drone flight, the majority of which govern drone operation or flight by individuals for non-commercial purposes.⁵¹ While these laws, especially the Wisconsin state statute, protect the privacy of individuals, they do little to protect in-

variety of reasons, including the emergence of new technologies affecting the agency’s legal area of focus. OFFICE OF THE FED. REGISTER, A GUIDE TO THE RULEMAKING PROCESS 2 (2011), https://www.federalregister.gov/uploads/2011/01/the_rulemaking_process.pdf [<https://perma.cc/N8WB-SJLL>]. In promulgating a new regulation, the agency must provide notice to the public that it is considering issuing a proposed rule and allow interested parties to comment on the proposed rule. *Id.* at 3. In promulgating a final rule, once all of the comments, relevant scientific data, expert opinions, and facts have been collected (collectively, the “rulemaking record”), the agency “must base its reasoning and conclusions on the rulemaking record.” *Id.* at 6. After creating a final rule, the agency must publish the new rule in the Federal Register and amend any regulations affected by the new rule in the Code of Federal Regulations. *Id.* at 9.

⁴⁷ See 49 U.S.C. § 106(g)(1)(A)–(B) (2012) (providing that the FAA shall enforce and regulate all statutes relating to civil aviation safety, except for the “transportation, packaging, marking, or description of hazardous material”); *What We Do*, *supra* note 1 (listing the various roles played by the FAA within the U.S. government, including the promotion of safety within civilian aviation and the stimulation of both civil aeronautics and advancement of aviation technology).

⁴⁸ 49 U.S.C. § 40103(b) (providing that the FAA must promulgate regulations that promote safe and efficient use of U.S. airspace by aircraft); *id.* § 44506 (listing all of the factors to be considered by the FAA when developing training and hiring policies for air traffic controllers).

⁴⁹ *Id.* § 40103(b)(2)(B). It is unclear from the text of the statute whether protection of people and property on the ground refers only to their physical safety. See *id.* (failing to further define physical safety).

⁵⁰ See SUMMARY OF SMALL UNMANNED AIRCRAFT RULE (PART 107), *supra* note 11, at 1 (providing that a pilot cannot fly his or her drone over an individual unconnected with the flight who is not under a covered structure but failing to include any protections for the property rights of low-altitude airspace or individual privacy).

⁵¹ See, e.g., Trost, *supra* note 6, at 16–18 (providing examples of a municipal law in Green Bay, Wisconsin, and a Wisconsin state law that restrict when and how hobbyists may fly their drones). The municipal law prohibits flying a drone below four hundred feet above a special event, including football games, fireworks shows, and the city’s annual art festival. *Id.* at 16. The state law is stricter and imposes liability for a Class A misdemeanor on any drone operator who uses his or her drone for voyeuristic purposes. *Id.* at 18.

dividual property interests.⁵² This is because the Wisconsin state law only punishes drone operators who use their drone for voyeuristic purposes; the law does not impose liability upon those who simply invade the airspace above a property owner's land without using the drone to take pictures or video of the individuals living on the land.⁵³

B. Common Law Trespass

At common law, trespass is essentially defined as the intentional, unpermitted entry onto the land of another, regardless of whether any damage to the property itself occurred.⁵⁴ In *Roman Catholic Archbishop of Boston v. Rogers*, for instance, the Massachusetts Appeals Court held that the former parishioners of a closed-down church were trespassing by holding a vigil on the structure's steps.⁵⁵ Because the Archbishop of Boston owned the church and told the parishioners to "move on" from their vigil, the court relied on Section 158 of the Restatement (Second) of Torts to hold that the parishioners were trespassers.⁵⁶

An individual does not have to remain on the land for it to constitute a trespass.⁵⁷ In *Jacque v. Steenberg Homes, Inc.*, the Wisconsin Supreme Court held that the defendant, a mobile home delivery company, was liable for trespass after crossing the plaintiffs' farm field to deliver mobile homes to the plaintiffs' neighbors.⁵⁸ The defendant did so, despite being told not to by the plaintiffs, because it would be far more time-consuming and costly for the defendant to make deliveries via a nearby private road.⁵⁹ The Wisconsin Supreme Court held that there is an important public interest in protecting landowners from intentional trespassers and that one hundred thousand dollars in punitive damages was appropriate to deter such behavior and uphold property rights.⁶⁰

⁵² See *id.* (noting that critics have complained about the Wisconsin state law's failure to protect property rights in addition to privacy rights).

⁵³ *Id.*

⁵⁴ See RESTATEMENT (SECOND) OF TORTS § 158 (explaining that one is liable for trespass if he or she "intentionally (a) enters land in possession of the other, or causes a thing or third person to do so, or (b) remains on the land, or (c) fails to remove from the land a thing which he is under a duty to remove").

⁵⁵ *Roman Catholic Archbishop of Bos. v. Rogers*, 39 N.E.3d 736, 743 (Mass. App. Ct. 2015). The court noted that a number of factors, such as paying real estate taxes and utility bills for the property, clearly indicate that the Archbishop owned the property. *Id.* at 742.

⁵⁶ *Id.* at 742–43. The parishioners intentionally entered and remained on church property without justification or excuses, thus making them trespassers. *Id.* (citing RESTATEMENT (SECOND) OF TORTS § 158).

⁵⁷ *Jacque v. Steenberg Homes, Inc.*, 563 N.W.2d 154, 160–61 (Wis. 1997) (holding that a mobile home company's repeated crossing an individual's lawn to deliver mobile homes is a trespass that warrants punitive damages).

⁵⁸ *Id.*

⁵⁹ *Id.* at 157.

⁶⁰ *Id.* at 160–61 (describing the strong interest individuals have in excluding trespassers from their land and explaining that landowners should feel secure knowing that they can vindicate their

Although the intrusion was brief, fleeting, and caused no serious damage to the plaintiff's land, the court nevertheless held that the defendant's actions constituted a trespass.⁶¹

A trespass must also be a tangible invasion of the landowner's property.⁶² Intrusions by matter such as dirt, dust, noise, and vibrations are usually not considered the type of physical invasion necessary to sustain a trespass action.⁶³

Common law trespass doctrine applies to more than just the unauthorized, intentional intrusion onto the surface land of another.⁶⁴ Rather, an individual or entity can commit common law trespass "on, beneath, or above the surface of the earth."⁶⁵ Under traditional property law, a land owner holds the rights to the land itself, the air above it, and the ground below it, a concept known as the ad coelum doctrine.⁶⁶ The ad coelum doctrine thus embodies the proposition that trespass can occur below, on or above one's land, stating "land has an indefinite extent, upwards, as well as downwards, so as to include everything terrestrial, under or over it."⁶⁷ In light of the doctrine, it would seem that a drone or other aircraft entering the air above someone's land would be an obvious trespass.⁶⁸ Naturally, however, the ad coelum doctrine is not enforced literally in a modern era dominated by aerial travel.⁶⁹ In regards to aerial trespass, the Restatement (Second) of Torts states that aircraft flight above another's property can be a trespass only if the craft "enters into the immediate

property rights in the courts). The court upheld the trial jury's award of \$100,000 in punitive damages. *Id.* at 163.

⁶¹ *Id.*

⁶² *See, e.g., Adams v. Cleveland-Cliffs Iron*, 602 N.W.2d 215, 225 (Mich. Ct. App. 1999) (holding that dust, noise, and vibrations caused by a mining operation were intangible intrusions onto the plaintiff's land, thereby defeating the plaintiff's claim of trespass).

⁶³ *E.g., id. But see Martin v. Reynolds Metals Co.*, 342 P.2d 790, 794 (Or. 1959) ("[W]e may define trespass as any intrusion which invades the possessor's protected interest in exclusive possession, whether that intrusion is by visible or invisible pieces of matter or by energy which can be measured only by the mathematical language of the physicist.").

⁶⁴ RESTATEMENT (SECOND) OF TORTS § 159 (stating that trespass can occur above the land as well).

⁶⁵ *Id.*

⁶⁶ *See Causby*, 328 U.S. at 260–61 (noting that the owner of land under the ad coelum doctrine has rights to the land that "extend[] to the periphery of the universe"). The Latin phrase from which the doctrine is derived is "[c]ujus est solum, ejus es usque ad coelum," which translates as "[t]o whomever the soil belongs, he owns also to the sky." Rule, *supra* note 14, at 166. The full phrase is "[c]ujus est solum, ejus es usque ad coelum et ad inferos." *Id.* at 166 n.53.

⁶⁷ Chad J. Pomeroy, *All Your Air Right Are Belong to Us*, 13 NW. J. TECH. & INTELL. PROP. 277, 284 (2015).

⁶⁸ *See Causby*, 328 U.S. at 261 (noting that under a literal application of the ad coelum doctrine in the modern world, "every transcontinental flight would subject the operator to countless trespass suits").

