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Delivery Drones: Inapt for Application of Current Negligence Theory

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DELIVERY DRONES: INAPT FOR APPLICATION OF CURRENT NEGLIGENCE THEORY

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ABSTRACT

Deliveries by commercial drones are no longer ideas one would only expect to see in science-fiction movies. In August 2020, Amazon, one of the major logistics operators in the United States, received approval from the Federal Aviation Administration (FAA) to use drones for its delivery operators. Delivery drones have become a reality in modern times. Since 2012, the FAA has promulgated regulations to respond to continuous innovations and developments in this area of technology. In December 2020, the FAA issued its Final Rule to safely expand the regular operation of drones at night or over people. In 2019, the National Conference of Commissioners on Uniform State Laws proposed specific rules applicable to drones in privacy laws. However, these different legal players have yet to propose specific rules to address liability from negligent torts.

This Comment takes a deep dive into the law of negligence and argues for enacting more specific drone laws addressing various questions relating to negligent tort lawsuits. The Comment demonstrates that absent clearer guidance, the ordinary negligence cause of action is insufficient in the context of personal injury or property damage by commercial drones because the injured parties will likely be unable to establish the requisite elements of duty and breach. Finally, this Comment recommends different theories of liability as more viable options for injured parties to seek compensation. As applied to commercial drones, these other theories of liability better serve the primary purpose

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of tort law, provide uniformity in the law among different courts, and reduce costs for involved parties.

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I. INTRODUCTION

ON AUGUST 31, 2020, Amazon received approval from the Federal Aviation Administration (FAA) to use drones[1] for its delivery operations.[2] The approval allowed Amazon to begin

[1] Drones and uncrewed aircraft are used interchangeably throughout this Comment. Drone Advisory Comm., Fed. Aviation Admin., Public eBook June 23, 2021 DAC Meeting 104, 113 (2021), https://www.faa.gov/uas/programs_partnerships/drone_advisory_committee/media/DAC_Public_eBook_06_23_2021.pdf [https://perma.cc/8C4G-3W5S]. At the time this Comment was written, the FAA term in use was unmanned aircraft, with a proposal to change the regulatory term to uncrewed aircraft. *Id.*

[2] Güner Soysal, *Amazon's Next Potential Game Changer: Drone Deliveries*, Seeking Alpha (Sept. 13, 2020, 11:41 PM), https://seekingalpha.com/article/4374000-

drone deliveries in a limited setting, initially involving ten houses.[3] But Amazon is not the first logistics operator to obtain such approval; both UPS Flight Forward (UPS) and Alphabet's Wing already received FAA approvals for their drone delivery operations in 2019.[4] UPS has since started transporting medical samples to a hospital in North Carolina as its pilot program.[5] This trend continued as Walmart joined the bandwagon to explore the area of drone deliveries in September 2020.[6]

The benefits of drone deliveries are obvious: reduction in delivery time and increased efficiency.[7] As the shortest distance between two locations is a direct, straight line, "if [one] can take [the] delivery out of the conventional vehicle route and serve it by drone instead, then [one] save[s] a lot of money on the conventional vehicle routes," because it is less constrained and requires fewer detours.[8] Amazon claimed drones will be indispensable in achieving its goal of thirty-minute delivery.[9] Likewise, UPS's pilot program, which delivers medical samples from a doctor's office to a testing lab, projects the transit time to be less than five minutes.[10] With "two of the largest logistics operations in the country" investing their resources in drone deliveries while also developing and perfecting the technology, it is conceivable that drone delivery will become the norm in the United States soon.[11]

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amazons-next-potential-game-changer-drone-deliveries [https://perma.cc/VP9L-N4DU].

[3] Matt Leonard, *Amazon Prime Air Gets FAA Clearance for Drone Delivery on 'Highly Rural' Test Range*, SUPPLY CHAIN DIVE (Sept. 1, 2020), https://www.supplychaindive.com/news/amazon-prime-air-faa-clearance-drone-delivery-rural-test-range/584436/#:~:text=dive [https://perma.cc/C26A-FWJ5].

[4] *Id.*; Annie Palmer, *Amazon Wins FAA Approval for Prime Air Drone Delivery Fleet*, CNBC (Aug. 31, 2020, 3:03 PM), https://www.cnbc.com/2020/08/31/amazon-prime-now-drone-delivery-fleet-gets-faa-approval.html [https://perma.cc/GDP7-9B99].

[5] Maggie Schneider Huston, *The Sky Is the Limit for Medical Drones*, UPS (Mar. 26, 2019), https://www.linkedin.com/pulse/sky-limit-medical-drones-maggie-schneider-huston/ [https://perma.cc/TD62-KEZ6].

[6] Tom Ward, *Walmart Now Piloting On-Demand Drone Delivery with Flytrex*, WALMART (Sept. 9, 2020), https://corporate.walmart.com/newsroom/2020/09/09/walmart-now-piloting-on-demand-drone-delivery-with-flytrex [https://perma.cc/JYH5-3HWG].

[7] *See* Leonard, *supra* note 3.

[8] *Id.*

[9] *Id.*

[10] Huston, *supra* note 5.

[11] Leonard, *supra* note 3.

Because of the increased prevalence of recreational or commercial drones, several articles have been written addressing people's constitutional rights to privacy and implications on landowners' property and privacy rights, especially in the area of trespass, nuisance, and intrusion on seclusion.[12] However, privacy and property rights are not the only liabilities that may arise from the increased use of commercial drones. As experts anticipate a rise in personal injury or property damage cases from negligent drone operations, negligence is another area of law that legislators and legal practitioners should turn to as experts.[13] This Comment takes a deep dive into the law of negligent torts and argues for enacting more specific drone laws addressing various questions related to negligent tort suits. This Comment demonstrates that absent clearer guidance, the ordinary negligence cause of action is insufficient because the injured parties will likely be unable to establish the required elements of duty and breach. It explores different theories of liability as more viable options under which injured parties could seek compensation.

Part I introduces increasing trends in drone usage and anticipated increased uses by logistics operators. Part II then looks at the current jurisprudence in the arena of commercial drones, including available FAA rules, the National Conference of Commissioners on Uniform State Laws' (NCCUSL) (also known as the Uniform Law Commission or ULC) proposed Tort Law Relating to the Drones Act, available state drone laws, and common law torts. Part III applies negligence tort theory to what might become a typical personal injury or property damage case once commercial drones are fully incorporated. Part III considers questions like who can be held liable for such harms, what duty is owed, and how difficult it would be for the injured parties to show breach if any. Part IV proposes some recommendations that legislatures or the NCCUSL should adopt and alternative causes of action available for the injured parties.

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[12] *See, e.g.*, Tyler Watson, Note, *Maximizing the Value of America's Newest Resource, Low-Altitude Airspace: An Economic Analysis of Aerial Trespass and Drones*, 95 IND. L.J. 1399, 1400–05, 1429 (2020); Thomas Carlton, Note, *New Heights, New Uses, and New Questions: Can Individuals Enforce Their Property Rights Against the Impending Rise of Low-Flying Civilian Drones?*, 59 B.C. L. REV. 2135, 2135, 2137 (2018); Jordan M. Cash, Note, *Droning On and On: A Tort Approach to Regulating Hobbyist Drones*, 46 U. MEM. L. REV. 695, 724–31 (2016).

[13] *See* Vivek Sehrawat, *Liability Issue of Domestic Drones*, 35 SANTA CLARA HIGH TECH. L.J. 110, 116–19, 126–27 (2018) (finding that negligence law is applicable to drone liability).

Next, Part V considers currently available protections for logistics operators against potential tort suits and resulting liabilities (insurance coverage and 18 U.S.C. § 32(a)), and Part VI concludes.

II. CURRENT JURISPRUDENCE IN THE ARENA OF COMMERCIAL DRONES

This Section discusses the current jurisprudence affecting the operations of commercial drones. First, the FAA's role, purpose, and regulations will be explored. Then the Section introduces the NCCUSL's proposed rules, briefly discusses the lack of state drone laws governing liability, and presents relevant causes of action under common law torts.

A. FAA Regulations and Their Purpose in Regulating Commercial Drones

The FAA Modernization and Reform Act of 2012 defines uncrewed aircraft, or more commonly referred to as drones, as "an aircraft that is operated without the possibility of direct human intervention from within or on the aircraft."[14] The FAA is charged with promoting safety by prescribing minimum standards for aircraft in U.S. air space.[15] It states that its "mission is to provide the safest, most efficient aerospace system in the world. . . . by ensuring that all those who utilize [United States'] airspace operate safely and responsibly."[16] The existence of uncrewed aircraft systems raises potential safety concerns for both people on the ground and other aircraft.[17] The FAA promulgated five operating standards to address the safety concerns:

> (1) restricting operations over populated areas, (2) limiting use around spectators until the aircraft was flight tested and proven airworthy, (3) restricting operations to 400 feet, (4) using observers to assist operations, and (5) requiring devices to give right of ways to [crewed] aircraft[ ] and avoiding flying near [crewed] aircraft.[18]

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[14] FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 331(8), 126 Stat. 11, 72 (2012) (codified as amended at 49 U.S.C. § 44801(11)).

