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Drones: Proposed Standards of Liability

Harris, Kristopher-Kent 'K-K'

DRONES: PROPOSED STANDARDS OF LIABILITY

Kristopher-Kent 'K-K' Harris*

The law often incorrectly uses the term drone, therefore a more exact definition is needed. As defined by specialists in the applicable technological field, the term drone generally means any algorithm that carries out an action following a command or commands. This includes commands programmed in advance and real-time commands. A drone has limited autonomous decision-making abilities and is therefore always subject to its master, master controller, or operator. Drones are not capable of truly autonomous artificial intelligence. Accordingly, this Article will argue that strict liability rather than negligence is the most appropriate legal standard for assessing the liability of manufacturers, distributors, designers, and users of drones for injury caused by a drone.

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* M.Juris., University of Washington School of Law, President of Tech Law Society, Artificial Intelligence Researcher at Technology Law and Policy Clinic; B.B.A., minor: Economics, Asian Studies, University of Hawai'i at Mānoa, Management Information Systems, certificate: APEC, PAMI International Business Management; Exchange Student, National Taiwan University (國立臺灣大學); A.A.S., Bellevue College, Vice President of International Student Association (iSA); DigiPen Institute of Technology, Computer Science, Real-Time Interactive Simulation; certificate: CompTIA A+, CompTIA Green IT; member: International Game Developers Association (igda), Google Developers Group (GDG). I thank John F. Hart, Christopher Erhardt and Signe H. Naeve.

INTRODUCTION

The term drone generally means any algorithm that carries out an action following a command or commands.[1] This includes commands programmed in advance and real-time commands. This proposal puts forth suggestions about drone liability with the specific involvement of a master,[2] master controller,[3] operator, or bystander through American tort law. Drone liability can be strenuous for courts to consider, especially if the courts cannot determine the actor at fault. This Article advocates that courts adopt a strict liability approach to apportion drone liability under The Restatement (Second) of Torts and The Restatement (Third) of Torts: Product Liability. This proposal unravels the complexities of drone liability by unmasking the true master of the drone.

I. DRONE LIABILITY HIERARCHY

A. Proposed Strict Liability

This Article will argue that the appropriate guiding doctrine for drone liability is strict or absolute liability.[4] The makers, sellers, or designers of drone products have rushed to the market, without conducting the preliminary safety tests that modern American law has advised for in new technologies.[5] Manufacturing defects are often responsible for injuries.[6] However, drone sellers are not liable for

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[1] Memorandum from Reginald C. Govan, Chief Counsel, FAA, to Earl Lawrence, Director, Unmanned Aircraft Systems Integration Office (May 4, 2016), 2016 WL 2851144, (addressing educational use of unmanned aircraft systems (UAS)); Alex Alben, WASH. OFF. OF PRIVACY & DATA PROTECTION, WASHINGTON STATE POLICY GUIDELINES FOR UNMANNED AIRCRAFT SYSTEMS (2016), http://www.wsdot.wa.gov/NR/rdonlyres/AC738BE5-FDCE-4FD9-A173-6C913FDABE24/0/DronePolicyGuidelines.pdf (last visited June 12, 2017).

[2] *Master*, MERRIAM-WEBSTER DICTIONARY (2018).

[3] *Master Controller*, MERRIAM-WEBSTER DICTIONARY (2018).

[4] *Strict Liability*, BLACK'S LAW DICTIONARY (10th ed. 2014).

[5] *See* BRUNO SICILIANO, ET. AL., SPRINGER HANDBOOK OF ROBOTICS, 1522 (Bruno Siciliano & Oussama Khatib eds., 2nd ed. 2016).

[6] *See* RESTATEMENT (SECOND) OF TORTS § 402A cmt. g (AM. L. INST. 1965); *See* RESTATEMENT THIRD OF TORTS § 2(a) (AM. L. INST. 1998).

design or warning instruction faults or for accident or safety costs.[7] Thus, under current tort law standards, injured victims cannot be effectively compensated by the sellers, if said sellers have modified or rebranded the drone. If the court were to apply a strict liability rule to this issue, this approach would then serve as an effective test of responsibility.

The law also requires the application of a test that specifically considers abnormally dangerous activities.[8] Judges will enforce liability without fault when explosives cause harm, even if they are properly handled.[9] When a defendant has been held under a strict liability standard, neither negligence nor intent must be proven.[10] This principle is ideally suited to drones and strict liability. By definition, a drone is incapable of acting on its own volition. If a drone performs an action, it is merely obeying a previous command input. Any resulting harm is the responsibility of the master controller who, as an operator, gave the drone that command without first ascertaining that the command could be safely performed by the drone under his or her operation. In fact, a recent Seattle court decision has proven that, in the case of a physical injury inflicted by a drone, the master operator was properly held to a strict liability standard.[11,12]

The court would be wrong to attribute blame to the drone, even in the case of artificial intelligence, since any drone is a mere functionary of some form of command input and the drone is incapable of acting on its own volition. Many cases arise where the plaintiff suffers personal harm at the hands of an employee, but seeks to impose liability on the employer. In these cases, the employer often contends that the employee caused the harm in a way that fell outside that employee's assigned responsibilities or that the employee otherwise fell short of the practices which they have been trained to follow. In fact, drones will, or at least are intended to, follow the will of their operator as well as their master programmer, service provider, or programmer. Strict liability provides a definite legal resolution to such matters.