⁶⁹ *See id.* at 287–88 (explaining that federal statutes and regulations and Supreme Court precedent have all but precluded the literal enforcement of the ad coelum doctrine). Prior to the invention of the airplane, anything that invaded a property owner's airspace was very close to the ground—making the ad coelum doctrine conceptually easy to apply. *Id.* at 286.

reaches of the airspace next to the land” and seriously hinders the property owner’s ability to use and enjoy the land.⁷⁰ Courts reached this modern understanding of aerial trespass gradually.⁷¹

Numerous cases demonstrate the practical approach courts have taken to the application of the ad coelum doctrine in the modern era.⁷² In 1925, in *Herrin v. Sutherland*, for instance, the Montana Supreme Court held that the defendant, standing on a neighboring parcel, committed a trespass by firing his shotgun over the plaintiff’s property.⁷³ In 1906, in *Butler v. Frontier Telephone Co.*, the New York Court of Appeals decided that a telephone company’s attempt to hang a telephone wire thirty feet above the plaintiff’s property constituted a trespass.⁷⁴ In 1872, in *Smith v. Smith*, the Massachusetts Supreme Judicial Court held that barn eaves hanging over the boundary line between two neighbors’ parcels of land was a trespass.⁷⁵ Similarly, in 1905, in *Puroto v. Chieppa*, the Connecticut Supreme Court held that the defendants’ addition to their home, which hung one inch over the boundary line between the defendants’ and plaintiffs’ property, constituted a trespass at common law.⁷⁶

⁷⁰ *Id.* It is unclear whether drones are considered “aircraft” as understood by the Restatement’s drafters in 1965, but Small Rule 107’s requirement that UAS fly under four-hundred feet at all times will likely lead to drones entering “the immediate reaches of the airspace next to the land.” RESTATEMENT (SECOND) OF TORTS § 159(2); see SUMMARY OF SMALL UNMANNED AIRCRAFT RULE (PART 107), *supra* note 11, at 1 (stating that UAS must generally fly at a maximum altitude of four-hundred feet). For reference, an average two-story house is typically between twenty and twenty-five feet tall, meaning that a drone flying at the maximum height of four hundred feet would be between sixteen and twenty times higher in the air than an average two-story house. See *How Tall Is a Two Story House?*, REFERENCE.COM, <https://www.reference.com/art-literature/tall-two-story-house-39352dafb18b8121#> [<https://perma.cc/7ZB9-GSUU>] (providing the average height of a two-story house and providing the factors that determine how tall a two-story house will stand). At this height, a drone would be visible, but almost certainly inaudible, from the ground. See Harvest Zhang, *Why Are Drones So Loud?*, QUORA.COM (Mar. 7, 2016), <https://www.quora.com/Why-are-drones-so-loud> [<https://perma.cc/X5KN-3DEW>] (stating that an individual on the ground would likely not hear or notice a typical drone unless they were already aware of its presence).

⁷¹ See *infra* notes 72–92 and accompanying text (discussing the evolution of judicial understanding of aerial trespass).

⁷² See, e.g., *Herrin*, 241 P. at 331 (referring to the ad coelum doctrine and holding that shooting a shotgun over someone’s property is a trespass).

⁷³ *Id.* at 331–32. The court reasoned that the plaintiff’s land included ownership of all space above and below it and that firing a shotgun over plaintiff’s land impeded his ability to use and enjoy his property. *Id.*

⁷⁴ *Butler*, 79 N.E. at 718. Like in *Herrin*, the court in *Butler* held that the plaintiff owned the space inhabited by the defendant’s wire; therefore, the defendant was liable for trespass upon the plaintiff’s property. *Id.*

⁷⁵ *Smith v. Smith*, 110 Mass. 302, 304 (Mass. 1872). The court noted that if the plaintiff never brought a trespass action against the defendant, the defendant would likely have a valid claim for adverse possession if the eaves continued to hang over the boundary line between their properties for twenty years. *Id.* An adverse possession claim requires the plaintiff to occupy the defendant’s property without permission, which is trespassing. *Id.*

⁷⁶ *Puroto v. Chieppa*, 62 A. 664, 665 (Conn. 1905). Although there was no specific injury to the plaintiffs attributable to the defendant’s home addition, the court nevertheless decided that the plain-

Smith v. New England Aircraft Co. represents an early application of the ad coelum doctrine to low-flying aircraft.⁷⁷ In this case, the plaintiffs resided near the Worcester, Massachusetts, airport and brought a trespass claim to enjoin the airport from allowing planes to fly at low altitudes above their property.⁷⁸ Here, the court held that such low-altitude flights did constitute trespass and explained that property rights cannot be diminished due to the emergence of the aviation industry.⁷⁹

In 1936, six years after *New England Aircraft* was decided in Massachusetts, the United States Court of Appeals for the Ninth Circuit took a near opposite approach to reject the ad coelum doctrine in *Hinman v. Pacific Air Transport*.⁸⁰ Like *New England Aircraft*, *Hinman* involved plaintiffs suing over the flight of airplanes above their property.⁸¹ Yet, rather than finding for the plaintiffs through the literal application of the ad coelum doctrine, the *Hinman* court instead decided that in order for a plane to trespass airspace, the property owner must use the airspace in a way that is connected with the use or enjoyment of the land.⁸² The court went on to state that, in its view, ad coelum as applied literally was never good law and emphasized the importance of basing a charge of aerial trespass upon its effect on the use and enjoyment of the land.⁸³

In 1946, in *United States v. Causby*, the Supreme Court settled the place of the ad coelum doctrine in the modern world and sided with the *Hinman* court in stating “[the ad coelum doctrine] has no place in the modern world.”⁸⁴ The Court went on to explain that the literal application of the ad coelum doctrine would interfere with Congress’s intention to use the skies as a medium for transportation.⁸⁵ Although it rejected the ad coelum doctrine, the Court found that the plaintiff-property owners did have enforceable rights against low-

tiffs were entitled to nominal damages as a result of the legal injury caused by the defendant’s trespass. *Id.*

⁷⁷ *Smith v. New England Aircraft Co.*, 170 N.E. 385, 393 (Mass. 1930).

⁷⁸ *Id.* at 386–87. The judge found that many planes flew as low as one-hundred feet above the plaintiffs’ property. *Id.* at 387.

⁷⁹ *Id.* at 393. The court decided that, although the defendants had committed trespass, the damages were not substantial enough to warrant injunctive relief requested by the plaintiffs. *Id.* at 393–94.

⁸⁰ *Hinman v. Pacific Air Transp.*, 84 F.2d 755, 757 (9th Cir. 1936) (abrogating the ad coelum doctrine).

⁸¹ *Id.* at 756. The plaintiffs alleged that the defendants flew their commercial airplanes as low as one-hundred feet above their property—the same altitude that the defendants flew their planes in *New England Aircraft*. *Id.* at 756; *New England Aircraft*, 170 N.E. at 387.

⁸² *Hinman*, 84 F.2d at 757.

⁸³ *Id.*

⁸⁴ *Causby*, 328 U.S. at 260–61.

⁸⁵ *Id.* at 261. The Court stressed that, if applied as understood in ancient times, the ad coelum doctrine would subject airline companies and pilots to near limitless liability for trespass every time they operated an airplane. *Id.*

flying aircraft that diminished their use and enjoyment of the land.⁸⁶ Furthermore, the Court exempted aircraft from the ad coelum doctrine because they move goods and people exponentially faster than any other mode of transportation.⁸⁷ The plaintiffs in *Causby* sued the U.S. government under the theory that its low-flying aircraft constituted a taking, but this case would undoubtedly be brought as a trespass action if the plaintiffs sued a private party that flew aircraft at a similar altitude over their land.⁸⁸

Importantly, and perhaps unfortunately, the Court in *Causby* did not specify just how much airspace a property owner owns above his or her land.⁸⁹ The Court instead used a rather vague standard, holding that property owners only have dominion over the airspace within the “immediate reaches” of the parcel.⁹⁰ The immediate reaches test states that the property owner owns only airspace that he or she could “occupy or use in connection with the land.”⁹¹ The Court also held that the immediate reaches test covered airspace that, when entered into by an unwanted party, “[subtracts] from the owner’s full enjoyment of the property.”⁹²

In 1974, the Tenth Circuit grappled with the application of the “immediate reaches” doctrine in *Pueblo of Sandia ex rel. Chaves v. Smith*.⁹³ In *Pueblo of Sandia*, a legally recognized Indian tribe sued the owner of a neighboring private airport for aerial trespass, alleging that arriving and departing aircraft consistently flew over the tribe’s property at altitudes of one-hundred-fifty feet

⁸⁶ See *id.* at 266–67 (agreeing with the lower court in its holding that low-flying aircraft over one’s property can create an actionable burden if it affects the use and enjoyment of the property). In *Causby*, the plaintiffs sought to establish that a taking of their land had occurred because the U.S. military, occupying a municipal airport directly adjacent to plaintiffs’ property, was the entity flying the planes over their land. *Id.* at 258–60. The flights not only startled the plaintiffs and negatively impacted their ability to sleep, but also destroyed their ability to run and maintain a chicken farm on their property. See *id.* at 259 (describing how one-hundred-fifty chickens killed themselves by flying into the walls of the coop in terror from the sound of the jet engines and how the sounds of the aircraft severely diminished the farm’s output).

⁸⁷ See *id.* at 260–61 (stating that the literal application of the ad coelum doctrine “has no place in the modern world” because it would disrupt the use of high-altitude airspace as the “public highway” as Congress had deemed); Pomeroy, *supra* note 67, at 293 (arguing that aircraft transporting people and goods need and use high-altitude air rights more than landowners who would have a property interest in those same air rights under the ad coelum doctrine).