[15] 49 U.S.C. § 44701(a), (b).

[16] *National Drone Safety Awareness Week: Nov. 16–22, 2020*, Fed. Aviation Admin. (2020), https://www.faa.gov/uas/resources/events_calendar/drone_safety_awareness/media/DSAW_2020_guidebook.pdf [https://perma.cc/ME7J-MS8U].

[17] *See* Jamie Busby, *Drone Delivery: The Danger of Opening the Air as a Commercial Highway*, 18 Loy. Mar. L.J. 287, 290 (2019).

[18] *Id.* (citation omitted).

In anticipation of more prevalent uses of commercial drones, the FAA subsequently created new regulations regarding uncrewed aircraft systems.[19] Under Title 14 of the Code of Federal Regulations (C.F.R.) Part 107, drones must be kept within the pilot's visual line of sight;[20] flown at or below 400 feet above the ground;[21] cannot be flown at night unless the drone has anti-collision lighting visible for "at least [three] statute miles;"[22] and cannot be flown over a human being unless that person is directly participating in the operation of the drone or located under a covered structure or inside a stationary vehicle.[23] Additionally, the total weight of the drone and cargo cannot exceed fifty-five pounds.[24] However, drone operators can request specific waivers from the FAA, which allow certain operations of drones that usually fall outside of the regulations.[25] For instance, an operator can seek a waiver to allow remote pilots to fly their drones beyond the visual line of sight.[26]

On December 28, 2020, the FAA issued additional drone rules—also known as the Final Rule—to "address safety, security and privacy concerns while advancing opportunities for innovation and utilization of drone technology."[27] The purpose of the Final Rule is to amend 14 C.F.R. Part 107 "by permitting the routine operation of small [uncrewed aircraft systems] at night or over people under certain conditions" without separate waiver requests.[28] It creates four operational categories with different safety requirements, like limits on weight and potential

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[19] *See id.* at 291.

[20] 14 C.F.R. § 107.31 (2021).

[21] *Id.* § 107.51(b).

[22] *Id.* § 107.29(a)(2).

[23] *Id.* §107.39(a)–(b).

[24] *See id.* § 107.3.

[25] *Part 107 Waiver*, FED. AVIATION ADMIN., https://www.faa.gov/uas/commercial_operators/part_107_waivers [https://perma.cc/CF36-ZVEE] (Apr. 19, 2021, 10:27 AM).

[26] *Part 107 Waiver Section Specific Evaluation Information*, FED. AVIATION ADMIN., https://www.faa.gov/uas/commercial_operators/part_107_waivers/media/Part-107-Waiver-Section-Specific-Evaluation-Information.pdf [https://perma.cc/Z734-WSVN].

[27] Press Release, Fed. Aviation Admin., U.S. Department of Transportation Issues Two Much-Anticipated Drone Rules to Advance Safety and Innovation in the United States (Dec. 28, 2020), https://www.faa.gov/news/press_releases/news_story.cfm?newsId=25541 [https://perma.cc/9LT6-CNAL].

[28] Operation of Small Unmanned Aircraft Systems Over People, 86 Fed. Reg. 4314, 4314 (Jan. 15, 2021) (to be codified at 14 C.F.R. pts. 11, 21, 43, 107) [hereinafter Final Rule].

for severe injury.[29] Depending on the category, the Final Rule requires remote-identification technology, which "provides identification of drones in flight as well as the location of their control stations."[30] This requirement allows law enforcement officials to be more aware of airspace and "reduces the risk of drone interference with other aircraft[s] and people or property on the ground."[31] The Final Rule also requires pilots to keep their remote pilot certificate and identification on their person when operating a drone to present such information to authorities when requested.[32] The Final Rule also allows the operation of drones at night in limited areas.[33] However, "the FAA [currently] does not have any laws governing the liability that may result from the operation of drones."[34] The Final Rule briefly mentions that the FAA recognized the liability and privacy concerns but then states that the agency has no authority to mandate liability insurance purchases or "impose regulations based on privacy concerns."[35] Rather, it emphasizes that the operators should comply with existing, applicable laws or regulations.[36]

B. State Drone Laws and Tort Law Related to the Drones Act

In 2013, thirty states tried to pass regulations against the commercial use of drones, but none of these laws addressed liability.[37] Because specific state drone laws were lacking, the NCCUSL introduced the Tort Law Relating to Drones Act Committee in November 2017, and the Drafting Committee published its first draft in December 2017.[38] The NCCUSL's Tort Law Relating to Drones Act (Drones Act) seeks to establish model rules for addressing potential liabilities arising from trespass by drones, violations of privacy by drones, and negligent

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[29] *See id.* at 4315–17.

[30] Press Release, *supra* note 27.

[31] *Id.*

[32] *Id.*

[33] *Id.*

[34] Sehrawat, *supra* note 13, at 121.

[35] Final Rule, *supra* note 28, at 4365.

[36] *Id.*

[37] Sehrawat, *supra* note 13, at 121–22.

[38] *See* Vic Moss, *ULC Updates Tort Law Relating to Drones Act*, Drone U (June 10, 2019), https://www.thedroneu.com/blog/ulc-tort-law-drone-privacy-rights/ [https://perma.cc/7GQL-D5PL].

operations of drones.[39] However, the Drones Act focuses on the first two torts and only has a general statement for the latter.[40] Regarding negligence, the Drones Act only states that "except as provided for in this [Drones Act], and subject to any [c]onstitutional rights or privileges, the common law and statutory tort law of [a] state shall apply to a person who owns or operates [uncrewed] aircraft within [the] state . . . ."[41] It is worthy to note that in its March 2019 draft, the NCCUSL had included a separate (albeit brief) section on the "Negligent Operation of an Unmanned Aircraft."[42] This section states that,

> (a) An operator acts negligently if the operator does not exercise reasonable care under all of the circumstances. (b) The standard of care against which an operator of an [uncrewed] aircraft shall be judged is the standard of care of a similarly situated operator of an [uncrewed] aircraft, including whether the operator is a commercial or hobbyist operator and whether the operator is required by the Federal Aviation Administration or other authority to hold a license for the operation of the [uncrewed] aircraft.[43]

C. Common Law and Statutory Tort Laws

Without specific drone laws addressing potential liabilities that may arise from malfunctions or improper operations of drones, both injured and injuring parties will need to turn to the common law and statutory tort law of a forum state.[44] When a person is physically injured, or a product damages their property, the person has the following causes of action available: negligence, strict liability, products liability,[45] negligence per se, or

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[39] *See* Brian Wynne & Gary Shapiro, *New Approach to State Drone Laws Balances Privacy and Innovation*, TechCrunch (July 3, 2019, 8:30 AM), https://techcrunch.com/2019/07/03/new-approach-to-state-drone-laws-balances-privacy-and-innovation/ [https://perma.cc/NA45-SP8B].

[40] *See generally* Unif. Tort L. Relating to Drones Act prefatory note (Unif. L. Comm'n, Draft May 30, 2019) (stating the Act analyzes tort law in trespass to land and privacy as they are "[t]he two most contentious areas of [t]ort [l]aw [r]elating to [d]rones").

[41] *Id.* § 4(b).

[42] Tort L. Relating to Drones Act § 9 (Unif. L. Comm'n., Draft Feb. 19, 2019).

[43] *Id.*

[44] *See, e.g.*, Unif. Tort L. Relating to Drones Act § 4(b).

[45] Because products liability can be based on negligence, strict liability, or contract law under the breach of implied warranty of merchantability, this cause of action is considered separately. *See* Restatement (Third) of Torts: Prods. Liab. § 2 cmt. N. (Am. L. Inst. 1998).

breach of implied warranty of merchantability.[46] Because this Comment focuses on applying existing tort laws on liabilities stemming from the operation of commercial drones, the last cause of action (breach of implied warranty of merchantability) is not considered.

Negligence theory "considers the reasonableness of the [injuring party]'s actions," whereas strict liability theory assigns liability to the injuring party regardless of fault.[47] Products liability subjects sellers or distributors of a defective product to liability for the harm it causes to persons or property.[48] Lastly, the negligence per se doctrine renders an action negligent if the injuring party violates a safety statute without a valid excuse.[49] In the next Section, the current jurisprudence of negligence tort theory is discussed and applied to potential accidents arising from drone deliveries.

III. NEGLIGENCE TORT THEORY AND ITS APPLICATION

This Section discusses each element of negligence, emphasizes the lack of current case law related to commercial drones, then applies the first two elements of negligence in the context of commercial drones. The analysis demonstrates that the ordinary negligence cause of action is insufficient absent clearer guidance from the NCCUSL or the legislatures because the injured parties are unlikely to establish the duty and breach elements.