Next, this article explores certain technologies where courts have applied strict liability, when such technologies have injured an individual. This article will identify the factors that courts have found

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[7] *See* DAVID G. OWEN, PRODUCTS LIABILITY LAW § 6.2 (2d ed. 2008).

[8] *See* RESTATEMENT (SECOND) OF TORTS § 402A (AM. L. INST. 1965).

[9] *Id.*

[10] *Id.*

[11] City of Seattle v. Skinner, No. 610377, Instructions No. at 5-9 (Seattle Mun. Ct., Jan. 12, 2017); & Verdict Form, (Seattle Mun. Ct., Jan. 13, 2017) (finding the defendant guilty of reckless endangerment); SEATTLE, WA. WASH., CRIM. CODE § 12A.06.050 (1973).

[12] *See* discussion *infra* Section I.C. (for clarification on determining onto whom liability falls.)

to be significant for determining when to apply strict liability.[13] Under tort law, strict liability results from liability for all defective product distributors.[14] First, fault falls on the product distributor when one's product design is defective and then the law applies the use of a cost-benefit approach test.[15] If a product defect causes injury, the selling business or product's distributor is held to strict liability for that injury. Consequently, distributors are held to a strict liability standard for manufacturing product defects.[16] In this manner, the possible result of bodily harm is made into a concern for the seller, while the injured individual finds a suitable party to compensate for the defect.[17]

Furthermore, drone sellers who have rebranded or modified a drone after manufacturing can and should be strictly liable. This same attribution of strict liability would still apply in cases where true fault lies with the manufacturer. If a manufacturer of a delivered drone, for example, did not include the proper safety materials needed for protecting the drone's battery and caused an explosion, then the manufacturer transgressed upon the basic expectation that the drone should be safe to use in its surrounding environment. The manufacturer, who should have reduced the drone's likelihood of injuring operators, would therefore be negligent.[18] While sellers of the drones at the wholesaler and retailer levels are not at fault, they are equally as legally liable as those manufactures of a defective product. The law holds that manufacturers are strictly liable for the products which they sell. Therefore, all manufacturing defects present in any drone (as in any manufactured product) are held to a strict liability standard by all distributors. This practice is a form of corrective justice;[19] it provides compensation to the injured person, yet enforces a liability on all distributors. Further, a distributor who claims no fraudulent or negligent misrepresentation of their product is still liable for any injury inflicted by that misrepresentation, even if the misrepresentation did not result in negligence or in fault.[20] Similar liability is enforced upon the manufacturer against defects or due to misrepresentation.[21]

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[13] *See* RESTATEMENT (SECOND) OF TORTS § 402A (AM. L. INST. 1965).

[14] *See* RESTATEMENT THIRD OF TORTS (PRODUCTS LIABILITY) § 1 (AM. L. INST. 1998).

[15] Krummel v. Bombardier Corp., 206 F.3d 548 (5th Cir. 2000). ("Bombardier" failed to warn the dangers of the watercraft).

[16] RESTATEMENT (SECOND) OF TORTS § 402A cmt. f (AM. L. INST. 1965).

[17] RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 1 cmt. a (AM. LAW INST. 1998).

[18] RESTATEMENT (SECOND) OF TORTS § 402A (AM. L. INST. 1965).

[19] *Corrective Justice*, BLACK'S LAW DICTIONARY (10th ed. 2014).

[20] RESTATEMENT (THIRD) OF AGENCY § 2.03 (AM. L. INST. 2006).

[21] RESTATEMENT (SECOND) OF TORTS § 402A cmt. f (AM. L. INST. 1965).

In like manner, this article will consider instances where strict liability has been applied to occurrences in which a defendant, through high-energy activities, has caused physical harm to a plaintiff. An Indianapolis judge ruled that Sony "notebook/laptop" batteries which had caused fires or even explosions were unreasonably defective.[22] Hewlett-Packard sought negligence relief in the form of monetary compensation for its status as the seller of these Sony batteries. So, to escape Indiana's products liability statute, Hewlett-Packard carried out several forensic tests to prove the fault lay with Sony Energy and Sony Taiwan manufacturing.[23] Judges may conclude that liability must be based on easily-determined fault, but it is not so simple for said judges to reach this determination if the activity is considered common.[24] It is the right of each state to determine which strict liability tests and rules its judges enforce.[25] Even if the machine in question might be dangerous, it should be possible to handle or use the device with an expectation of reasonable safety, thus minimizing strict liability.[26] Therefore, future drone laws should enforce strict liability on abnormally dangerous activities, when calculated against deterrents in future holdings.