⁸⁸ *Causby*, 328 U.S. at 258; see *Hinman*, 84 F.2d at 756 (involving plaintiffs who brought a trespass action against a private party that flew aircraft at a low altitude over their property); *New England Aircraft*, 170 N.E. at 386–87 (involving a plaintiff who sued a neighboring airport for aerial trespass as a result of aircraft flying at low altitudes over the plaintiff’s property).

⁸⁹ *Causby*, 328 U.S. at 266 (stating that the Court did not, at the time of the opinion, have to decide where the line between private and public airspace lies).

⁹⁰ *Id.*

⁹¹ *Id.* at 264.

⁹² *Id.* at 265.

⁹³ *Pueblo of Sandia ex rel. Chaves v. Smith*, 497 F.2d 1043, 1044–45 (10th Cir. 1974).

or less.⁹⁴ Ultimately, the court declined to find that an aerial trespass had occurred because, although a flight that is one-hundred-fifty feet above the ground may be within the immediate reaches of the land, the plaintiffs did not allege that the low-altitude aircraft using defendant's airport substantially interfered with the use of the land.⁹⁵

Under the ambiguous principles expressed in *Causby*, questions still remain about the upper-limit of "immediate reaches," what constitutes an occupation or use "in connection with the land," and what kinds of aerial activities by outside parties "subtract from the owner's full enjoyment of the property."⁹⁶ At the time *Causby* was decided, the immediate reaches standard was successful in settling the debate over whether landowners had enforceable rights against airplanes flying at high-altitude under the ad coelum doctrine.⁹⁷ Due to the FAA small rule's requirement that civilian drones must fly at an altitude below four-hundred feet, however, it will be much more difficult to reliably determine whether a property owner has a cause of action against the operator of a drone flying in the low-altitude airspace above his or her property.⁹⁸

C. Common Law Nuisance and Privacy Rights

At common law, landowners can also enforce their property rights through an action for private nuisance.⁹⁹ The Restatement (Second) of Torts provides that an individual can be held liable for nuisance if, but only if, his or her conduct constitutes an intrusion of the property owner's interest in their

⁹⁴ *Id.* at 1044.

⁹⁵ *Id.* at 1045.

⁹⁶ See *Causby*, 328 U.S. at 264–66 (explaining the immediate reaches standard and the factors to be considered when deciding whether airspace is within the immediate reaches of an individual's land); Rule, *supra* note 14, at 168–69 (discussing the questions left about airspace rights post-*Causby*).

⁹⁷ Rule, *supra* note 14, at 169 n.81 (describing how, at the time *Causby* was decided and immediately thereafter, federal law mandated that aircraft fly at altitudes certainly higher than what the Court envisioned as falling within the immediate reaches of one's land) (citing STUART BANNER, WHO OWNS THE SKY? THE STRUGGLE TO CONTROL AIRSPACE FROM THE WRIGHT BROTHERS ON 259–60 (2008) (explaining that the after the Court's decision in *Causby*, cases involving aerial trespass became less common and the debate over aerial trespass generally subsided)).

⁹⁸ See SUMMARY OF SMALL UNMANNED AIRCRAFT RULE (PART 107), *supra* note 11, at 1 (stating that UAS must generally fly at a maximum altitude of four-hundred feet); Nabihah Syed & Michael Berry, *Journo-Drones: A Flight over the Legal Landscape*, 30 J. MEDIA INFO. & COMM. L. 1, 30 (2014) (explaining that while flying a drone in the low-altitude airspace above an individual's property may constitute a trespass, in the end, established law cannot conclusively determine how a judge would decide such a case); see also Colin Cahoon, *Low Altitude Airspace: A Property Rights No-Man's Land*, 56 J. AIR L. & COM. 157, 198 (1990) (describing landowners' rights as to the low-altitude airspace above their land as a "property rights 'no-man's land,'" in which neither property owners nor those who would enter said low-altitude airspace understand the legal ramifications of doing so).

⁹⁹ See RESTATEMENT (SECOND) OF TORTS § 822 (AM. LAW INST. 1979) (describing the general elements of conduct that would subject one to liability for a private nuisance).

ability to privately use and enjoy the land, and such intrusion is either “(a) intentional and unreasonable, or (b) unintentional and otherwise actionable under the rules controlling liability for negligent or reckless conduct, or for abnormally dangerous conditions or activities.”¹⁰⁰ The comments to Section 822 of the Restatement clarify that, unlike trespass, an action for nuisance is supposed to protect a specific interest or interests in the land.¹⁰¹ Thus, a successful nuisance claim must show that the defendant’s intrusion of the plaintiff’s land somehow injured his or her ability to use and enjoy the land.¹⁰²

Other sections of the Restatement also clarify the elements necessary to succeed in a nuisance claim.¹⁰³ Section 824 states that a nuisance can occur as the result of an overt act or a failure to act by the defendant when he or she has the duty to do so.¹⁰⁴ Section 825 specifies that an invasion of an owner’s interest in the use and enjoyment of his or her land is intentional when the actor acts with the purpose of injuring the owner’s interest in the use or enjoyment of the land, or knows that such an injury will result or is substantially certain to result from the act.¹⁰⁵ Section 826 outlines what makes an intentional invasion unreasonable and states that an invasion is such if the “gravity of the harm” is greater than the “utility of the actor’s conduct,” or if the actor could compensate the landowner without undue financial burden.¹⁰⁶ Sections 827 and 828

¹⁰⁰ *Id.* To succeed in a nuisance action against a drone operator, a property owner would likely have to prove that the intrusion was intentional and unreasonable; it seems unlikely that someone would be flying a drone unintentionally. See SUMMARY OF SMALL UNMANNED AIRCRAFT RULE (PART 107), *supra* note 11, at 2 (specifying that drones subject to the new small rule must be operated by a remote pilot); see also RESTATEMENT (SECOND) OF TORTS § 822(a) (providing the “intentional and unreasonable” invasion prong of liability for nuisance).

¹⁰¹ RESTATEMENT (SECOND) OF TORTS § 822 cmt. b.

¹⁰² *Id.* Commentators have already discussed how landowners may claim that low-flying drones over their property significantly interferes with their ability to use and enjoy the land. See, e.g., Michael A. Thompson, *The Emerging Field of Drone Law*, ARK. LAW., Nov. 13, 2016, at 28 (noting that property owners would likely worry about their safety and privacy if drones are constantly flying over their homes and that the sight and sound of drones could interfere with an individual’s use and enjoyment of his or her property).

¹⁰³ See RESTATEMENT (SECOND) OF TORTS §§ 824–831 (discussing the conduct necessary to liability, intentionality, unreasonableness of an intentional invasion, gravity of harm, utility of conduct, malicious or indecent conduct, severe harm, avoidable invasions, and conduct unsuited to a locality).

¹⁰⁴ *Id.* § 824.

¹⁰⁵ *Id.* § 825. The comments clarify that no malicious intent is required on the part of the defendant to constitute an intentional invasion—if the defendant knows he or she is causing an invasion of the owner’s interest in using and enjoying the land, then this element is met. *Id.* cmt. c. Furthermore, once the actor knows he or she has caused an invasion, any further invasions will be deemed intentional. *Id.* cmt. d. Most nuisance cases involve multiple or repeated invasions, so this concept of intentionality usually applies. *Id.*

¹⁰⁶ *Id.* § 826. When weighing the gravity of the harm to the landowner versus the utility of the actor’s conduct, the court must examine both the gravity and the utility from an objective, legal standard. *Id.* cmt. d. For example, a court should not use a plaintiff’s subjective annoyance with the defendant’s activity as the benchmark for determining the gravity of the harm caused. *Id.* When determining

detail a list of factors to be considered when determining the gravity of the harm against the landowner's interest in the use and enjoyment of the land and the utility of the defendant's conduct, respectively.¹⁰⁷ The factors to be considered in determining the gravity of the harm are (1) the extent and character of the harm; (2) the social value of the use or enjoyment harmed as determined by the law; (3) whether the use or enjoyment harmed is particularly important to the locality, and (4) how easily the property owner could avoid the harm.¹⁰⁸ To determine the utility of the conduct that causes the harm, the court should examine (1) the social value of the primary purpose of the conduct as determined by the law; (2) whether the conduct is particularly important to the locality; and (3) how easily the actor could avoid the invasion of the property owner's use or enjoyment of their land.¹⁰⁹

A leading case that demonstrates the application of common law nuisance doctrine is *Boomer v. Atlantic Cement Company* in which the plaintiffs sued a neighboring cement factory under a nuisance theory for consistently making loud noise and emitting dust into the air around their homes.¹¹⁰ The New York Court of Appeals, in 1970, agreed with the plaintiffs that the dust, dirt, and noise emitted by the defendant constituted a nuisance because it interfered with their use and enjoyment of the land.¹¹¹ The court, however, decided that it would be too costly to shut the factory down and accordingly denied the plaintiff's request for an injunction and allowed the defendant to pay permanent damages to the plaintiffs as a way to end the ongoing litigation.¹¹²

the utility of the defendant's conduct, "the conduct for which the utility is being weighed includes both the general activity and what is done about its consequences." *Id.* cmt. e. Thus, the utility of a noisy factory emitting large amounts of smoke would be greatly reduced if the owner did nothing to compensate his or her neighbors. *Id.*

¹⁰⁷ *Id.* §§ 827–828. The factors for both tests are to be applied on a case-by-case basis. *Id.*

¹⁰⁸ *Id.* § 827. The factors listed in § 827 to determine the gravity of the harm are not exhaustive, and the weight of each factor's determinativeness will depend on a case-by-case basis analysis. *Id.* cmt. b. Rather, in some cases the gravity of the harm will be determined by one factor, whereas in others the gravity of the harm will be based upon a combination of all of the factors. *Id.* The circumstances of the harm must be considered as well; loud noises at night, for example, will likely be deemed more serious than loud noises during the day. *Id.*

¹⁰⁹ *Id.* § 828. To determine the utility of the conduct in question, the court should primarily rely upon the social value attributed to the conduct. *Id.* cmt. b, e. However, although the conduct's social value is the primary factor in determining its utility, all three factors must be supported by some utility in order for a court to hold that the conduct's utility overall outweighs the gravity of the harm to the landowner's interest in the use and enjoyment of their land. *Id.* cmt. c.