A. NEGLIGENCE

To establish a prima facie case of negligence, an injured party must show the following: (1) the injuring party owed a duty of care to the injured party; (2) such duty was breached by the injuring party; (3) the breach was the actual and proximate cause of the injury; and (4) there was an injury, resulting in damages.[50]

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[46] *See* Gary E. Marchant & Rachel A. Lindor, *The Coming Collision Between Autonomous Vehicles and the Liability System*, 52 SANTA CLARA L. REV. 1321, 1323 (2012); Jacob B. Jensen, Note, *Self-Driving but Not Self-Regulating: The Development of a Legal Framework to Promote the Safety of Autonomous Vehicles*, 57 WASHBURN L.J. 579, 590 (2018).

[47] Marchant & Lindor, *supra* note 46, at 1323.

[48] RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 1 (AM. L. INST. 1998).

[49] RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL & EMOTIONAL HARM § 14 (AM. L. INST. 2010).

[50] *See generally* RESTATEMENT (SECOND) OF TORTS § 281 (AM. L. INST. 1965); *cf. id.* §§ 430–31.

Generally, the injuring person's duty is to exercise ordinary, reasonable care to the injured person.[51] The Third Restatement of Torts states that "[a] person acts negligently if the person does not exercise reasonable care under all the circumstances."[52] However, an injuring party may owe a higher standard of care when that party "engages in a business, occupation, or profession [that] must exercise the requisite degree of learning, skill, and ability of that calling with reasonable and ordinary care."[53] For example, the standard of care required of a pilot is that of what an ordinary prudent *pilot* would do in the same or similar circumstances, not what an ordinary prudent *person* would do.[54]

To determine whether the injuring party breached a duty owed to the injured party, courts have applied Judge Learned Hand's formula: B<PL.[55] The injuring party would be liable if B<PL, where B is the burden of having adequate precautions, P is the probability of the harm occurring, and L is the gravity of the resulting injury.[56] In other words, there must be a balance between the burden and the magnitude of the risk.[57] The Second Restatement of Torts similarly compares the magnitude of the risks and utility of the act to assess whether the act is negligent.[58]

For the causation element, the injured party must show the existence of both actual and proximate causation.[59] The injured party must establish that the injuring party's action actually

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[51] *See, e.g.*, Brown v. Kendall, 60 Mass. (6 Cush.) 292, 296 (Mass. 1850) (using the term "ordinary care" as the standard for negligence); *see also* RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL & EMOTIONAL HARM § 7(a) (AM. L. INST. 2010) ("An actor ordinarily has a duty to exercise reasonable care when the actor's conduct creates a risk of physical harm.").

[52] RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL & EMOTIONAL HARM § 3 (AM. L. INST. 2010).

[53] Heath v. Swift Wings, Inc., 252 S.E.2d 526, 529 (N.C. Ct. App. 1979) (listing other professionals such as fire sprinkler contractors, industrial designers, physicians, and attorneys).

[54] *See id.*

[55] *See* United States v. Carroll Towing Co., 159 F.2d 169, 173 (2d Cir. 1947) (Judge Hand introducing the formula to a barge-steamship accident); *see, e.g.*, Washington v. Louisiana Power & Light Co., 555 So. 2d 1350, 1353–55 (La. 1990) (applying the formula to a power line accident).

[56] *Carroll Towing Co.*, 159 F.2d at 173.

[57] *See id.* (stating that the adequate precautions that need to be taken depend on the place and time).

[58] RESTATEMENT (SECOND) OF TORTS § 291 (AM. L. INST. 1965).

[59] RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL & EMOTIONAL HARM § 6 cmt. b (AM. L. INST. 2010).

caused the harm and that there is also a sufficient relationship between the negligent act and the harm.[60] Typically, the "but for" test is used to determine actual causation, which asks whether the injury would have resulted but for the negligent act.[61] If there are multiple tortfeasors or causes for the injury, different tests are applied to show actual causation existed.[62] Proximate causation is also required to limit the scope of liability when the relationship between the injuring party's negligent conduct and the harm is too tenuous.[63] Foreseeability is the touchstone in determining the existence of proximate causation.[64] The essential idea is that a negligent actor should not be liable for every possible harmful effect of his conduct, but only for those harms that a reasonable person in the actor's position should have been able to foresee arising from that conduct.[65]

Although foreseeability is arguably the most common approach, there are other approaches. The Second Restatement of Torts requires two parts for negligent conduct to be a legal cause of harm: (1) the act is a substantial factor in bringing about the harm, and (2) that no rule of law exists to relieve the actor from liability.[66] In comparison, the Third Restatement of Torts states that "[a]n actor is not liable for harm when the tortious aspect of the actor's conduct was of a type that does not generally increase the risk of that harm."[67] Although articulated in different ways, each approach shares the same principle that proximate causation is required to limit the scope of liability based on actual causation.

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[60] *See, e.g.*, Gutierrez v. Excel Corp., 106 F.3d 683, 687 (5th Cir. 1997) ("Cause in fact . . . [means] the negligent act or omission was a substantial factor in bringing about the injury[.]").

[61] *See id.* ("['But for cause' means] without which no harm would have been incurred.").

[62] Different tests include the concurrent causes test, substantial factor test, and alternative causes doctrine, among others. *See* J. Shahar Dillbary, *Causation Actually*, 51 GA. L. REV. 1, 3–4 (2016).

[63] *See, e.g.*, *Gutierrez*, 106 F.3d at 687–88 (rejecting circumstantial evidence as sufficient to prove causation).

[64] *See, e.g.*, Palsgraf v. Long Island R.R. Co., 162 N.E. 99, 101 (N.Y. 1928) (implying that the defendant should not be held liable if he was not aware of the possibilities of danger).

[65] *See id.*

[66] RESTATEMENT (SECOND) OF TORTS § 431 (AM. L. INST. 1965). Section 433 lists factors to determine whether the negligent act was a substantial factor in producing the harm. *Id.* § 433.

[67] RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL & EMOTIONAL HARM § 30 (AM. L. INST. 2010).

Lastly, a person must have sustained actual loss or damages due to the injuring party's conduct.[68] This element would likely not be hard for the injured party to establish because the injured party's claim would arise from either their property being damaged by negligent drone delivery operations or their person being physically, mentally, or emotionally harmed by negligent drone delivery operations.

B. Lack of Case Law Relating to Commercial Drones

Although delivery by drones is highly anticipated and expected to be widely commercialized in the near future, there are no cases involving personal injury or property damage from drone deliveries because it is not extensively used yet. However, several instances of personal injuries from recreational or private drone use have been reported.[69] For example, a drone that was carrying a mistletoe as part of TGI Friday's "Mobile Mistletoe" event struck a person with one of its "spinning, uncovered blades."[70] The accident happened as the drone was trying to land on the person's hand.[71] In another incident, a woman suffered a serious head injury when a drone that was taking photos of attendees at a fraternity party "fell on (her) head, causing her to stumble forward . . . ."[72] Her head had "immediately [begun] to bleed vigorously from her wounds," and she sustained permanent scars from the accident.[73]

Similarly, a drone brought to a wedding injured two guests.[74] Both guests sued the groom and the event company, "claiming they suffered permanent physical and emotional injury as a re-

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[68] *See id.* § 26.

[69] *See, e.g.*, Vanessa Ogle, *Drone Strike! Our Photographer Injured by TGI Friday's Mistletoe Copter*, Brooklyn Paper (Dec. 8, 2014), https://www.brooklynpaper.com/drone-strike-our-photographer-injured-by-tgi-fridays-mistletoe-copter/ [https://perma.cc/5MYR-PSZZ]; California News Wire Services, *Woman Struck by Drone at USC Frat Party Sues Northridge Event Company*, Patch (Sept. 27, 2016, 6:07 PM), https://patch.com/california/northridge/woman-struck-drone-usc-frat-party-sues-northridge-event-company [https://perma.cc/2J32-EPRU]; Kiera Blessing, *Wedding Drone Crash Leads to Guests' Lawsuit*, Eagle-Tribune (Dec. 16, 2016), https://www.eagletribune.com/news/wedding-drone-crash-leads-to-guests-lawsuit/article_9bdf14d4-c3bd-11e6-87dc-0752f3c938b6.html [https://perma.cc/WZA5-XVRE].

[70] Ogle, *supra* note 69.

[71] *Id.*

[72] California News Wire Services, *supra* note 69.

[73] *Id.*

[74] Blessing, *supra* note 69.

sult of the [drone] crash."[75] One of the guests suffered a concussion and needed more than twenty stitches to close the laceration; the other guest claimed that she "suffered fractured orbital bones, a fractured nose[,] and a concussion."[76] Even though the groom was not operating the drone at the time of the accident, the two guests sued the groom.[77] The groom did not seem concerned with the lawsuit, displaying doubt about whether the two women would continue with the lawsuit.[78] He said that "[t]he whole thing seem[ed] kind of frivolous."[79]

Assuming that drone deliveries become ubiquitous in a few years, it is not too difficult to envision similar scenarios where drones themselves or the packages the drones are carrying damage people or property below. The next Part applies negligence theory to these situations and asserts that the NCCUSL should propose more specific standards of tort liability arising from delivery drones.