Customarily, the court commonly holds that enforcing strict liability will reduce harm by encouraging an industry to reduce abnormally dangerous activities, to discover new avenues to achieve the same desired results, or to encourage these activities to be conducted in a controlled environment.[27] It is not clear whether strict liability deters risk;[28] however, in order to allow drones to be used to advance our society, we cannot dismiss the fact that risk reduction would be logically preferable. Naturally, drone activities such as controlling a drone in a construction site or sending a bot into a highly

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[22] Am. Family Ins. Co. v. Hewlett-Packard Co., No. 1:10-cv-01124-JMS-DML, 2011 WL 4550155 (S.D. Ind. Sept. 28, 2011).

[23] *Id*.

[24] DAN B. DOBBS, PAUL T. HAYDEN & ELLEN M. BUBLICK, HORNBOOK ON TORTS § 32.6 (2d ed. 2016) (citing Grube v. Daun, 213 Wis. 2d 533 (Wis. 1997)).

[25] *Id*.

[26] *Id.*

[27] DOBBS ET AL., *supra* note 24, § 32.6 (citing G.J. Leasing Co. v. Union Elec. Co., 54 F.3d 379, 386 (7th Cir. 1995) (The popular quote from Posner, C.J.: "…" . . . the tiger, is that the abnormally hazardous activity is conceived of as the sale of the thing that makes the activity hazardous, rather than as the activity itself. It is as if it were fine to keep the tiger in your backyard but if you sell it to someone else to put in his backyard and the tiger claws him, you are strictly liable for the injury. We cannot find any precedent, or any basis in common sense, for such a theory of strict liability. Of course there is also strict liability for the sale of a dangerous or defective product…")).

[28] DOBBS ET AL., *supra* note 24, § 32.6 (citing Joseph H. King, Jr., *A Goals-Oriented Approach to Strict Tort Liability for Abnormally Dangerous Activities*, 48 BAYLOR L. REV. 341, 353–54 (1996)).

hazardous condition can be productive.[29] Although there is always a question of negligence when considering the use of drones for recreational purposes, some non-recreational activities involving drones cannot be confined to safety zones. For example, this is true if such devices are needed in a construction site to reduce human injuries. The activity may be uncommon or unnatural, but we cannot put too many deterrents on drone activities, especially if reducing risks is the ultimate desired outcome.

Distributing risk at an enterprise level undoubtedly necessitates a different course of action. Society is under the impression that a corporation itself could not be at fault and that an individual overseeing the corporation is at fault. However, under the influence of the law, enterprising business ventures in the drone technology field typically should display a good-faith effort by allowing their products to undergo rigorous testing. Currently, society still believes that enterprise backing of a liability claim equates to that enterprise becoming a good-risk distributor for its sellers.[30] Most individual inventors cannot be burdened with protecting themselves from lawsuits,[31] while an enterprise is more than willing to absorb the costs of cost-benefit analytics. Similarly, individuals who are harmed by drone technology might be less likely to file for non-negligent harm.

Following this logic, questions regarding enterprise liability are not simply restricted to cost-benefit analyses or determinations of the responsible corporate individual. Each affected community's concepts of fairness or justice decide if an individual or a business should bear the costs of strict liability, even if the business or individual inventor did not contribute to the cause at hand.[32] If an inventor or enterprise carries out an activity negligently, but in an otherwise perfectly normal way per his or her community's expectations, then strict liability may not be enforced as heavily as it would be in a community which regards the activities as more high-risk or unique to the situation.[33] New technologies, like drone technology, should therefore proceed according to strict liability, rather than the law of negligence.

Presently, the primary issue in apportioning liability among those who have designed, made, supplied, or operated a drone seems to be the identification of the particular command inputs which led to the

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[29] SICILIANO, ET. AL., *supra* note 5, at 1521.

[30] DOBBS ET AL., *supra* note 24, § 32.7 (citing Virginia E. Nolan & Edmund Ursin, *The Revitalization of Hazardous Activity Strict Liability*, 65 N.C. L. REV. 257 (1987)).

[31] Marcel v. Becnel, 96-1139 (La. App. 1 Cir. 3/27/97), 691 So. 2d 1344, writ denied, 97-1080 (La. 6/13/97), 695 So. 2d 984 (1997)).

[32] *See* Wimberly v. Derby Cycle Corp., 56 Cal. App. 4th 618 (1997).

[33] Leatherwood v. Wadley, 121 S.W.3d 682 (Tenn. Ct. App. 2003).

injury in question.[34] For example, the law might decide that a flying drone is not inherently dangerous merely because it flies. Regardless, the law might also judge, for reasons of justice and public policy, that liability should be assigned to the person who commanded the drone to fly so fast that it deprived a small child of his eye.[35] In this same scenario, we should apportion liability between the drone operator who gave the offending command and the manufacturer who originally granted the device the capacity to fly at dangerous speeds when operated by the end purchaser.