¹¹⁰ *Boomer v. Atl. Cement Co.*, 257 N.E.2d 870, 871 (N.Y. 1970).

¹¹¹ *See id.* (stating that "a nuisance has been found after trial" but denying a request for an injunction). The court affirmed the trial court's finding that the defendant's conduct constituted a nuisance. *Id.*; *see Boomer v. Atl. Cement Co.*, 287 N.Y.S.2d 112, 114 (N.Y. Sup. Ct. 1967) (finding that the defendant created a nuisance because "the discharge of large quantities of dust upon each of the properties and excessive vibration from blasting deprived each party of the reasonable use of his property and thereby prevented his enjoyment of life and liberty").

¹¹² *Boomer*, 257 N.E.2d at 874–75 (ordering the defendant to pay permanent damages).

Unlike aerial trespass cases, there are far fewer instances of courts addressing what constitutes an aerial nuisance.¹¹³ The case that exemplifies the difference between aerial trespass and aerial nuisance is *Brenteson Wholesale, Inc. v. Arizona Public Service Co.*, decided by the Arizona Court of Appeals in 1990.¹¹⁴ The defendant-appellee, Arizona Public Service Company, asserted in its counterclaim that an airstrip used by its neighbor, the plaintiff-appellant Brenteson Wholesale, Inc., to deliver Christmas trees harvested in the Pacific Northwest constituted either a trespass or a nuisance.¹¹⁵ The court held that the plaintiff-appellant's use of the airstrip could not be a trespass because the defendant-appellee never claimed that the descending aircraft entered its airspace.¹¹⁶ The appeals court, however, upheld the trial court's injunction on Brenteson's use of the airstrip because, although there were no physical invasions of the defendant-appellee's airspace, the use of airstrip by the plaintiff-appellant negatively impacted the Arizona Public Service Company's ability to use and enjoy its land.¹¹⁷ The court also noted the Restatement's assertion that harms caused by aircraft that do not physically enter the low-altitude airspace above an individual's property should be assessed under the principles of nuisance law rather than trespass law.¹¹⁸

A claim for invasion of privacy, specifically intrusion upon the seclusion of another, may support a nuisance claim against a drone operator.¹¹⁹ The de-

¹¹³ Compare *Brenteson Wholesale, Inc. v. Arizona Pub. Service Co.*, 803 P.2d 930, 934 (Ariz. Ct. App. 1990) (deciding that the operator of overflights that do not physically enter the immediate reaches of a landowner's airspace can still be held liable under a nuisance theory), with *Causby*, 328 U.S. at 264–66 (discussing the factors to be considered when determining whether an overflight constitutes an aerial trespass), *Hinman*, 84 F.2d at 756 (deciding whether low-flying aircraft over an individual's land can be held liable for aerial trespass in the Ninth Circuit), and *New England Aircraft*, 170 N.E. at 386–87 (deciding whether low-flying aircraft over an individual's land can be held liable for aerial trespass in Massachusetts).

¹¹⁴ *Brenteson Wholesale*, 803 P.2d at 934 (discussing the difference between aerial trespass and aerial nuisance and why the facts of the case established a successful claim for aerial nuisance rather than an aerial trespass).

¹¹⁵ *Id.* at 932, 934. The trial court enjoined the plaintiff-appellant from using its airstrip on the grounds that such use would create an “unreasonable risk” of trespassing into defendant-appellee's airspace and potentially striking a power line on the defendant-appellee's property. *Id.* at 933. The trial court was overturned on the trespass determination, but the nuisance claim was allowed. *Id.* at 934.

¹¹⁶ *Id.*

¹¹⁷ *Id.* The court focused on the fact that plaintiff-appellant's use of the airstrip created a “great risk of trespass” and increased the likelihood of serious accidents if an aircraft were to collide with a power line on defendant-appellee's property. *Id.*

¹¹⁸ *Id.*; see RESTATEMENT (SECOND) OF TORTS § 159 cmt. m (explaining that the operators of overflights which do not enter the immediate reaches of an individual's land may still invade the landowner's ability to use and enjoy the land and, as such, a determination of liability will fall under nuisance law rather than trespass).

¹¹⁹ See RESTATEMENT (SECOND) OF TORTS § 652B (explaining that one is liable for intrusion upon the seclusion of another if the defendant's intrusion “upon the solitude or seclusion of another or his private affairs or concerns . . . would be highly offensive to a reasonable person”).

defendant is liable under this tort if his or her intrusion “would be highly offensive to a reasonable person.”¹²⁰ An intrusion upon seclusion that would be highly offensive to a reasonable person on his or her own property would also likely qualify as interfering with the plaintiff’s use and enjoyment of their land.¹²¹ This is because an intrusion upon a landowner’s seclusion that is highly offensive to a reasonable person would likely be considered unreasonable under common law nuisance analysis.¹²²

II. EXAMINING THE POTENTIAL APPLICATION OF COMMON LAW TRESPASS AND NUISANCE TO LOW-FLYING DRONES

It is unclear exactly how a court would decide whether a drone flying in the low-altitude airspace above an individual’s property exposes the operator to liability for either trespass or nuisance.¹²³ This Part discusses the factors that would need to be examined in a claim by a private landowner for either trespass or nuisance as a result of drone operation above his or her land.¹²⁴ Section A examines how the concepts of common law trespass would apply to a drone flying in the low-altitude airspace above an individual’s land.¹²⁵ Similarly, Section B analyzes how the concepts of common law nuisance would apply to a drone flying in the low-altitude airspace above an individual’s land.¹²⁶

A. Applying the Principles of Common Law Trespass to Low-Flying Drones

Under traditional notions of trespass, operating a drone over an individual’s land would almost certainly subject the pilot to liability.¹²⁷ The landowner

¹²⁰ *Id.*

¹²¹ *See id.* cmt. b (providing examples of behavior that would subject a defendant to liability under this tort, including looking into the plaintiff’s windows with binoculars); *id.* § 822(a) (explaining that an intrusion onto another’s land that prevents the landowner from full enjoyment and use of his or her land is a nuisance if the intrusion is intentional and unreasonable).

¹²² *Id.* §§ 652B, 822(a). Because the common law treats seclusion and privacy within one’s own property as an important right to be protected, such an invasion would likely be considered a grave harm under nuisance law that outweighs the utility of the intruder’s conduct. *Id.* §§ 652B, 827.

¹²³ *See, e.g.,* Rule, *supra* note 14, at 165 (noting that current property law, as it is understood today, is not clear in establishing what rights a property owner has to keep drones or other low-flying objects out of the airspace directly over their parcel); Thompson, *supra* note 102, at 28 (noting that property owners’ worries about safety, privacy, and noise could foreseeably lead to claims that the operation of a drone above an individual’s real property is a nuisance and that the validity of these hypothetical claims is still unsettled law).

¹²⁴ *See infra* notes 127–165 and accompanying text.

¹²⁵ *See infra* notes 127–154 and accompanying text.

¹²⁶ *See infra* notes 155–165 and accompanying text.

¹²⁷ *See* *Jacque v. Steenberg Homes, Inc.*, 563 N.W.2d 154, 160–61 (Wis. 1997) (holding that a mobile home company’s repeated crossing of an individual’s lawn to deliver mobile homes is a trespass that warrants punitive damages); RESTATEMENT (SECOND) OF TORTS § 158 (explaining that one is liable for trespass if he or she “intentionally (a) enters land in possession of the other, or causes a

would only have to prove that the drone entered the airspace above the land and that the owner did not previously allow the entry.¹²⁸ Situations in which a commercial drone flies over a landowner's property to make a delivery, or where a private operator flies their drone above someone's property, are both analogous to the defendant's actions in *Jacque v. Steenberg Homes, Inc.*, in which the mobile home delivery company repeatedly crossed the plaintiffs' farm field to make deliveries without causing any damage to the land itself.¹²⁹ Similarly, a private operator who hovers their drone above an individual's property acts in a way similar to the parishioners in *Roman Catholic Archbishop of Boston v. Rogers* who refused to abandon the vigil they created after their former church closed down.¹³⁰ Furthermore, any situation in which a drone enters the low-altitude airspace above a landowner's property would constitute a tangible, as opposed to intangible, invasion.¹³¹ Unlike dust, dirt, noise, and vibrations, a drone would be a physical, tangible thing that invades the property of a landowner.¹³² As the operator causing a tangible drone to intrude upon the property of another, the drone pilot would thus be liable for trespass.¹³³

Clearly, under the ad coelum doctrine, a private landowner would have a valid claim for trespass against the operator of a drone flying at any level above his or her property.¹³⁴ Under this formulation of private property rights, an operator would only need to fly his or her drone over an individual's property, regardless of altitude, to expose himself or herself up to liability for trespass.¹³⁵ The Supreme Court, however, specifically abrogated the literal appli-

thing or third person to do so, or (b) remains on the land, or (c) fails to remove from the land a thing which he is under a duty to remove").