C. Application of Current Negligence Jurisprudence

Imagine the following scenario: a package is being delivered by a well-known logistics operator on a sunny day. Suddenly, the drone crashes on the way to its destination, injuring a person checking their mailbox below. This Section analyzes how the injured person can seek compensation under current negligence jurisprudence and whether they will be successful in a negligence suit against the logistics operator.

The first issue the plaintiff will encounter is determining who to sue for negligence. Two likely defendants will be the logistics operator in charge of delivering the package and the drone pilot. Regardless of who the plaintiff decides to sue, to establish a prima facie case of negligence, the plaintiff will have to show that the defendant owed a duty of care to the plaintiff, duty was breached, and the breach was the actual and proximate cause of the harm that resulted.[80]

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[75] *Id.*

[76] *Id.*

[77] *See id.*

[78] *See id.*

[79] *Id.*

[80] *See generally* Restatement (Second) of Torts § 281 (Am. L. Inst. 1965); *cf. id.* §§ 430–31.

1. Liable Parties

For a negligence claim arising from injuries from recreational or private drones, the plaintiff will be able to establish each element of negligence more easily. First, the plaintiff would be able to pinpoint the blame to the drone's pilot because the pilot was actually operating the drone. The FAA requires recreational fliers to keep the drone within their visual line of sight or within another observer's sight who is physically located next to and directly interacting with the pilot.[81] Furthermore, pilots are generally barred from flying drones over moving vehicles and people, and are directed to "not operate [their] drone[s] in a dangerous manner."[82] Therefore, the pilot had a duty to at least exercise reasonable care when flying the drone, and that duty was breached when the pilot operated the drone improperly, causing the crash. Actual causation would undoubtedly be established because but for the flying of the drone, the harm would not have resulted. The plaintiff will also be able to argue that the pilot should have foreseen that such an accident was likely to occur when he decided to fly the drone in the vicinity of people because the drone was supposed to be in the pilot's visual line of sight.

On the contrary, the plaintiff suing a commercial drone pilot would have a difficult time establishing each element of the negligence claim. Commercial drones are exempt from several requirements that recreational fliers must comply with. For example, pilots can operate commercial drones beyond their visual line of sight.[83] As such, most pilots would not be in the near vicinity of where the drones are located, and thus, will likely not have the same view as a recreational or private drone pilot during the entire flight. However, commercial drones are usually equipped with cameras that provide the necessary visual data to the pilots.[84] In addition, commercial drones are typically con-

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[81] *Recreational Flyers & Modeler Community-Based Organizations*, FED. AVIATION ADMIN., https://www.faa.gov/uas/recreational_fliers/ [https://perma.cc/99HS-TMYN] (Sept. 2, 2021, 11:02 AM).

[82] *Id.*; *cf. Operations Over People General Overview*, FED. AVIATION ADMIN., https://www.faa.gov/uas/commercial_operators/operations_over_people/ [https://perma.cc/8GJS-EK4X] (Apr. 7, 2021, 3:43 PM) (providing the narrow exceptions when a drone can fly over moving vehicles).

[83] *See Package Delivery by Drone (Part 135)*, FED. AVIATION ADMIN., https://www.faa.gov/uas/advanced_operations/package_delivery_drone/ [https://perma.cc/67NQ-Z27N] (Mar. 16, 2021, 3:29 PM).

[84] *See Commercial Drones: Industries that Use Drones, Deliverables, and Our List of the Top Models on the Market*, FLYABILITY, https://www.flyability.com/commercial-

trolled from a remote-control room, where the command for the drone to reach certain GPS coordinates will be programmed.[85] Therefore, it would be difficult, if not impossible, for the plaintiff to nail down a single pilot for negligence unless they can obtain such information from the logistics operators through discovery.

In such cases, the plaintiff may be able to hold the logistics operator liable under two different causes of action. First, the logistics operator could be sued under the respondeat superior doctrine, a type of vicarious liability.[86] Under the respondeat superior doctrine, an employer (principal) may be liable for the negligent actions of its employees (agents) if the tortious act happened within the employee's scope of employment.[87] To hold the principal liable for the agent's torts, not only does the plaintiff need to show that the agent committed the tort, but he must also prove that (1) the employer–employee relationship existed and (2) the act happened within the scope of the employment.[88] The existence of an employer–employee relationship is essential because a principal is not liable for its independent contractors' tortious acts.[89] The Second Restatement of Agency articulates the differences between an employee and an independent contractor, which mainly depend on the principal's amount of control over the agent's physical conduct.[90]

In a lawsuit against the logistics operator as the principal, it would be relatively easier for the plaintiff to establish that the tortious act happened within the scope of the pilot's employment with the logistics operator. Assume arguendo that the pilot's sole responsibility is to input the correct command for the flight path. If the drone crashed by non-intervening causes—

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drones [https://perma.cc/HAQ9-J37X]; Benjamin D. Mathews, Comment, *Potential Tort Liability for Personal Use of Drone Aircraft*, 46 ST. MARY'S L.J. 573, 582–83 (2015).

[85] *See* Alberto Cuadra & Craig Whitlock, *How Drones Are Controlled*, WASH. POST (June 20, 2014), https://www.washingtonpost.com/wp-srv/special/national/drone-crashes/how-drones-work/ [https://perma.cc/6MM6-XR8C].

[86] *See generally* RESTATEMENT (SECOND) OF AGENCY § 219 (AM. L. INST. 1958).

[87] *E.g.*, Goodyear Tire & Rubber Co. v. Mayes, 236 S.W.3d 754, 757 (Tex. 2007); *cf.* RESTATEMENT (SECOND) OF AGENCY § 219(1) (AM. L. INST. 1958).

[88] *See Mayes*, 236 S.W.3d at 757; *see also* RESTATEMENT (SECOND) OF AGENCY § 219(1) (AM. L. INST. 1958).

[89] *See* RESTATEMENT (SECOND) OF AGENCY § 219 cmt. a (AM. L. INST. 1958).

[90] *See id.* § 220 (listing factors to consider the agent's status as a "servant," i.e., employee, or as independent contractor).

i.e., not due to malfunctions of drones, software program error, or the weather—then the pilot likely put in the incorrect command, which would be within the scope of his employment.

However, the plaintiff may not be able to show that these pilots are employees of logistics operators. This showing will largely depend on how the logistics operators contract with their agents. Even though courts have ruled that the label of either W-2 employees or 1099 independent contractors is not dispositive in determining the relationship, the employers are aware of the factors that the courts use to determine such relationship.[91] Employers would be able to construct contract terms that would only give them some general control over the pilots but are insufficient to form the employer–employee relationship. For instance, Amazon currently has two different types of drivers with different terms.[92] The first type, becoming an employee of Amazon's Delivery Service Partners, requires an individual to work full-time and provides full benefits, opportunities for promotion, and a delivery vehicle.[93]

On the other hand, Amazon Flex drivers use their own vehicles to deliver packages; get paid in hourly blocks; choose the block of hours that fit their schedules; and are responsible for the gas cost, auto insurance, and repairs and maintenance of their vehicles.[94] Applying the Second Restatement of Agency factors, these Amazon Flex drivers generally seem to fall under the independent contractor category.[95] First, Amazon's extent of control over the Amazon Flex drivers appears narrow because they get to schedule their own blocks of time.[96] These drivers probably also have other distinct occupations or businesses.[97] Additionally, picking up packages from the warehouses and de-

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[91] *See, e.g.*, McKee v. Brimmer, 39 F.3d 94, 98 (5th Cir. 1994) ("In essence, an employer will not be allowed to escape liability by drafting a contract which labels its employee an independent contractor, but retains employer-like control over him."); Howard W. Luff Co. v. Capece, 61 F.2d 635, 636 (6th Cir. 1932) ("This court concluded that whether a relationship is one of master and servant, or of employer and independent contractor, must be determined in each case from the pertinent facts and circumstances.").

[92] *Amazon Delivery Driver,* AMAZON, https://hiring.amazon.com/job-opportunities/delivery-driver-jobs#/ [https://perma.cc/BE9L-GGHT]; *Amazon Flex Delivery Driver*, AMAZON, https://hiring.amazon.com/job-opportunities/flex-driver-jobs#/ [https://perma.cc/RS3F-8XZD].

[93] *Amazon Delivery Driver*, *supra* note 92.

[94] *Amazon Flex Delivery Driver, supra* note 92.

[95] *See* RESTATEMENT (SECOND) OF AGENCY § 220 (AM. L. INST. 1958).