Yet, as with nearly every endeavor, the most complicated factor remains: the human factor. Judges and juries have not properly characterized drone activity because they simply cannot comprehend the technical aspects of which drones are capable and so are reliant upon technical witnesses to provide even a modicum of elucidation.[36] Judges and juries must confront special barriers to the proper characterization of drone activity when they seek to decipher drone technology. Drone technological advancement would be hindered if the courts utilized a uniform approach, as such an approach risks the likelihood that an equal footing may then develop between a defendant and a plaintiff in regards to activity characterization. By applying strict liability, the court signals that the activity is uncommon and that the defendant's actions are special.[37] Depending on its presentation, the activity in question might or might not be perceived as abnormally dangerous by a particular community.[38] Injuries caused by drone activities can be minimized if judges are able to determine if the risk stemmed from the defendant or if the plaintiff had any control over those risks.[39] High-activity risks should instead be considered as inherent risks,[40] regardless of who previously interacted with the drone.

Thus, between the competing principles of tort liability, strict liability, and negligence liability, strict liability emerges as the best source of guidance for future case law when dealing with the matter of liability for drone-caused injuries. However, courts should also consider developing a more novel and nuanced approach to liability by

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[34] *See* RESTATEMENT THIRD OF TORTS (PRODUCTS LIABILITY) § 1 (AM. L. INST. 1998).

[35] Mary-Ann Russon, *UK toddler Oscar Webb loses eye in UAV accident*, INT'L BUS. TIMES, (Dec. 2, 2015 10:18AM), http://www.ibtimes.co.uk/uk-toddler-oscar-webb-loses-eye-uav-accident-people-are-problem-not-drones-1531390

[36] § 11:95.Content—Explaining technical matters—Importance in product liability and medical malpractice cases, 2 La. Prac. Pers. Inj. § 11:95

[37] DOBBS ET AL., *supra* note 24, § 32.7 (citing William K. Jones, *Strict Liability for Hazardous Enterprises*, 92 COLUM. L. REV. 1705 (1992)).

[38] Gallagher v. H.V. Pierhomes, LLC, 182 Md. App. 94 (2008).

[39] *Id*.

[40] *Inherent Risk*, BLACK'S LAW DICTIONARY (10th ed. 2014).

taking into account some of the distinguishing factors developed by previous courts when dealing with injuries caused by agents, employees, subcontractors, and independent contractors.

B. Proposed Vicarious Liability

When the realms of drone technology and vicarious liability intersect in a court of law, it is difficult to assign liability between individuals and results. The complexity of the drone's role in society, as both a recreational object and professional asset, only exacerbates this dilemma, as does the applicability of a master-servant rule[41] for drones. Vicarious liability is a tort for another person who is accountable for their own legal fault; yet, in the absence of fault, this individual is not responsible for other parties under the *respondeat superior* principle.[42] This tort principle addresses actions taken within the scope of employment by employees who are jointly responsible for said actions along with their tortfeasor employer (especially private employers). This principle does not make employees liable for torts of their employers or of other employees, and the principle does not apply to employees individually.[43]

To understand vicarious liability, it is necessary to define the roles of both the relevant employer and the employee in the scope of employment. The term master signifies an employer, while either the terms of agent or servant define an employee. An agent has the freedom to sign contracts or to sell products for their employer and the employer can be liable for their agents' contracts with others.[44] However, the employer is not liable for an agent's tortious actions.[45] Alternatively, an agent can be known as an electronic agent,[46] the designation of which can be easily applied to a drone. Employees who perform physical tasks are called servants.[47]

Additionally, independent contractors exist as a distinct subset of employee.[48] Independent contractors differ from servants or agents because the master is not ordinarily vicariously liable for the independent contractor's torts.[49] However, the master is liable for the

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[41] *Master-Servant Rule*, BLACK'S LAW DICTIONARY (10th ed. 2014).

[42] Melin-Schilling v. Imm, 149 Wash. App. 588 (2009).

[43] DOBBS ET AL., *supra* note 24, § 31.1 (citing Ware v. Timmons, 954 So. 2d 545 (Ala. 2006)).

[44] *See* Ware v. Timmons, 954 So. 2d 545 (Ala. 2006).

[45] Carman v. Wieland, 406 S.W.3d 70 (Mo. Ct. App. 2013)

[46] *Electronic Agent*, BLACK'S LAW DICTIONARY (10th ed. 2014).

[47] DOBBS ET AL., *supra* note 24, § 31.1

[48] DOBBS ET AL., *supra* note 24, § 31.5 (citing *See, e.g.*, Patterson v. T.L. Wallace Construction, Inc., 133 So.3d 325 (Miss. 2013)).

[49] DOBBS ET AL., *supra* note 24, § 31.5 (citing Patterson v. T.L. Wallace Construction Constr.,

torts of their servants when the servants commit a tort within their scope of employment.[50] No matter how humanlike or humanoid a drone may seem, courts should exercise caution before calling a drone an agent, employee, or servant, because the drone's master controller or master is in control of its pre-determined actions.