¹²⁸ RESTATEMENT (SECOND) OF TORTS § 158.

¹²⁹ See *Jacque*, 563 N.W.2d at 160–61 (crossing a property owner's land without permission is comparable to crossing the low-altitude airspace above a landowner's land without their permission).

¹³⁰ See *Roman Catholic Archbishop of Bos. v. Rogers*, 39 N.E.3d 736, 743 (Mass. App. Ct. 2015) (holding that plaintiffs who refused to leave a vigil they created at a closed-down church still owned by the Archbishop of Boston were trespassers under the basic Restatement definition of trespass).

¹³¹ See, e.g., *Adams v. Cleveland-Cliffs Iron*, 602 N.W.2d 215, 225 (Mich. Ct. App. 1999) (holding that dust, noise, and vibrations caused by a mining operation were intangible intrusions onto the plaintiff's land, thereby defeating the plaintiff's claim of trespass).

¹³² *Id.*

¹³³ *Id.*; *Jacque*, 563 N.W.2d at 160–61.

¹³⁴ See, e.g., *Smith v. New England Aircraft Co.*, 170 N.E. 385, 393 (Mass. 1930) (holding that the low-flying planes which became common with the emergence of the aviation industry did not supersede the rights afforded to property owners under the ad coelum doctrine); *Herrin v. Sutherland*, 241 P. 328, 331 (Mont. 1925) (deciding that firing a shotgun over a neighbor's parcel constituted a trespass under the ad coelum doctrine).

¹³⁵ See *United States v. Causby*, 328 U.S. 256, 261 (1946) (stating that, under the ad coelum doctrine, individuals would have a valid claim for trespass against the operator of any transcontinental flight). Because the ad coelum doctrine envisages the landowner as having title to all of the land beneath his property and all of the airspace above it, the Supreme Court's application of the doctrine to transcontinental flights in the middle of the twentieth century is analogous to how the literal applica-

cation of the ad coelum doctrine as applied to aircraft in *United States v. Causby*, which seems to preclude its use to determine private property owner's air rights with respect to civilian drones.¹³⁶

The use of the ad coelum doctrine in regard to civilian drones may not be completely precluded, however, depending on whether drones are considered the type of "aircraft" that are specifically immune from the application of the ad coelum doctrine.¹³⁷ The key reason why the Court in *Causby* exempted operators of these aircraft from liability under the ad coelum doctrine was the fact that they afforded society a legitimate benefit—the ability to be exponentially more efficient in moving people and goods.¹³⁸ Thus, whether the ad coelum doctrine can be applied to civilian drones, both private and commercial, would depend partly upon a balancing test between the benefits afforded to society by drone use and the cost to the landowner of drones operating in the low-altitude airspace above his or her property.¹³⁹ If drones are not used for transporting people or goods, then they lack the underlying rationale for the exemption to the ad coelum doctrine and thus might not be exempted from the doctrine.¹⁴⁰

Drones used for non-commercial purposes, such as recreation, or, on a more sinister level, watching unsuspecting individuals while at home, would likely fail such a test because they do not help transport people or goods.¹⁴¹

tion ad coelum doctrine would affect drone operators today. *Id.*; see Pomeroy, *supra* note 67, at 284 (providing a definition of the ad coelum doctrine).

¹³⁶ See *Causby*, 328 U.S. at 261 (stating "[the ad coelum doctrine] has no place in the modern world"); Rule, *supra* note 14, at 166 (arguing that the growth of aviation in the twentieth century quickly caused the ad coelum doctrine to become outdated).

¹³⁷ See Pomeroy, *supra* note 67, at 292–94 (arguing that drones used purely for surveillance purposes are not the kind of aircraft excepted from the ad coelum doctrine by the Court in *Causby*).

¹³⁸ See *Causby*, 328 U.S. at 260–61 (relying on Congress's desire for freedom for the movement of people and goods through the sky as the basis for rejecting the literal application of the ad coelum doctrine); RESTATEMENT (SECOND) OF TORTS § 159 (noting that the American Law Institute is unsure as to whether "space rockets, satellites, missiles, and similar objects" fall within the scope of the immediate reaches test, promulgated by the Court in *Causby*, for aerial trespass committed by aircraft); see also Pomeroy, *supra* note 67, at 294 (arguing that the kinds of aircraft excepted from the ad coelum doctrine by the Court in *Causby* are those that carry people or commercial goods and do not damage the land over which they fly).

¹³⁹ See *Causby*, 328 U.S. at 264–65 (explaining that aircraft that fly very close to an individual's land are not afforded the same protection against a claim for common law trespass as are aircraft that fly at high-altitude and that low-flying aircraft which negatively impact the landowner's ability to use and enjoy his or her land are liable for trespass); Pomeroy, *supra* note 67, at 293 (arguing that surveillance drones do not provide the same benefit to society as aircraft used to transport people and commercial goods and, therefore, should not be afforded the same protections against liability as said aircraft).

¹⁴⁰ Pomeroy, *supra* note 67, at 293.

¹⁴¹ See *id.* at 293–94 (arguing that surveillance drones, and by extension other drones incapable of moving people or goods, should not be considered aircraft when determining whether to apply the ad coelum doctrine to their flight above private property). It seems difficult to discern any benefit to the individual operator of any drone used to spy on others on their own property that would outweigh the harm caused to the landowner. See Nick Bilton, *When Your Neighbor's Drone Pays an Unwelcome*

Although they are not widely utilized now, the drones that companies like Amazon want to use for the rapid delivery of products to consumers would likely have a stronger argument for exemption from the *ad coelum* doctrine.¹⁴² A company such as Amazon, however, is already able to deliver products rapidly to its customers, thus leaving the question of whether the benefit of a thirty-minute delivery is so great that these drones should be classified as aircraft under *ad coelum*.¹⁴³

Even if civilian drones, both private and commercial, are considered aircraft exempted from the *ad coelum* doctrine, a potential trespass can still be explored under the immediate reaches test enunciated by the Court in *Causby*.¹⁴⁴ Airspace that is within the immediate reaches of the land includes that which the property owner could “occupy or use in connection with the land” and airspace which, when entered into by an unwanted party, “[subtracts] from the owner’s full enjoyment of the property.”¹⁴⁵ It seems likely that there will be drones that enter the immediate reaches of individuals’ property, as the FAA small rule governing civilian drone flight proscribes a maximum flying altitude of four-hundred feet.¹⁴⁶ Unfortunately, there is no bright-line rule that an-

Visit, N.Y. TIMES (Jan. 27, 2016), https://www.nytimes.com/2016/01/28/style/neighbors-drones-invade-privacy.html?_r=0 [<https://perma.cc/H48S-AK6H>] (providing examples of instances where private, individual drone operators have come into conflict with landowners after spying on them while they are on their own property). Similarly, concerns to landowners about safety and noise resulting from the low-altitude flight of drones above their property seem to outweigh the benefit to a benign, recreational drone operator. See Thompson, *supra* note 102, at 28 (noting safety and noise as reasons why a landowner would want to keep drones from flying above his or her property).

¹⁴² See *Causby*, 328 U.S. at 260–61 (relying on Congress’s desire to encourage air commerce as the one of the bases for rejecting the literal application of the *ad coelum* doctrine); Pomeroy, *supra* note 67, at 293 n.99 (clarifying that drones which function to accomplish goals other than surveillance may fall within the category of aircraft exempted from the literal application of the *ad coelum* doctrine); see also Mott, *supra* note 4 (reporting that Amazon is currently developing autonomous drones that will be able to deliver packages weighing five pounds and under to customers within thirty minutes of their order and that these drones will be able to fly twenty miles round-trip).

¹⁴³ See Pomeroy, *supra* note 67, at 292 (explaining that the aircraft exception to the *ad coelum* doctrine is predicated on the revolutionary speed in which airplanes could transport people and commercial goods in the middle of the twentieth century); *Give the Gift of Prime*, https://www.amazon.com/gp/prime/pipeline/prime_gifting_landing? [<https://perma.cc/3JX2-2XJZ>] (listing the numerous benefits of Amazon Prime membership, the most popular of which is free two-day shipping on over fifty million products available for purchase through the website).

¹⁴⁴ See *Causby*, 328 U.S. at 264–66 (explaining the immediate reaches standard that must be used to determine whether an aircraft violated a landowner’s airspace property rights).

¹⁴⁵ See *id.* at 264–65 (providing the “occupy or use in connection with the land” requirement “[subtracts] from the owner’s full enjoyment of the property” requirement).