[96] *Id.* § 220(2)(a).

[97] *Id.* § 220(2)(b).

livering them is customarily done without much supervision, and not much skill is required apart from the ability to drive.[98] Second, the drivers use their own cars, and therefore, Amazon does not supply "the instrumentalities, tools, and the place of work for the person doing the work."[99] Third, Amazon pays the drivers by the time worked rather than by the job.[100] Lastly, absent specific contract terms, it is hard to determine whether Amazon and Flex drivers believed they were creating an employment relationship.[101] However, based on the limited facts and generalizations provided above, it appears that they did not intend to create such permanent relationships. The only factors that lean towards finding an employer–employee relationship are that Amazon is in the logistics business, and the drivers' work is part of its regular business.[102]

Relatedly, Amazon has subcontracted with delivery companies to provide shipping services.[103] Even though "those ubiquitous gray-blue vans and uniformed drivers all have Amazon branding on them," there are at least 250 subcontracted companies that do the heavy lifting.[104] The drivers of these subcontracted companies would not be considered Amazon's employees, and thus, Amazon would likely not be held liable for these drivers' torts. Injured parties could argue that Amazon was the principal, the subcontractor was the agent, and the driver was an agent of the agent, but this may make it more challenging to show an employer–employee relationship because the principal is one step removed from the tortfeasor. So, even if the FAA requires all commercial drone pilots to be licensed and more heavily regulated, it seems likely that logistic operators will continue to use subcontractors. The Amazon-branded cars "deliver about half of all the company's last-mile shipments,"[105] which would likely be the shipments picked up by the commercial drones (if they meet the weight requirement). Hence, with the increasing prev-

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98 *Id.* § 220(2)(c)–(d).

99 *Id.* § 220(2)(e).

100 *Id.* § 220(2)(g).

101 *Id.* § 220(2)(i).

102 *See id.* § 220(h), (j).

103 *See* Kate Cox, *Amazon Delivery Contractors Operate with Little Oversight, Report Finds*, ARS TECHNICA (Sept. 3, 2019, 3:30 PM), https://arstechnica.com/tech-policy/2019/09/amazon-delivery-contractors-operates-with-little-oversight-report-finds/ [https://perma.cc/72DX-BKNV].

104 *Id.*

105 *Id.*

alence of the "gig economy"[106] and the uses of subcontractors, the plaintiff will have a hard time establishing that the pilot who operated the injury-causing commercial drone was an employee of the logistics operator.

Another way to hold a logistics operator liable is to sue for its direct negligence. As a principal, the logistics operator could be negligent in failing to supervise its employees adequately, provide sufficient instructions, or hire competent or suitable people to fly the drones.[107] However, these are business decisions, and courts usually apply high deference standards to such decisions.[108] Therefore, the plaintiff likely will not succeed in seeking compensation.

2. Duty and Breach

Even if the plaintiff can point out the pilot who was associated with the particular commercial drone that caused the injury, it is unclear what duty a particular pilot would owe to the plaintiff. The lowest, yet reasonable, duty would be for the pilot to input the GPS coordinates of the package's destination correctly. After all, commercial drones are uncrewed, automated aircraft.[109] With the ability to detect obstacles and avoid collisions, they are expected to fly by themselves once the pilot has inserted the correct command.[110] For example, Amazon's delivery drone called the Prime Air drone features "an automated drone management system" and "carries a 'diversity of sensors' . . . including visual, thermal, and ultrasonic, in order to

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[106] "The gig economy in total accounts for the world's second-highest number of work opportunities. To put this in perspective, a third of the world's workers are employed within this economy, with transactions looking to rise from $204 billion to $455 billion in 2023." Richard Fang, *The Gig Economy Is Growing and Why the Tech Industry Is Loving It*, MEDIUM (Nov. 22, 2020), https://medium.com/swlh/the-gig-economy-is-growing-and-why-the-tech-industry-is-loving-it-6f890ee0be4a [https://perma.cc/FG77-27L4].

[107] *See generally* DON MAYER, DANIEL M. WARNER, GEORGE J. SIEDEL, JETHRO K. LIEBERMAN & ALYSSA ROSE MARTINA, THE LEGAL ENVIRONMENT AND BUSINESS LAW 505 (Executive MBA ed. 2012), https://app.livecarta.com/catalog/preview/the-legal-environment-and-business-law [https://perma.cc/7BAW-X5C6].

[108] *See, e.g.*, Wynn Resorts, Ltd. v. Eighth Judicial Dist. Court in & for County of Clark, 399 P.3d 334, 341-42 (Nev. 2017).

[109] *See* Fintan Corrigan, *How Do Drones Work and What Is Drone Technology*, DRONEZON (Oct. 1, 2020), https://www.dronezon.com/learn-about-drones-quadcopters/what-is-drone-technology-or-how-does-drone-technology-work/ [https://perma.cc/WQN6-NPJD].

[110] *Id.*

feed data to a sophisticated sense-and-avoid system."[111] The drone should be able to detect "people, dogs, and even a slender clothesline from the air," resulting in "safe, predictable behavior in every situation."[112]

Despite such an automated system, one may propose that the pilot should have the duty to pay attention to the surroundings of the drone during its entire flight via the camera to make sure that nothing goes wrong. When a similar question was asked in the context of automated vehicles, one author proposed that if a reasonable user of the automated car understands the manufacturer's instructions "to mean that the driver can choose to not pay attention, it seems inequitable to then hold her liable for negligence for anything that happens after that, barring any user misuse of intervening cause of plaintiff's injury."[113] As commercial drone pilots will not be actively controlling the flight paths of these drones, it also seems unfair to impose on the pilots the duty to oversee flight paths of every single package being delivered from start to finish. Additionally, as drone deliveries become more common, it may be impossible for pilots to meet the ordinary standard of care—let alone the heightened standard that usually applies to pilots[114]—simply due to the sheer number of deliveries per day. For instance, in July 2020, Amazon shipped 415 million packages.[115] "Amazon [said] that 86% of its packages weigh less than five pounds,"[116] which is the maximum weight that its drones can carry.[117] Similarly, UPS saw volume growth of 26% that same month while "FedEx volume

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[111] Miriam McNabb, *See Amazon's New Delivery Drone Fly: Will Your Stuff Be Delivered By Drone Within Months?*, DRONELIFE (June 6, 2019), https://dronelife.com/2019/06/06/see-amazons-new-delivery-drone-fly-will-your-stuff-be-delivered-by-drone-within-months/ [https://perma.cc/8U8U-YJA7].

[112] *Id.*

[113] Orly Ravid, Comment, *Don't Sue Me, I Was Just Lawfully Texting & Drunk When My Autonomous Car Crashed Into You*, 44 SW. L. REV. 175, 198 (2014).

[114] *See* Heath v. Swift Wings, Inc., 252 S.E.2d 526, 529 (N.C. Ct. App. 1979) (holding defendant to a minimum standard of care for pilots rather than for ordinary persons).

[115] Frank Holland, *Amazon Is Delivering Nearly Two-Thirds of Its Own Packages as E-Commerce Continues Pandemic Boom*, CNBC (Aug. 13, 2020, 3:59 PM), https://www.cnbc.com/2020/08/13/amazon-is-delivering-nearly-two-thirds-of-its-own-packages.html [https://perma.cc/RF2X-UUY7].

[116] Josh Dunham, *Drones: An In-Depth Guide to Success*, REVEEL (May 22, 2019), https://www.reveelgroup.com/drones-an-in-depth-guide-to-success/ [https://perma.cc/XC5L-T8UD].

[117] Frederic Lardinois, *A First Look at Amazon's New Delivery Drone*, TECHCRUNCH (June 5, 2019, 11:59 AM), https://techcrunch.com/2019/06/05/a-first-look-at-amazons-new-delivery-drone/ [https://perma.cc/C3YD-EHAG].

rose 22%."[118] Therefore, once commercial delivery drones are fully incorporated, one can only imagine how many deliveries will be made per day across the nation.[119]

Regardless of whichever duty is imposed, the plaintiff will likely not be able to show that such duty was breached by either the pilot or the logistics operator. Applying Judge Hand's formula, the burden imposed on either defendant would be higher than the probability of the harm occurring multiplied by the gravity of the resulting injury.[120] The pilot would have a significant burden, as discussed above, especially if the pilot is expected to oversee the entire flight path of each package. Alternatively, if the pilot only has the duty to take reasonable care to input the correct commands, then unless the wrong coordination proximately caused the drone to crash into the plaintiff, there would be no breach.

Similarly, for the logistics operators, courts would not likely find that a breach has occurred. To be compliant with the FAA's regulations, the logistics operators would have already taken significant precautionary measures. They would have performed several pilot programs;[121] hired licensed pilots and provided training;[122] limited weight of packages; and installed required safety and security features, such as cameras, anti-collision lights visible from three miles away, and remote identification technology.[123] On the other hand, the probability of harm occurring would be relatively low, with the probability decreasing as the harm becomes more grievous.