It may be difficult for courts to understand the proper imputation of blame in a drone-related incident. In such cases, it is vital to consider the person of the master controller, who acts as the drone's service provider or programmer and who can override the drone operator's commands. From the master controller's perspective as the defendant, vicarious liability will mean strict liability because the drone should be without fault.[51] However, confusion may remain as to whether fault lies with the drone, the master controller, the drone operator, the manufacturer, or with the designer. Should the plaintiff argue a negligence standard, he or she must first prove that the drone committed a tort [52] and that it was acting within its scope of employment.[53] In such instances, the fault could fall upon the drone's master controller, who might have irresponsibly provided a drone operator with an unsafe drone [54] or trusted in a reckless drone operator.[55] In such scenarios, vicarious liability does not apply[56] and the master controller is liable for their own negligent entrustment or their own negligent supervising.[57]

Respondeat superior liability should apply to drones. Respondeat superior encompasses the master's negligent acts, even if the master did not command the drone to perform those tasks and could not foresee those acts in any specific way.

Inc. 133 So. 3d 325 (Miss. 2013)).

[50] RESTATEMENT (THIRD) OF AGENCY § 7.07 (1) (AM. L. INST. 2006).

[51] Instructions to Jury No. 5-9, City of Seattle v. Skinner, No. 610377 (Seattle Mun. Ct., Jan. 12, 2017); Verdict Form, City of Seattle v. Skinner, No. 610377 (Seattle Mun. Ct., Jan. 13, 2017) (finding the defendant guilty of reckless endangerment); SEATTLE MUN. CODE § 12A.06.050 (2018).

[52] DOBBS ET AL., *supra* note 24, § 31.1 (citing *e.g.*, Nat'l Union Fire Ins. Co. of Pittsburgh, Pa. v. Wuerth, 122 Ohio St. 3d 594 (2009)).

[53] RESTATEMENT SECOND AGENCY § 229, ILL. 1 (AM. L. INST. 1959).

[54] DOBBS ET AL., *supra* note 24, § 31.1 (citing Ali v. Fisher, 145 S.W.3d 557 (Tenn. 2005)).

[55] *Id*. (citing RESTATEMENT (THIRD) OF AGENCY § 7.05(1) (2006)).

[56] Instructions to Jury No. 5-9, City of Seattle v. Skinner, No. 610377 (Seattle Mun. Ct., Jan. 12, 2017); Verdict Form, City of Seattle v. Skinner, No. 610377 (Seattle Mun. Ct., Jan. 13, 2017) (finding the defendant guilty of reckless endangerment); SEATTLE MUN. CODE § 12A.06.050 (2018).

[57] DOBBS ET AL., *supra* note 24, § 31.1 (citing *e.g.*, MV Transp. v. Allgeier, 433 S.W.3d 324 (Ky. 2014)).

1. Respondeat Superior Liability

In examining the efficacy of respondeat superior for drones, we find that the master controller or drone operator must be held to a strict liability standard. The law as a basic premise attempts to hold individuals accountable for their wrongs, but the involvement of a drone complicates such attempts because a drone cannot evaluate an action as a "wrong" on its own. Usually courts defend the imputation of strict liability if either: (1) an innocent person, either the plaintiff or the employer, must bear the loss,[58] (2) the employer had formal right of control over the employee's work,[59] or (3) the employer benefits from the employee's work.[60] The first consideration of accountability has been applied selectively by courts; however, in a drone case, this principle could be crucial to determining the rightful bearer of liability and so should not be overlooked. Through the accountability principle, courts may determine the proper responsibility of control to fall upon the likely beneficiary of the activity. The employer is the likely beneficiary and must therefore bear the liability of the burdens their actions have caused. Even though control is questionable in most cases, drones have a direct connection to a master controller or several masters to receive instructional inputs; therefore, the employee's tort and the master controller's benefit are an insufficient argument.

Employers, or future drone master controllers, are likely to discourage employees from assuming responsibility for conducted drone activity so as to avoid their own liability. If an employee takes responsibility under enterprise liability, and strict liability is applied to the operation, then businesses may perceive the risk as worthwhile in balance with the economic benefits that drone operations bring to the company.[61] However, if strict liability were imposed upon businesses, a reasonable business model would necessitate more careful consideration of safety precautions. On the other hand, a business can subsidize enterprise liability by raising or lowering dividends for use as insurance for losses caused by injury.[62] If a business were to implement such subsidization, that policy would result in a spread of losses to benefit those involved in the business's activities.[63] The

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[58] *Id*. (citing South Carolina Ins. Co. v. James C. Greene & Co., 290 S.C. 171 (S.C. Ct. App. 1986)).

[59] *Id*. (citing RESTATEMENT (THIRD) OF AGENCY §§ 1.01, 7.07(2) (AM. L. INST. 2006)).

[60] *Id*. (citing Mary M. v, City of Los Angeles, 54 Cal. 3d 202 (1991)).

[61] *Id*. (citing Alan Q. Sykes, *The Economics of Vicarious Liability*, 93 YALE L.J. 1231 (1984)).