¹⁴⁶ See generally SUMMARY OF SMALL UNMANNED AIRCRAFT RULE (PART 107) (implementing a number of rules that govern the flight of drones in the United States, including a maximum altitude of four-hundred feet). Since four-hundred feet is the maximum, individuals will likely fly at much lower heights than that maximum. *Id.*

nounces just exactly how high the immediate reaches of an individual's airspace begins.¹⁴⁷

Although there is no exact measurement as to what height is considered within the immediate reaches of the land, the Tenth Circuit's 1974 decision in *Pueblo of Sandia ex rel. Chaves v. Smith* highlights the need for a landowner to also show that the low-altitude aerial invasion interfered with their use and enjoyment of the land.¹⁴⁸ In *Pueblo of Sandia*, the court held that flights arriving at and departing from the defendant's private airport, at heights of one-hundred-fifty feet and below over the plaintiff's land, did not satisfy the immediate reaches test as set out in *Causby* because the flights did not substantially interfere with the plaintiff's ability to use and enjoy the land.¹⁴⁹ In the case of a camera-equipped, private drone flying in the low-altitude airspace above an individual's land, the landowner would likely have a strong argument that their ability to use and enjoy the land has been substantially interfered with by alleging that they cannot feel comfortable on their own property when being monitored by an aerial voyeur.¹⁵⁰ In the context of commercial drones, which will likely dominate the skies once fully developed by various companies, a landowner would be able to argue that the constant sight, sound, and safety concerns that would result from a copious amount of drones in the low-altitude airspace above their home substantially interfere with their ability to use and enjoy any land not covered by a home or structure.¹⁵¹

¹⁴⁷ See RESTATEMENT (SECOND) OF TORTS § 159 cmt. 1 (explaining that there is no concrete definition of the Court's "immediate reaches" standard as set out in *Causby*).

¹⁴⁸ See *Causby*, 328 U.S. at 264–65 (providing the additional requirements that flights within the immediate reaches of the land must also enter airspace that the owner could "occupy or use in connection with the land" and that such entry must negatively impact the owner's ability to fully enjoy their property); *Pueblo of Sandia ex rel. Chaves v. Smith*, 497 F.2d 1043, 1045 (10th Cir. 1974) (holding that continuous flights of one-hundred-fifty feet or lower over the plaintiff's land did not constitute trespass because the flights, while low, did not substantially interfere with the plaintiff's ability to use the land).

¹⁴⁹ *Pueblo of Sandia*, 497 F.2d at 1045.

¹⁵⁰ See *id.* (holding that continuous flights of one-hundred-fifty feet or lower over the plaintiff's land did not constitute trespass under the immediate reaches test because there was no substantial interference with the plaintiff's use and enjoyment of the land); Thompson, *supra* note 102, at 28 (arguing that, among other issues, individual landowners likely have valid concerns that camera-equipped drones will infringe upon their expectation of privacy when on their own real property). A property owner who cannot use all or part of their outdoor land because of a voyeuristic low-flying drone would certainly have a strong argument that the drone is not only in the immediate reaches above their land, but also that it substantially interferes with their ability to use and enjoy the land as well. See *Causby*, 328 U.S. at 264–65 (providing the additional requirements that flights within the immediate reaches of the land must also enter airspace that the owner could "occupy or use in connection with the land" and that such entry must negatively impact the owner's ability to fully enjoy their property); *Pueblo of Sandia*, 497 F.2d at 1045 (requiring substantial interference with the plaintiff's ability to use and enjoy the land, in addition to entry into the airspace within the immediate reaches of the land, in order to sustain an aerial trespass action post-*Causby*).

¹⁵¹ See *Causby*, 328 U.S. at 264–65 (providing the additional requirements that flights within the immediate reaches of the land must also enter airspace that the owner could "occupy or use in connec-

The Restatement suggests, for instance, that flying an aircraft fifty-feet from an individual's land, and preventing the owner from fully enjoying the property, is clearly a trespass.¹⁵² A flight at one-hundred-fifty feet that also impedes the owner from full enjoyment of the land, however, would likely present a question of fact to the court.¹⁵³ Thus, under current law, determining whether operation of a drone is a trespass will depend on a fact intensive, case-by-case basis.¹⁵⁴

B. Applying the Principles of Common Law Nuisance to Low-Flying Drones

Unlike a trespass action against a drone operator, a successful nuisance claim does not require that the drone enter the immediate reaches of the landowner's airspace so long as it interferes with the owner's use and enjoyment of his or her land.¹⁵⁵ The first element of a nuisance claim is that the intrusion was intentional, and since the operator must know where he or she is flying if they are able to control the drone, it seems highly unlikely that any drone would unintentionally fly over someone's land.¹⁵⁶ Given the numerous conflicts between drone operators and individuals on the ground, the operator must also know that he or she is invading a landowner's ability to fully use and enjoy their property when flying over it at a low altitude.¹⁵⁷ Therefore, whether a drone flight or repeated drone flights over an individual's property consti-

tion with the land" and that such entry must negatively impact the owner's ability to fully enjoy their property); Thompson, *supra* note 102, at 28 (arguing that the continuing presence of drones overhead, the noise they make, and the safety concerns associated with a drone falling out of the sky all provide landowners with plausible claims that their ability to use and enjoy the land has been hindered).

¹⁵² RESTATEMENT (SECOND) OF TORTS § 159 cmt. 1 (explaining that there is no concrete definition of the Court's "immediate reaches" standard as set out in *Causby*).

¹⁵³ *Id.*

¹⁵⁴ See *Causby*, 328 U.S. at 266 (declining to announce the exact limits of the immediate reaches test); RESTATEMENT (SECOND) OF TORTS § 159 cmt. 1 (providing that some aerial trespass cases must be resolved based upon a question of fact).

¹⁵⁵ See RESTATEMENT (SECOND) OF TORTS § 159 cmt. m (explaining that the operator of a flight outside of the immediate reaches of the surface that nevertheless interferes with the owner's ability to use and enjoy the land can be held liable under a claim of nuisance); *id.* § 822 (providing the general elements for a successful nuisance claim).

¹⁵⁶ See Farber, *supra* note 33, at 12, 14 (stating that a drone is controlled by its operator using such equipment as a controller, tablet, or smartphone).

¹⁵⁷ See RESTATEMENT (SECOND) OF TORTS § 825(b) (providing that the intentional invasion requirement to succeed in a nuisance claim is satisfied when the actor knows their conduct invades the owner's ability to use and enjoy the land or when such conduct is substantially certain to do so); see also Rule, *supra* note 14, at 163–64 (describing instances of conflict between drone operators and both individual and institutional landowners after flying a drone above the owner's property); Bilton, *supra* note 141 (discussing different examples of conflict between drone operators and individuals whose land they have flown over, including multiple instances of landowners shooting drones out of the sky).

tutes a nuisance will turn on whether the flight invades the owner's interest in using and enjoying the land and whether such invasion was unreasonable.¹⁵⁸

A drone flying at low-altitude seems almost certain to provide a landowner with arguments as to how it invades his or her interest in the use and enjoyment of the land because noise, privacy, and safety concerns all appear to be factors that would prohibit someone from fully enjoying their real property.¹⁵⁹ Drones outfitted with cameras seem especially likely to invade one's interest in use and enjoyment of their land, as most owners are likely to feel uncomfortable being photographed or videotaped without consent while on their own property.¹⁶⁰ To determine if an invasion of airspace is unreasonable, however, a court would have to make a case-by-case determination as to whether the gravity of the harm caused by the drone flight outweighs its utility.¹⁶¹

Generally, a landowner would have a better nuisance claim against a private drone operator, whose drone would likely have a camera, than a commercial drone pilot because there is more utility in promoting commerce than recreational drone use.¹⁶² The Restatement provides that, in determining the utility of conduct that harms a landowner, a court should principally rely upon the social value of the primary purpose of the conduct.¹⁶³ It seems likely that a court would attach a high level of social value to commercial drones, which have the potential to revolutionize how Americans engage in commerce, and would be reluctant to hamstring a novel innovation that drastically lowers shipping costs and makes an online transaction between consumers and companies highly convenient.¹⁶⁴ There are also proposed innovative uses for

¹⁵⁸ RESTATEMENT (SECOND) OF TORTS § 822.

¹⁵⁹ *Id.*; see Thompson, *supra* note 102, at 28 (noting safety, privacy, and noise as reasons why a landowner would want to keep drones from flying above his or her property).

¹⁶⁰ See RESTATEMENT (SECOND) OF TORTS § 822 (stating that one is subject to liability for nuisance if, but only if, their conduct invades the landowner's ability to use or enjoy the land—a requirement that the operation of a drone used to videotape or photograph a property owner would likely satisfy); see also Pomeroy, *supra* note 67, at 293 (providing a hypothetical argument in which owners argue that they always enjoy the right to avoid covert, aerial observation when on their land). If full use and enjoyment of the land includes not being spied on, then flying a drone with a camera over an individual's property would clearly invade that interest. Pomeroy, *supra* note 67, at 293.

¹⁶¹ See RESTATEMENT (SECOND) OF TORTS §§ 827–828 (detailing the factors to be considered when weighing the gravity of the harm versus the utility of the conduct that causes the harm).

¹⁶² *Id.*; see *Holy Stone HS170 Mini RC Predator*, *supra* note 34 (providing an example of an inexpensive drone that can fly for at least sixty minutes after a six to eight minute charge time). It seems unlikely that a court would find the gravity of an invasion of privacy to be outweighed by a private drone operator's interest in flying his or her drone over someone else's property. See RESTATEMENT (SECOND) OF TORTS §§ 827–828 (explaining the numerous factors that must be considered when determining whether the gravity of the harm caused outweighs the utility of the offender's conduct). The value that society places on a particular harm is part of the nuisance analysis, and since society values privacy, this is a cognizable harm in a nuisance claim. *Id.* § 827.