Applying the risk-utility test of the Second Restatement of Torts results in a similar conclusion.[124] The Restatement states that the "risk is unreasonable and the act is negligent if the risk is of such magnitude as to outweigh what the law regards as the utility of the act or of the particular manner in which it is

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[118] Holland, *supra* note 115.

[119] "A 2017 industry report predicted that demand for urban freight delivery [will] grow 40% by 2050." Dunham, *supra* note 116.

[120] See discussion *supra* Section III.A.

[121] *See* Jaclyn Diaz, *U.S. Announces New Rules for Drones and Their Operators*, NPR (Dec. 29, 2020, 3:54 AM), https://www.npr.org/2020/12/29/951010863/u-s-announces-new-rules-for-drones-and-their-operators [https://perma.cc/9VLZ-Z6EW] (reporting that Walmart conducted a pilot program and Amazon is still testing its services even after receiving FAA approval).

[122] *See id.*

[123] *See id.*

[124] *See generally* RESTATEMENT (SECOND) OF TORTS §§ 291–93 (AM. L. INST. 1965) (listing factors to determine both utility and magnitude of risk).

done."[125] Some of the factors in determining the utility of the actor's conduct are as follows: the social value of the interest to be advanced, the "extent of the chance that this interest will be advanced or protected by the particular course of conduct," and the availability of less dangerous alternatives.[126] Like automated vehicles, the social value promoted by commercial drones is efficient and faster delivery with potentially fewer accidents because drone deliveries will reduce the number of deliveries by human-driven automobiles.[127] On the other hand, factors used to determine the magnitude of the risk include the social value of the interest imperiled, the likelihood that the "actor's conduct will cause an invasion of any interest of the other," the grievousness of the harm, and the "number of persons whose interests are likely to be invaded if the risk takes effect in harm."[128] Commercial drones imperil several other interests, such as privacy rights, which go beyond the scope of this Comment.[129] However, personal injury and property damages are expected to decrease with automated commercial drones. In other words, the number of persons who commercial drones will harm compared to those who will benefit from the incorporation of commercial drones will be lower.

Therefore, even without addressing the proximate causation element, the negligence theory of liability will likely not be an effective cause of action for the injured parties seeking compensation for damages from the pilots or the logistics operators. Professor Gary Marchant and Rachel Lindor, Directors of the Center for Law, Science & Innovation at the Sandra Day O'Connor College of Law, posed a similar question as this Comment for autonomous vehicles.[130] Dividing the autonomous vehicles into two categories—partially and completely autonomous vehicles—they hypothesized that

> "partial autonomous systems will shift some . . . of the responsibility for accident avoidance from the driver to the vehicle. . . . With

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[125] *Id.* § 291.

[126] *Id.* § 292.

[127] *See* Jensen, *supra* note 46, at 584.

[128] RESTATEMENT (SECOND) OF TORTS § 293 (AM. L. INST. 1965).

[129] *See, e.g.*, Watson, *supra* note 12, at 1400 (arguing that adopting a per se aerial trespass rule would be premature and economically disadvantageous); Carlton, *supra* note 12, at 2137–38 (arguing that property owners' privacy and property rights should be protected against drones through comprehensive federal regulation); Cash, *supra* note 12, at 698–99 (stating that current tort law is adequate to protect privacy rights in the context of drones).

[130] Marchant & Lindor, *supra* note 46, at 1326–30.

> a fully autonomous vehicle, however, the responsibility for avoiding an accident shifts entirely to the vehicle and the components of its accident avoidance systems."[131]

Consequently, they stated that the person who is more likely to be held liable would be the vehicle manufacturers or other producers of components of these vehicles under the products liability theory rather than the drivers under the negligence theory.[132] Similarly, parties injured by commercial drones will have a better chance of recovery under other theories of liability such as strict liability, products liability, and negligence per se doctrines. The following Section proposes recommendations for alternative recovery options instead of the negligence tort theory.

IV. PROPOSED RECOMMENDATIONS

This Section first proposes that the NCCUSL should adopt its earlier version of the Drones Act. Then, the current jurisprudence of different liability theories is discussed and applied in the context of commercial drones.

A. Tort Law Relating to Drones Act

As mentioned above in Section II.B, the NCCUSL included a separate section specific to negligence liability in the earlier draft of its Drones Act. It stated that an operator is negligent "if the operator does not exercise reasonable care under all of the circumstances."[133] Furthermore, it identified the standard of care applicable to the operator as "the standard of care of a similarly situated operator of an [uncrewed] aircraft, including whether the operator is a commercial or hobbyist operator and whether the operator is required by the [FAA] or other authority to hold a license for the operation of the [uncrewed] aircraft."[134] Despite its brevity, it clarifies the duty that operators owe to the injured parties. This standard of care is broad and rather indefinite, but at least it specifies that the heightened standard of care laid out in *Heath v. Swift Wings, Inc.* should be applied.[135] Consequently, the NCCUSL should reincorporate this section into the Drones Act.

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[131] *Id.* at 1326.

[132] *Id.* at 1327–28.

[133] Tort L. Relating to Drones Act § 9(a) (Unif. L. Comm'n., Draft Feb. 19, 2019).

[134] *Id.* § 9(b).

[135] *See* Heath v. Swift Wings, Inc., 252 S.E.2d 526, 529 (N.C. Ct. App. 1979).

Further, the NCCUSL should define "operators"—whether they are the pilots operating the commercial drones or the owners of the commercial drones, namely the logistics operators. Professor Nanci Carr, Business Law Professor at California State University in Northridge, proposed that one way the owners of automated systems could be assigned liability is to treat "the car [as] the electronic agent of the owner."[136] She supported this proposition by stating that Congress lent some support for the agency theory because "it [had] previously passed legislation clarifying that individuals can be held to contracts entered into by their electronic agents."[137] If such legislation were to apply to automated vehicles, the same agency theory could likely extend to commercial drones.

B. Strict Liability

Generally, strict liability applies in two distinct situations: maintaining custody of livestock or wild animals and conducting abnormally dangerous activities.[138] An owner of a wild animal, even if the animal is domesticated, is strictly liable for harm caused by the animal, even if the owner was not aware of the danger.[139] Similarly, an injuring party would be liable under strict liability claims if the conduct is qualified as an abnormally dangerous activity, even if the injured party used the utmost care.[140] An activity is abnormally dangerous if it creates a "foreseeable and highly significant risk of physical harm" regardless of whether actors exercise reasonable care and the activity is not of "common usage."[141] The Second Restatement of Torts also considers the appropriateness of the activity to the location it is

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[136] Nanci K. Carr, *As the Role of the Driver Changes with Autonomous Vehicle Technology, so, Too, Must the Law Change*, 51 St. Mary's L.J. 817, 840 (2020).

[137] *Id.* at 839 & n.138 ("A contract or other record relating to a transaction in or affecting interstate or foreign commerce may not be denied legal effect, validity, or enforceability solely because its formation, creation, or delivery involved the action of one or more electronic agents so long as the action of any such electronic agent is legally attributable to the person to be bound.") (quoting 15 U.S.C. § 7001(h)).

[138] Restatement (Third) of Torts: Liab. for Physical & Emotional Harm § 24 (Am. L. Inst. 2010).

[139] *Id.* § 22–23 (subjecting to strict liability an owner or possessor of a wild animal or of an animal which the owner or possessor "knows or has reason to know" has dangerous tendencies).

[140] *See id.* § 20(a), (b)(1); *see also id.* § 20 cmts. g, h; Restatement (Second) of Torts § 519(1) (Am. L. Inst. 1977).

[141] Restatement (Third) of Torts: Liab. for Physical & Emotional Harm § 20(b) (Am. L. Inst. 2010); *cf.* Turner v. Big Lake Oil Co., 96 S.W.2d 221, 226

carried out at and the activity's value to the community.[142] Examples of abnormally dangerous activities include those involving explosives and nuclear waste. The common ground between these two categories—wild animals and abnormally dangerous activities—is that both exhibit inherent risks of dangers that could result in serious harm.

Legislatures should, at least temporarily, include commercial drones as another category that will hold owners and operators strictly liable for harm caused by commercial drones. Until commercial drones become fully incorporated, drone delivery will not be considered a "natural or necessary and common use" of the device.[143] Furthermore, delivery by commercial drones creates a foreseeable and significant risk of physical harm despite the reasonable precautions taken by the logistics operators to comply with the FAA regulations. Although the accidents may be infrequent due to technological advances,[144] the resulting harm could be significant because these drones could drop from 400 feet above the ground at a maximum speed of 100 mph.[145] As noted in the next paragraph, similar reasonings were used to propose strict liability for harms caused by an airplane "if anything [went] wrong with the flight."[146]

As Michael Spanel noted, "[crewed] aircraft were considered abnormally dangerous in the infancy of experimental commercial flight."[147] The Second Restatement of Torts specifically dedicates a section to state that both the operator and the owner of

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(Tex. 1936) (contrasting common use of land between England and Texas to determine application of a negligence rule).