[62] DOBBS ET AL., *supra* note 24, § 32.7 (citing Virginia E. Nolan & Edmund Ursin, *The Revitalization of Hararddous Acitivity of Strict Liability*, 65 N.C. L. Rev. 257 (1987).

[63] DOBBS ET AL., *supra* note 24, § 31.2 (citing George L. Priest, *The Invention of Enterprise Liability: A Critical History of the Intellectual Foundations of Modern Tort Law*, 14 J. LEG. STUD.

application of strict liability to businesses ensures that no one individual has to bear the whole loss resulting from their injury.[64] As a result, the consumer of the business's product may pay a higher compensation cost to the injured employee.[65]

Drone manufacturers and suppliers may try to argue that they should escape liability in certain circumstances, based on various legal standards of liability for the actions of an employee whose use of a drone caused personal injury. Courts have found that it is unfair and inappropriate to hold manufacturers and suppliers liable for the actions of an employee who disregarded their instructions, failed to behave according to their training, or who suffered from an undisclosed emotional defect.[66] Arguments that manufacturers and suppliers of a drone should not be held liable because an injury resulted from the drone disobeying its commands are inappropriate because the real issue in determining liability should focus on identifying the commands given to the drone. Once the injury-relevant command has been identified, strict liability applies. Various courts have found the application of the enterprise liability doctrine to respondeat superior liability to be rational.[67] Based on courts' consideration, it would be logical for a court to apply this doctrine to drone liability whenever a master controller as an employer is involved.

2. Unmasking the Apparent Agent

Apparent agency[68] becomes a complex tort law issue when a master controller or master obtains a leased drone and creates an illusion that the drone is acting on behalf of their business as their servant or slave.[69] For example, if an employee of Company X deals with the drone and is led to believe that the drone is owned by the company for which they work, then under apparent agency, the employee who is interacting with the drone should be entitled to hold their employer vicariously liable if they suffer injury from that drone.[70] This illusion created by the employer leaves the injured employee open

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461, 447–83 (1985)).

[64] DOBBS ET AL., *supra* note 24, § 32.7 (citing Virginia E. Nolan & Edmund Ursin, *The Revitalization of Hazardous Activity of Strict Liability*, 65 N.C. L. Rev. 257 (1987).

[65] DOBBS ET AL., *supra* note 24, § 31.2 (citing Fruit v. Schreiner, 502 P.2d 133 (Alaska 1972)).

[66] *See* Williams v. Cloverland Farms Dairy, Inc., 78 F. Supp. 2d 479 (D. Md. 1999).

[67] DOBBS ET AL., *supra* note 24, § 31.2 (citing *e.g.*, Carter v. Reynolds, 175 N.J. 402, (2003)).

[68] *Apparent Agent*, BLACK'S LAW DICTIONARY (10th ed. 2014).

[69] *See* RESTATEMENT (THIRD) OF AGENCY § 2.03 (2006).

[70] DOBBS ET AL., *supra* note 24, § 31.7 (citing RESTATEMENT (SECOND) OF TORTS § 429 (1965); RESTATEMENT (SECOND) OF AGENCY § 267 (1959); RESTATEMENT (THIRD) OF AGENCY § 2.03 (2006)).

to liability for the drone.[71] If the drone is acting within its scope of duty, then the injured employee should be able to hold the employer vicariously responsible. In addition, the employer should also be held responsible for the drone which is acting on its behalf. If the employer fails to properly identify the drone, the employee can reasonably believe that the drone is acting under the rightful scope of employment and is thus appearing as the drone of the employer.[72]

Let us visualize the following scenario: a person's home requires bug extermination. The exterminator comes to the individual's house with a drone. The drone wears a decal on its body that claims the drone is from the exterminating company, Company T. The employee from Company T uses the drone to gas the house. However, as the drone is releasing the gas inside the house, it knocks over a few antiques and grazes the inside of the house, leaving gashes in the walls. The homeowner sues Company T, only to later find out that the drone was leased from another company, Company E. In this scenario, Company T is subject to liability, not Company E. Company T has created the illusion that the drone is theirs and the drone acted as an agent for Company T; therefore, it can indeed be proper for the homeowner to think that the drone is an agent of Company T.[73]

The issue of drone ownership, when decided solely based on appearance, may create difficulties where an estoppel-asserter[74] plaintiff needs to prove the apparent agent is related to the defendant.[75] On the matter of recovery for an estoppel-asserter upon whom harm has been inflicted, courts have been divided between Restatement (Second) of Agency § 267 and Restatement (Third) of Torts § 429, which both require reliance on the plaintiff or recovery without reliance.[76] Under the Restatement (Second) of Agency § 267, the estoppel's representation[77] would likely need to prove that the employer or master created the illusion of the drone acting as their servant or slave. On the other hand, Restatement (Third) of Torts § 429 only requires the plaintiff to have accepted that those services were handled by the defendant. In both cases, the estoppel-asserter reasonably believes the services were performed by the defendant. Therefore, we can conclude that the defendant, who had the drone as

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[71] *Id*. (citing RESTATEMENT (THIRD) OF AGENCY § 2.05 (AM. L. INST. 2006).