¹⁶³ *Id.* § 828.

¹⁶⁴ See *id.* cmt. b, e (stating that the conduct which causes the harm's social value is the primary factor in determining its utility); see also Trost, *supra* note 6, at 16 (providing a highly innovative

drones that would further increase their social value if implemented, such as Facebook CEO Mark Zuckerberg's desire to build drones that can bring internet access to remote areas.¹⁶⁵

III. FAA REGULATION AND STATE LEGISLATION IS THE BEST WAY FOR LANDOWNERS TO VINDICATE THEIR PROPERTY RIGHTS AND PROTECT PRIVACY

While a landowner could succeed in a suit for trespass or nuisance against a pilot flying their drone in the low-altitude airspace above an individual's property, individual lawsuits are not the best way to protect property rights due to potential problems in both establishing trespass or nuisance liability and administrative impracticality in bringing these lawsuits to court.¹⁶⁶ In light of the difficulties property owners face in lawsuits, this Part argues that different approaches should be taken to protect individual property rights against commercial and private drones.¹⁶⁷ Section A explains why lawsuits are not the best way to enforce private property rights.¹⁶⁸ Section B recommends numerous steps the FAA could take to regulate the burgeoning commercial drone industry.¹⁶⁹ Section C argues that the protection of individual property rights against privately flown drones should be left to municipalities and states, rather than the FAA.¹⁷⁰

A. Individual Lawsuits Are Not the Best Way to Protect Property Rights

A landowner could potentially bring a claim for trespass or nuisance against the operator of a drone flying above his or her property.¹⁷¹ A drone flying low above an individual's property is analogous to more conventional situations in which trespass liability was found.¹⁷² If drones are not considered

potential use for drones by Facebook CEO Mark Zuckerberg who wants to use drones to bring internet access to remote parts of the world); Plaza, *supra* note 40 (describing how large online retail companies, such as Amazon, can significantly decrease both shipping costs and the time needed to deliver a package to a customer by implementing their own fleets of autonomous drones).

¹⁶⁵ See RESTATEMENT (SECOND) OF TORTS § 828 cmt. b, e (emphasizing the social value of the harmful conduct as the most important factor in determining its utility); see also Trost, *supra* note 6, at 16 (describing Zuckerberg's vision of drones that can bring internet access to areas of the world in which it is otherwise inaccessible).

¹⁶⁶ See *supra* notes 123–165 and accompanying text (explaining the failings of individual lawsuits to resolve property right disputes regarding drone usage).

¹⁶⁷ See *infra* notes 171–210 and accompanying text.

¹⁶⁸ See *infra* notes 171–186 and accompanying text.

¹⁶⁹ See *infra* notes 187–200 and accompanying text.

¹⁷⁰ See *infra* notes 201–210 and accompanying text.

¹⁷¹ See *supra* notes 123–165 and accompanying text (explaining how common law trespass and nuisance principles would apply to a low-flying drone above a landowner's property).

¹⁷² See *supra* notes 128–133 and accompanying text (analogizing different circumstances in which a drone flies low above an individual's land to more traditional trespass cases where the intrusion took place on the ground).

“aircraft,” then they may not be exempted from *ad coelum* under the test laid out in *United States v. Causby*, and their operators could be liable for trespass when operating above private property.¹⁷³ Landowners also have potential arguments that low-flying drones invade their use and enjoyment of their property, which would support a nuisance claim.¹⁷⁴ A nuisance claim’s success would rest on a balancing test between the gravity of the harm caused by the drone and the utility of its operation.¹⁷⁵

Substantively, trespass lawsuits are not the most efficient way to protect landowners because of the lack of clarity with regard to (1) whether drones are “aircraft” for the purposes of *ad coelum*; (2) where the “immediate reaches” of the land begins; and (3) whether a drone would substantially interfere with a landowner’s ability to use and enjoy the land.¹⁷⁶ Nuisance lawsuits are similarly unsuited to protect landowners’ rights because the judge’s determination in balancing the utility of drone flight versus the harm caused by the flight would decide the result, which could lead to inconsistent outcomes.¹⁷⁷

Furthermore, commercial drones will likely be autonomous, capable of delivering their packages without being controlled by human pilots on the ground.¹⁷⁸ Without a camera or a live feed to a commercial drone itself, individual landowners should not have to worry much about a commercial drone operator spying on them through a camera.¹⁷⁹ Regardless of whether a landowner could bring successful trespass or nuisance actions against a company, doing so would be highly difficult to administer.¹⁸⁰ Assuming the skies are filled with drones within the next ten years, it will be very difficult for landowners on the ground to figure out which company owns the drone flying over

¹⁷³ See *United States v. Causby*, 328 U.S. 256, 260–61 (1946) (using air commerce as a justification for exempting aircraft from the *ad coelum* doctrine); Pomeroy, *supra* note 67, at 294 (arguing that aircraft carrying people and goods are exempted from *ad coelum* because of the benefit they provide to society).

¹⁷⁴ See *supra* notes 155–165 and accompanying text (defining such potential arguments).

¹⁷⁵ See *supra* notes 162–165 and accompanying text (discussing balancing test).

¹⁷⁶ See *Causby*, 328 U.S. at 260–66 (presenting the aircraft exception, immediate reaches test, and substantial interference requirement); see also *supra* notes 136–147 and accompanying text (arguing that it is unclear how these concepts would apply to low-flying drones).

¹⁷⁷ See *supra* notes 162–165 and accompanying text (discussing factors that would influence a judge’s decision in balancing the utility of the conduct versus the gravity of the harm).

¹⁷⁸ Mott, *supra* note 4.

¹⁷⁹ See *id.* (explaining that consumers will be able to print out a landing pad on their computers which Amazon’s future drone fleet will scan and locate when making a delivery, making a human pilot unnecessary).

¹⁸⁰ See Fromkin & Calo, *supra* note 32 (describing how the FAA predicts at least seven million drones will be flying in U.S. skies by 2020). The sheer number of drones in the sky will present a number of problems for landowners seeking to vindicate their property rights, for companies trying to avoid litigation, and for a court system trying to keep up with lawsuits involving new technology. See *infra* notes 179–184 and accompanying text (describing these problems in more detail).

their land.¹⁸¹ If it is difficult to identify the owner of the drone, landowners will not be able to vindicate their air rights in court because they will not know whom to sue.¹⁸² The large companies that would be vulnerable to these suits due to their potentially widespread use of commercial drones would certainly want to avoid common law liability for trespass and nuisance in all fifty states.¹⁸³

The courts will also have a difficult time dealing with the massive influx of cases brought by landowners against commercial drone operators.¹⁸⁴ Not only will these cases back up the court system, but it will also be difficult for judges to determine how a reasonable person would respond to a commercial drone above their property.¹⁸⁵ Drone technology is so new that people do not know what constitutes reasonable use, which would likely lead to inconsistent outcomes in similar fact patterns.¹⁸⁶

B. The FAA Should Impose Regulations on Commercial Drones

Given the complications that will arise should the common law be the only way for individuals to vindicate their property rights against drones, comprehensive regulation by the FAA would be the more efficient, smooth option with respect to commercial drones.¹⁸⁷ The FAA has been tasked with promulgating regulations to promote the safe and efficient use of U.S. airspace by aircraft and was specifically tasked with promulgating UAS regulations in

¹⁸¹ See Froomkin & Calo, *supra* note 32 (explaining the expected explosion in drone use by 2020); see also Mott, *supra* note 4 (detailing Amazon's vision for the company's fleet of drones).

¹⁸² See FED. R. CIV. P. 3 (stating that a civil action begins once the plaintiff files a complaint with the court and that the plaintiff must identify the defendant to do so). If the plaintiff does not know who the party is that they want to sue, then they cannot successfully bring an action against the defendant in court. *Id.*

¹⁸³ See *Int'l Shoe Co. v. State of Washington*, 326 U.S. 310, 320 (1945) (holding that any corporation can be sued in states where it does systematic and continuous business but is not physically located). Surely nationwide companies such as Amazon, FedEx, and 7-Eleven would fall within this definition and be liable to suits in all fifty states. *Id.*

¹⁸⁴ See Froomkin & Calo, *supra* note 32 (explaining that the number of drones in the sky is expected to exponentially increase by 2020 and will likely continue to increase over time). Given the increasing number of drones that will fly in U.S. skies, it is only logical that suits against their operators will increase as well. *Id.*; see Bilton, *supra* note 141 (discussing different examples of conflict between drone operators and individuals whose land they have flown over, including multiple instances of landowners shooting drones out of the sky).

¹⁸⁵ See RESTATEMENT (SECOND) OF TORTS § 822 (explaining that an invasion of an individual's land is trespass if it interferes with his or her use and enjoyment of the land and is intentional and unreasonable). Given the novelty of drone technology, society likely doesn't quite know what is reasonable and what is not in this context. *Id.*

¹⁸⁶ See *id.* (standing for the proposition that if judges do not have a consistent understanding of what is reasonable when flying a drone, then it is more probable than not that cases with similar facts will come out differently).

¹⁸⁷ See *supra* notes 171–186 and accompanying text (explaining the problems that would arise if the common law was the only way for landowners to protect their property and privacy rights against low-flying drones above their property).