[142] RESTATEMENT (SECOND) OF TORTS § 520(e), (f) (AM. L. INST. 1977).

[143] *Turner*, 96 S.W.2d at 226 (explaining that a landowner's responsibility for damages was related to whether the use of the land was natural or common for the area).

[144] *See* Malek Murison, *What Are the Most Common Causes for Drone Crashes?*, DRONEBASE, https://blog.dronebase.com/2017/11/20/what-are-the-most-common-causes-of-drone-crashes [https://perma.cc/FE5E-82Q7] (Feb. 18, 2020) (noting that, at least for recreational drones, "the causes of [crashes] have shifted towards pilot error rather than a genuine technology fault.").

[145] Press Release, Fed. Aviation Admin., Fact Sheet – Small Unmanned Aircraft Systems (UAS) Regulations (Part 107) (Oct. 6, 2020), https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=22615 [https://perma.cc/DW3K-W3KS].

[146] RESTATEMENT (SECOND) OF TORTS § 520A cmt. c (AM. L. INST. 1977) (Ground Damage from Aircraft).

[147] Michael Spanel, *Liability and Allocation of Liability in Drone Accidents*, Chicago-Kent College of Law Aviation Law Seminar, at 5 (May 15, 2015), http://www.kentlaw.edu/perritt/courses/seminar/Michael%20Spanel%20-%20Final.pdf [https://perma.cc/3TFF-CYQC].

the aircraft—the one who "authorized or permitted the operation"—are subject to strict liability for any "physical harm to land or to persons or chattels on the ground" that is caused "by the dropping or falling of an object from the aircraft."[148] Comment c to § 520A of the Second Restatement of Torts further explains that such a position was necessary because "aviation ha[d] not yet reached the stage of development" to properly allocate the risks of accidental physical harm to the injured parties or to the industry itself.[149] The authors of the Restatement recognized that "while the safety record [wa]s greatly improved[,] it still [could not] be said that the danger of ground damage ha[d] been so eliminated or reduced that the ordinary rules of negligence law should be applied."[150] They added that people on the ground had "no place to hide from falling aircraft" and were "helpless to select any locality for their residence or business in which they will not be exposed to the risk, however minimized it may be."[151] The same rationale applies to commercial drones. Even though smaller in size, commercial drones create the same risk of harm to people and property on the ground. If people were staring at the sky when the delivery drones are falling, then they might be able to react quickly enough to find coverings or step aside to avoid a direct collision. However, their property on the ground, whether movable or immovable, would be unable to avoid such harm.

Additionally, there are only limited precautions people on the ground can take. Professors Robert Cooter of the University of California at Berkeley and Thomas Ulen of the University of Illinois, Urbana-Champaign, consider different theories of liability and each theory's effect on creating incentives to take efficient precautions.[152] One of their conclusions is that "[i]f only the [injured party] can take precaution, then a rule of no liability provides incentives for efficient precaution."[153] A rule of no liability is where injured parties bear the entire risk of harm.[154] The total cost for an injured party is the cost of harm and the cost of pre-

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[148] *Id.*; *see also* RESTATEMENT (SECOND) OF TORTS § 520A (AM. L. INST. 1977).

[149] RESTATEMENT (SECOND) OF TORTS § 520A cmt. c (AM. L. INST. 1977).

[150] *Id.*

[151] *Id.*

[152] ROBERT COOTER & THOMAS ULEN, LAW AND ECONOMICS 199–201 (6th ed. 2016) (defining the efficient level of precaution as a point where marginal social cost is equal to the marginal social benefit).

[153] *Id.* at 204.

[154] *See id.* at 202.

caution. Because injured parties have incentives to minimize the total cost they bear, they will be motivated to take precautions until the marginal cost is equal to the marginal benefit.[155]

On the other hand, "[i]f only the injurer can take precaution, then a rule of strict liability with perfect compensation provides incentives for efficient precaution."[156] This is because, under strict liability, injured parties are "indifferent between an accident with [perfect] compensation and no accident."[157] They have no incentive to take precaution because their total cost under strict liability would only be the cost of precaution since the injuring party would always cover the cost of harm.[158] As such, to minimize their total cost, they would not take any precautions. On the contrary, the injuring parties would take efficient precautions to ensure the marginal cost is equal to the marginal benefit to minimize their total costs or the sum of costs on precautions taken and the costs of harm caused.[159]

In the context of commercial drones, logistic operators have numerous reasonable precautions they can take to reduce the risk of accidents happening. For instance, they can hire qualified pilots, implement training systems and other protocols to maintain the quality of their operations, and comply with safety regulations and laws enacted by the FAA and state legislatures. However, people on the ground have limited numbers of reasonable precautions, if at all. Therefore, until commercial drones become ubiquitous and the law specific to commercial drones is well-developed, delivery by drones should be categorized as an abnormally dangerous activity under the Third Restatement of Torts.

Critics of this proposal would point out that it may unduly burden logistics operators and inhibit their incentives to adopt this new mechanism. However, this may be a fairer approach in the end because logistics operators would be in a better position to absolve such costs and distribute them among their consumers. Consumers would be opposed to the idea of increased costs when using logistics operators' services, but practically, such an increase would be minimal when spread among millions of con-

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[155] *Id.*

[156] *Id.* at 204.

[157] *Id.* at 203. Professors Cooter and Ulen suggest we "assume that the damages compensate the victim perfectly" as a useful analytic tool even while acknowledging this assumption is unrealistic. *Id.*

[158] *See id.*

[159] *See id.* at 203–04.

sumers. As such, the potential costs of litigation under a negligence cause of action would likely be greater than the sum of litigation costs under a strict liability cause of action and the minimally increased upfront costs due to a longer litigation period and a more robust discovery phase.

Furthermore, applying strict liability would better serve the purposes of tort law, which is to deter avoidable accidents and compensate victims.[160] Knowing that they will be strictly liable, the logistics operators would be incentivized to take more precautions, resulting in fewer accidents. Additionally, as seen above in the application of current negligence tort law, it would be difficult, if not impossible, for the injured parties to establish negligence and hold the injuring parties liable. As such, some parties at fault, such as owners and operators, may escape liability. However, injured parties would still need to show causation (both actual and proximate) and damages, removing potentially frivolous claims. Lastly, application of strict liability may save litigation costs for both parties by shortening the litigation period and encouraging settlement of lawsuits.[161] Strict liability can also lead to a reduction in administrative costs because the "courts need not determine what level of care should be required of defendants nor whether defendants have met the prescribed level of care."[162]

C. Negligence Per Se

Negligence per se doctrine holds that the violation of a statute is negligence as a matter of law.[163] The statute in question determines the standard of care, and the jury is left to determine whether (1) the statute was violated without a valid excuse, (2) the injured party was part of the class that the statute intended to protect, and (3) such violation both factually and legally caused the harm that the statute was protecting against.[164]

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[160] Carr, *supra* note 136, at 838.

[161] *Economic Analysis of Alternative Standards of Liability in Accident Law*, The Bridge, https://cyber.harvard.edu/bridge/LawEconomics/neg-liab.htm [https://perma.cc/9ST7-WBC2].

[162] *Id.*

[163] *See* Martin v. Herzog, 126 N.E. 814, 815–16 (N.Y. 1920); *see also* Paul Yowell, *Judicial Discretion in Adopting Legislative Standards: Texas's Solution to the Problem of Negligence Per Se?*, 49 Baylor L. Rev. 109, 110 (1997).

[164] Restatement (Third) of Torts: Liab. for Physical & Emotional Harm § 14 (Am. L. Inst. 2010) ("An actor is negligent if, without excuse, the actor violates a statute that is designed to protect against the type of accident the actor's conduct causes, and if the accident victim is within the class of persons the statute

There are different approaches to violations of statutes depending on the jurisdiction.[165] Some states hold that the violation of a statute creates a rebuttable presumption of negligence which means that the injuring party may rebut by showing that a reasonable person would have acted as he did.[166] Other jurisdictions hold that violations of safety statutes are merely evidence of negligence.[167] Regardless of these different approaches, the important element of this doctrine is that it removes considerations of the reasonableness of the injuring party's actions from the jury; instead, "the statute establishes the standard of care."[168]

Negligence per se doctrine is also a more viable alternative than the negligence tort theory because it removes courts' burden to determine the reasonable standard of care in different circumstances and plaintiffs' burden in establishing a breach of that duty. For instance, suppose a drone is delivering a package in heavy rain for the last segment of the delivery. The pilot coordinated the correct destination coordinates, and there is no problem with the drone itself. Because of the heavy rain, the package gets soaked even though it is waterproof, slips from the drone, falls on a parked car's front window, and significantly damages the car. Under the ordinary negligence cause of action, the plaintiff likely would not successfully recover from the logistics operator. First, the plaintiff may not even bring a lawsuit because litigation costs would probably be greater than the cost of repairing the car himself. Second, the plaintiff's main argument would be that the logistics operator was negligent in delivering the package in heavy rain. However, a significant counterargument would be that the logistics operator also took precautionary measures. Namely, the logistics operator waterproofed the package, and the drone was only used in the last segment of the delivery, meaning it was not in the rain for an extended period. Therefore, one court may rule that the standard of care used by the logistics operator was reasonable and that there was no breach, but another court may rule the other way.