[72] *Id*. (citing Wilkins v. Marshalltown Medical & Surgical Ctr., 758 N.W.2d 232 (Iowa 2008)).

[73] *Id*. (citing Independent Fire Ins. Co. v. Able Moving & Storage Co., 650 So.2d 750 (La. 1995)).

[74] *Estoppel-Asserter*, BLACK'S LAW DICTIONARY (10th ed. 2014).

[75] DOBBS, HAYEN & BUBLICK, The Law of Torts § 433 (2d ed. 2011 & Supp.).

[76] DOBBS ET AL., *supra* note 24, § 31.7 (*See* Fletcher v. South Peninsula Hosp., 71 P.3d 833 (Alaska 2003)).

[77] *Estoppel by Representation*, BLACK'S LAW DICTIONARY (10th ed. 2014).

their servant or slave, deliberately created and then presented that illusion. The estoppel by representation cannot recover until that belief has been proved.[78]

Apparent authority requires no reliance at all, but only a belief that the appearance of a drone gives it traceable authority[79] to act on behalf of the defendant's control and ownership. Agency by estoppel requires the business to have fostered an intentional or negligent belief that the drone is their agent or have otherwise failed to correct that misapprehension.[80] Courts have applied reliance standards based on the severity of the scenario, ranging from food services to medical services of the apparent agent.[81] Courts determine if a business has created an illusion of the drone acting as its agent on a case by case basis. If the drone causes injury or damage, the estoppel-asserter, as a consumer of the services, will likely have displayed sufficient reliance upon the business's name brand.

C. Proposed Master – "Slave" Rule

"Master" and "slave" are common computer terminologies used by technicians to separate the main device (the master) and the dependent device (the slave or its slaves). The dilemma of the drone acting as a slave comes into question when one master, a drone operator, or a mainframe[82], remotely controls a drone as a part of their task to do work for another. Imagine the following scenario: Company E leases drones to Company Z and provides Company Z with a drone. If the drone negligently causes injury to others, the question then arises whether vicarious liability should fall upon Company E as the drone's controlling master, upon Company Z as the special employer, or upon both.

In a personal employment scenario, courts would use a control test. [83] Thus, short-term cooperation agreements in personal employment scenarios cannot be compared to a drone, which functions as a borrowed employee.[84] Assuming that the controlling master, as the general employer, retains control over the drone, a judge would likely conclude that the general employer is vicariously liable for the

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[78] DOBBS ET AL., *supra* note 24, § 31.7 (citing Baptist Memorial Hosp. System v. Sampson, 969 S.W.2d 945 (Tex. 1998)).

[79] *Id*. (citing RESTATEMENT (THIRD) OF AGENCY § 2.03 (AM. L. INST. 2006)).

[80] *Id*. (citing RESTATEMENT (THIRD) OF AGENCY § 2.05 (AM. L. INST. 2006)).

[81] *Id.* (citing See Osborne v. Adams, 346 S.C. 4 (2001)).

[82] *Mainframe*, MERRIAM-WEBSTER DICTIONARY (2018).

[83] DOBBS ET AL., *supra* note 24, § 31.5 (citing RESTATEMENT (SECOND) OF AGENCY § 220 (AM. L. INST. 1959); RESTATEMENT (THIRD) OF AGENCY § 7.07 cmt. f (AM. L. INST. 2006)).

[84] *Borrowed Employee*, BLACK'S LAW DICTIONARY (10th ed. 2014).

drone's tort because it acted as a borrowed employee. Alternatively, if the drone operator, as the special employer, has direct control to command the drone's conduct, then the drone operator is the temporary master and the drone operator has become vicariously liable. If a mainframe is involved, then it necessarily follows that a hierarchy of control has been established. Under this hierarchy, the drone operator has now become the temporary master and ultimate control of the drone resides with the drone's master controller rather than with the drone's temporary master. Because the controlling master was not controlling the drone in this scenario, and the last instance of control over the drone was exercised by the drone operator, the controlling master is unlikely to be held liable under the respondeat superior doctrine.

Although the drone operator may have control over multiple drones, the master controller will likely retain control over some command inputs of the drone; the relevant principle states that liability for an act follows control, wherever control lies. Furthermore, some judges conclude that the true definition of control lies in the given tasks being performed (this is defined as the properties, purpose, and the tasks undertaken to finish the work).[85] The idea of control does not correlate perfectly to liability. Under the master-slave rule, the idea of control does not necessarily equate to liability. However, judges may use details of the controlled technical actions in imputing control, based on which party provided equipment to the master controller or to the drone operator. Furthermore, the master controller may retain some control or interact with the drone at the same time as the drone operator can have control over some performed tasks, so control can be undeterminable in many tort cases. In order to apply the notion of control to cases, courts ultimately evaluate the control elements of a task based on appropriate or fair outcomes, none of which are directly related to control or to the technical aspects of the circumstances. The judge is left to pass judgment on the issue of slave ownership, in spite of the judge's lack of technical knowledge. This can easily lead to conflicting technical conclusions or even to a judicial disaster.