2012.¹⁸⁸ Large companies like Amazon plan to use fleets of drones to deliver their products to consumers across the country.¹⁸⁹ Given the nature of Amazon's business, in which it is engaged in the sale of goods in interstate commerce to individuals all over the United States, the Commerce Clause will also give the FAA the power to regulate commercial drone deliveries.¹⁹⁰ Thus, the FAA almost certainly has jurisdiction to regulate all drones.¹⁹¹

As the executive agency responsible for overseeing the use of U.S. airspace, the FAA can regulate drones without having to worry about the complications that arise with applying common law concepts of trespass and nuisance to drone flight.¹⁹² The FAA would not have to argue whether drones are "aircraft" for the purposes of *ad coelum*, nor would it have to make showings to a court about whether a drone entered the "immediate reaches" of land.¹⁹³ Federal regulation would also allow for the protection of all property owners without requiring them to individually go to court to enforce their rights to the air above their land and would apply evenly to all drone operators.¹⁹⁴

The FAA should certainly impose a minimum height limit on commercial drones in transit, as this would ameliorate many noise and privacy concerns likely to arise amongst property owners.¹⁹⁵ The FAA could also ban cameras on commercial drones, which would alleviate privacy concerns.¹⁹⁶ Conversely, the FAA could require companies to fly their drones above public roads used by cars, which would assuage many of the issues that arise when a drone flies

¹⁸⁸ See 49 U.S.C. § 40103(b) (2012) (tasking the FAA with promulgating regulations to promote the safe and efficient use of U.S. airspace by aircraft); see also Federal Aviation Administration Modernization and Reform Act, Pub. L. No. 112-95, § 332(a)(1), 126 Stat. 11, 73 (2012) (codified at 49 U.S.C. § 40101) (requiring the FAA to promulgate regulations that integrate UAS into the national airspace).

¹⁸⁹ Mott, *supra* note 4 (describing Amazon's plans for its fleet of delivery drones).

¹⁹⁰ See *Wickard v. Filburn*, 317 U.S. 111, 124 (1942) (stating that the power of Congress, and in this case an agency created by Congress, to regulate matters involved in interstate commerce is "plenary"); see also U.S. CONST. art. I, § 8, cl. 3 (stating that Congress has the power "[t]o regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes").

¹⁹¹ See *supra* notes 188–191 and accompanying text (describing the FAA's power to regulate drones under both its regulatory authority and the Commerce Clause).

¹⁹² See 49 U.S.C. § 40103(b) (giving the FAA the power to oversee the use of navigable airspace in the United States).

¹⁹³ See *Causby*, 328 U.S. at 260–66 (presenting the aircraft exception and immediate reaches test).

¹⁹⁴ See *supra* notes 171–186 and accompanying text (presenting the problems that come with only relying on the courts to enforce owners' rights against low-flying drones).

¹⁹⁵ See, e.g., Thompson, *supra* note 102, at 28 (noting that property owners would likely worry about their safety and privacy if drones are constantly flying over their homes and that the sight and sound of drones could interfere with an individual's use and enjoyment of his or her property).

¹⁹⁶ See Wright, *supra* note 38 (discussing a situation in which an individual used a drone to take pictures of a high-rise apartment by hovering the drone outside the window of a female tenant who was changing clothes at the time).

above private property.¹⁹⁷ Finally, the FAA could create a private right of action for landowners to bring against drone operators in violation of FAA regulations, which would allow for lawsuits without the complications posed by the common law.¹⁹⁸

The FAA is best suited to regulate commercial drones because it can ensure both uniform enforcement of regulations against operators and uniform results for property owners seeking to protect their property rights.¹⁹⁹ Although the FAA can regulate both commercial and privately-operated drones, the states are best suited to regulate private drone operators.²⁰⁰

C. The Protection of Individual Property Rights Against Private Drone Operators Should Take Place at the State Level

Unlike commercial drones, privately operated, recreational drones are not involved in interstate commerce; therefore, their operators would likely not be subject to federal regulation under the commerce clause.²⁰¹ The FAA could still use its regulatory authority outside of the commerce clause, however, to regulate private drone operators.²⁰²

Regardless of the FAA's authority, states and municipalities have already shown that they are capable of regulating private drone operators via local ordinances or state statutes.²⁰² Florida's anti-drone surveillance statute, for instance, provides a civil cause of action for any "owner, tenant, occupant, invitee, or licensee of privately owned real property" against a drone operator who either records an image of said real property or records an image of the

¹⁹⁷ *Id.*; Froomkin & Calo, *supra* note 32 (arguing that programming drones to follow existing global positioning system (GPS) routes can ameliorate concerns that individual property rights will be invaded when drones fly over landowners' property).

¹⁹⁸ *See supra* notes 123–165 and accompanying text (explaining the ambiguities in the common law doctrines of trespass and nuisance as applied to low-flying drones).

¹⁹⁹ *See supra* notes 187–200 and accompanying text (arguing why the FAA is best suited to regulate commercial drones).

²⁰⁰ *See infra* notes 201–210 and accompanying text (arguing why the States are best suited to regulate the use of privately-operated drones).

²⁰¹ *See Wickard*, 317 U.S. at 124 (stating that Congress has the power to regulate matters involved in interstate commerce). Rather, privately operated drones present a different problem; they can easily be used to covertly view an unsuspecting individual on his or her own property by another private citizen. *See, e.g.*, Wright, *supra* note 36 (discussing a situation in which a privately-operated drone hovered outside of a high-rise apartment where a female tenant was changing her clothes).

²⁰² *See supra* note 191 and accompanying text (arguing that the FAA's regulatory authority over U.S. airspace gives it the power to regulate privately-operated drones not used in interstate commerce).

²⁰² *See, e.g.*, FLA. STAT. § 934.50(3)(b) (2013) (prohibiting individuals in Florida from using a drone to take photographs or video of an individual's private real property or from photographing or filming an individual on private real property where they would have a reasonable expectation of privacy).

individual while they are on the premises of the real property.²⁰³ This broad statute effectively provides individuals with more privacy protection than a trespass claim would because it does not require the drone to enter the low-altitude airspace above the parcel of private real property being recorded in order to impose liability on the operator.²⁰⁴ Rather, this statute looks more like a broader nuisance action because it is aimed at protecting an individual's specific interest in the land—in this case, the maintenance of a reasonable expectation of privacy from voyeuristic surveillance.²⁰⁵

States have the inherent ability to legislate for the general welfare of their citizens.²⁰⁶ A statute like Florida's, which is aimed at protecting privacy, certainly falls within the general welfare.²⁰⁷ In fact, the FAA has stated that laws traditionally left to the states under the general police power, such as land use, zoning, privacy, trespass, and law enforcement, should generally continue to be left to the states even if they involve drones.²⁰⁸

Additionally, state legislatures are best suited to handle the possible harms to their citizens' property rights caused by private drone operators for two reasons: (1) it is much easier to identify the operator of a private drone than it is to identify the operator of an autonomous commercial drone; and (2) landowners have strong arguments that an invasion of privacy by a low-flying drone above their property substantially impacts their ability to use and enjoy the land.²⁰⁹ Laws aimed at protecting landowners' privacy and property rights vis-à-vis private drone operators falls within the states' ability to legislate for public welfare and thus should be left to the states so that they may tailor such laws to the needs and desires of their residents.²¹⁰

²⁰³ *Id.* § 934.50(5)(b).

²⁰⁴ *See id.* (imposing liability for using a drone to record private real property or an individual with a reasonable expectation of privacy on private real property without requiring that the drone enter the airspace above the parcel of land in question).

²⁰⁵ *See id.* (protecting an individual's interest in not being surveilled while on their own real property); RESTATEMENT (SECOND) OF TORTS § 822 cmt. b (clarifying that the tort of private nuisance is designed to protect a property owner's interest in the use and enjoyment of the land, rather than protecting against unpermitted physical intrusions upon the land itself).

²⁰⁶ *See* U.S. CONST. amend. X ("The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively . . .").

²⁰⁷ *Id.*; FLA. STAT. § 934.50(3)(b).

²⁰⁸ Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. 42,063, 42,194 (June 28, 2016) (codified at 14 C.F.R. §§ 21, 43, 61).

²⁰⁹ *See* Thompson, *supra* note 102, at 28 (stating that, among other arguments, private landowners have a strong argument that a low-flying drone above their property creates a privacy concern that impedes their ability to fully use and enjoy the land); *Drones Are Coming: PNC Park's Aerial Visitor Is a Warning for the Future*, *supra* note 38 (reporting on a drone owned by a private citizen that flew over a Major League Baseball game in Pittsburgh, Pennsylvania, and noting that law enforcement was able to quickly identify the drone's operator once its presence above the game was reported).

²¹⁰ U.S. CONST. amend. X; Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. at 42,194.

CONCLUSION

In the near future, both private and commercial drones will dominate U.S. airspace. While such technology will certainly innovate the day-to-day lives of Americans, the rapid growth of drones should not completely outweigh the property rights of individual citizens. While individual property owners may be able to bring suit under theories of trespass or nuisance, the outcome of such a suit is unclear. Furthermore, litigation in this context is simply not an efficient way to protect property rights. In the context of commercial drones, the FAA should promulgate regulations that apply uniformly to all drones used for commercial purposes. This would provide clarity for both landowners and operators. State legislation, however, is best to protect landowners' property and privacy rights against private individuals flying drones. Such legislation falls within the province of the states' legislative authority and would allow each state to legislate based upon the needs and desires of its residents.

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