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is designed to protect."); *see also* Yowell, *supra* note 163, at 111 (explaining courts generally apply doctrine to statutes intended to protect the plaintiff from the particular harm suffered).

[165] *See* Yowell, *supra* note 163, at 111.

[166] *See, e.g.*, Sheehan v. Nims, 75 F.2d 293, 294 (2d Cir. 1935).

[167] *See, e.g.*, Gill v. Whiteside-Hemby Drug Co., 122 S.W.2d 597, 601 (Ark. 1938).

[168] Yowell, *supra* note 163, at 110–11.

However, suppose the FAA proposed a safety regulation prohibiting drone deliveries in bad weather—thunderstorms, heavy snows, high wind velocity, etc.—and state legislatures have adopted the regulation. In cases where harms occur because of bad weather and such a statute is in place, logistics operators would be held liable under the negligence per se doctrine if the injured party can show causation (both actual and proximate) and injury. Such a regulation would provide uniformity among different courts and better serve the purpose of tort law as plaintiffs will more likely be compensated.

Critics of this proposal would likely argue that this may unduly burden the FAA or state legislatures, wasting their limited resources on creating numerous laws that will be used in limited circumstances. Critics will likely also argue that it would be impossible for these lawmakers to foresee every possible scenario that may result in personal injury or property damage from negligent use or maloperations of commercial drones. However, even if these laws are limited specifically to commercial drones, such laws will provide clear *ex ante* guidance to logistics operators delivering millions of packages a month.[169] The law might be applied narrowly, but its impact will be broad. Furthermore, having clear rules to follow will likely reduce the number of accidents, decreasing the potential number of lawsuits. Therefore, the FAA or legislatures should enact more safety regulations and statutes to address when operations of commercial drones are permitted.

D. Products Liability

Another cause of action available to the injured party is products liability, which makes sellers or distributors of defective products liable for the harm caused by the defect.[170] There are three types of products liability defects: manufacturing defects, design defects, and defects due to inadequate instructions or warnings.[171] A manufacturing defect exists "when the product departs from its intended design even though all possible care was exercised in the preparation and marketing of the product."[172] A product has a defect in design when there is a reasona-

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[169] *See* Holland, *supra* note 115 (stating that Amazon shipped 415 million packages in July 2020).

[170] Restatement (Third) of Torts: Prods. Liab. § 1 (Am. L. Inst. 1998).

[171] *Id.* § 2.

[172] *Id.* § 2(a).

ble alternative design that could have been adopted to reduce or avoid the "foreseeable risks of harm posed by the product," and the "omission of the alternative design renders the product not reasonably safe."[173] For design defect claims, courts typically apply the "risk-utility" test, where the courts consider the weight of various factors such as the utility of the product, available substitutes, and the risk of harm.[174] Another test that some courts apply is the "consumer expectation test," which "inquires what level of safety a reasonable consumer would expect from the product in question."[175] In other words, if the product fails to meet the consumer's expectation, then the product is deemed unreasonably dangerous. The Third Restatement of Torts rejects this approach and states that the consumer expectation test is not a separate, independent test, but an influential or even determinative part of the risk-utility test.[176]

Lastly, inadequate instructions or warnings can result in a product being defective when foreseeable risks of harm exist that could have been reduced or avoided by supplying reasonable instructions or warnings.[177] The omission of such information makes the product not reasonably safe.[178] However, there is no duty to warn against obvious risks of harm.[179] The rationale is that the "obviousness of the danger is the surrogate for a warning and warnings about obvious and well known risks diminish the significance of warnings and tend to clutter warning labels with useless information."[180]

Until the FAA, state legislators, or the courts establish clearer standards, injured parties with bodily harm or property damages should seek compensation under the products liability cause of action. Jacob D. Walpert argued that manufacturers of a fully automated car should be held liable even if they were not directly involved in the crash "because the 'driver' is a computer system incapable of negligence under traditional common law

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[173] *Id.* § 2(b).

[174] Jensen, *supra* note 46, at 592.

[175] Marchant & Lindor, *supra* note 46, at 1324.

[176] RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2 cmt. g (AM. L. INST. 1998).

[177] *Id.* § 2 cmt. i.

[178] *Id.*

[179] *Id.* § 2 cmt. j.

[180] James A. Henderson, Jr. & Aaron D. Twerski, *The Products Liability Restatement in the Courts: An Initial Assessment*, 27 WM. MITCHELL L. REV. 7, 16 (2000).

and statutory formulations of due care."[181] Thus, the concept of computer systems being incapable of negligence should be extended to commercial drones to justify a claim under products liability.[182]

V. CURRENTLY AVAILABLE PROTECTIONS FOR LOGISTICS OPERATORS

The previous Section proposed that logistics operators should be strictly liable for harm caused by delivery drones. Logistics operators may view such a proposal as increasing their burden, which may eventually outweigh their potential profits. However, as previously noted, strict liability is beneficial to both parties. Knowing that they are strictly liable, logistics operators could distribute potential costs to their consumers. Alternatively, with a products liability cause of action, commercial drone manufacturers will also be incentivized to produce higher quality products with fewer defects. Hence, the number of accidents will be reduced.

Further, damaging a drone violates federal law and can result in a fine or imprisonment of up to twenty years.[183] Therefore, the logistics operators will not have to worry about their drones getting damaged by people on the ground who have negative feelings toward commercial drones. Furthermore, even though the FAA stated that it had no authority to "mandate the purchase of liability insurance," it recommended that "[p]rudent remote pilots should evaluate their existing insurance policies to determine whether they have appropriate coverage."[184] "[T]he property casualty insurance industry is responding to the rise in drone use" because of the increased exposure to new risks.[185] As such, logistics operators may be able

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[181] Jacob D. Walpert, Note, *Carpooling Liability?: Applying Tort Law Principles to the Joint Emergence of Self-Driving Automobiles and Transportation Network Companies*, 85 FORDHAM L. REV. 1863, 1894–95 (2017).

[182] *Cf.* McNabb, *supra* note 111 (drones will likely be equipped with a fully automated management system along with a "sophisticated sense-and-avoid system").

[183] 18 U.S.C. § 32(a); *see also* John Goglia, *FAA Confirms Shooting A Drone Is A Federal Crime. So When Will U.S. Prosecute?*, FORBES (Apr. 13, 2016, 12:55 PM), https://www.forbes.com/sites/johngoglia/2016/04/13/faa-confirms-shooting-drone-federal-crime-so-when-will-us-prosecute/?sh=63790fb12a25 [https://perma.cc/F3GP-W5Q7].

[184] Final Rule, *supra* note 28, at 4365.

[185] Sehrawat, *supra* note 13, at 130; *see also* Michael S. Levine & Jorge R. Aviles, *As Amazon's and Walmart's Drones Take to the Skies, It is Important for Commercial*

to obtain insurance plans that cover products liability, personal injury, and property damages.[186]

VI. CONCLUSION

With advancing technology and the FAA's active involvement in commercial drones, delivery drones will become ubiquitous in the near future. However, the current negligence theory provides unclear guidance as to whom the liabilities should be allocated in cases of personal injury or property damages caused by acts of nature, negligent operations, or malfunctions of commercial drones. Under the current negligence theory, the injured parties will not likely recover from either the logistics operator or the pilots. Alternate liability theories, such as strict liability, negligence per se, or products liability, appear to be more viable options for the injured parties with additional actions from the legislatures and the FAA. Ultimately, NCCUSL should reincorporate its earlier draft of the Drones Act, which at least provided a section on standards of duty that operators of commercial drones would owe to the injured parties. It is prudent that the FAA, state legislators, and courts establish clearer standards and recovery methods for those injured by drones.

Policyholders to Have a Strategy to Protect Against Drone-Related Risks and to Maximize their Recovery in the Event of a Loss, HUNTON ANDREWS KURTH: HUNTON INS. RECOVERY BLOG (Sept. 11, 2020), https://www.huntoninsurancerecoveryblog.com/2020/09/articles/property/as-amazons-and-walmarts-drones-take-to-the-skies-it-is-important-for-commercial-policyholders-to-have-a-strategy-to-protect-against-drone-related-risks-and-to-maximize-their-recover/ [https://perma.cc/H5NU-TT9H].

[186] *See* Sehrawat, *supra* note 13, at 131.