The appropriate standard for assessing the liability of designers, manufacturers, sellers, lessors, and operators of "drones that have caused injuries to others" is provided by strict liability. The basic principle of negligence law is that the defendant can escape liability as long as they had exercised "due care" in the activity alleged to have injured the plaintiff. "Due care" means that the defendant has acted

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[85] DOBBS ET AL., *supra* note 24, § 31.8 (citing New York Cent. R. Co. v. Northern Indiana Public Service Co., 140 Ind. App. 79, 221 N.E.2d 442 (1966); RESTATEMENT (SECOND) OF AGENCY § 227, cmt. a (1959)).

reasonably,[86] in light of existing know-how and the capabilities of existing technology.[87] Therefore, the negligence standard operates as a rule of liability based on industry standards, which are in turn based on the best practices of skilled practitioners. For example, courts have looked to negligence when assessing liability for a remotely-controlled surgery that results in serious harm. If the surgeon in question has used the best available techniques suitable for the type of operation, then it would be unfair and unproductive to impose liability on them, as they will have exercised "due care". On the other hand, where a surgeon has performed their task without exercising "due care", courts have felt that the surgeon should bear liability for the patient's injury.[88]

Currently, the only alternative to negligence doctrine has been the doctrine of strict liability. This principle recognizes that some kinds of activity and technology are inherently dangerous and cannot be operated safely. In these circumstances, courts and legislators have found some product-related injuries to be worthy of compensation by the designer, manufacturer, seller, lessor, or operator, even if these individuals had made the products as safe as possible. This approach gives the appropriate incentive to those who are in the best position to insure against liability or to seek ways to make the product safer. For example, the absolute liability standard has been used to determine an owner's liability in instances in which the owner's dangerous animals have escaped their care.[89] It has also governed the proper storage or operation of explosives, and has helped inform guidelines for the prescription of new medicines that cause serious harm. In each example, the application of strict liability provides strong protection in the form of the above-described incentive.

In instances of uncertainty or disputed outcomes involving control, it seems rationally apparent that there are few judges who would find both the master controller and the drone operator as being equally liable. By holding both employers equally liable as master controllers, courts would be biased towards the merits of the disputed dilemma. This is justified because the operator might not have had complete control over the drone's actions, if the operator's commands were overridden by a service provider or by the device's programming. For example, imagine another scenario in which a drone belonging to

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[86] *See* DOBBS ET AL., *supra* note 24, § 10.8.

[87] *See* DOBBS ET AL., *supra* note 24, § 33.19 (citing La. Rev. Stat. § 9:22800.59; Neb. Rev. Stat. §25-21, 182).

[88] DOBBS ET AL., *supra* note 24, § 31.8 (citing *e.g.*, Nazar v. Branham, 291 S.W.3d 599 (Ky. 2009); Starcher v. Byrne, 687 S.2d 737 (Miss. 1997); Harris v. Miller, 438 S.E.2d 731 (N.C. 1994)).

[89] *See* Irvine v. Rare Feline Breeding Ctr., Inc., 685 N.E.2d 120 (Ind. Ct. App. 1997).

Company E is leased out to Company Z to dig a trench. At Company E's direction, the drone digs the trench to a dangerous depth. The trench collapses and a Company Z employee, who was hired to lay fiber optic lines for the trench, is injured and sues. From the injured person's point of view, the employee can maximize the compensation if: (1) the person can claim workers' compensation from their employer, Company Z, and (2) if the person can sue Company E for tort damages. If both Company Z and Company E are found to be masters of the drone which excavated the ditch, the injured person should be able to assert both of the claims. However, Company Z might find this solution less-than-attractive because Company E may claim that damages occurred to its drone while it had been excavating the trench for Company Z. If both Company E and Company Z are masters, then Company Z will incur worker's compensation benefits and Company E will incur the cost of damages to their drone. Therefore, Company Z would be liable in tort under the worker's compensation rule. In addition, this would be an exclusive remedy for covering the injuries of both employee and drone. If Company E is found negligent, the effect of treating both employer and drone as masters in this setting is that Company E should not be immune for the drone in tort.

Let us next imagine a medical malpractice scenario—where a drone leased or owned by a hospital assists an independent surgeon in an operation and negligently harms the patient. Judges would conclude, based on such facts, that the skilled surgeon, or drone operator, or mainframe as the master controller, is the captain-of-the ship[90] and temporarily had the right to control the drone's work. Under the captain-of-the-ship doctrine, the surgeon would be liable for the actions of assistants who are under the surgeon's control but who are employees of the hospital, and not the surgeon. As such, the surgeon should be held liable for the negligence of the assisting drones. The hospital would not be liable at all, because its drone has become the surgeon's borrowed employee (i.e., the surgeon's slave).

Without considering technical facts, the captain-of-the ship doctrine attributes the status of master controller to the surgeon as a matter of tort law. The situation provides a stricter standard than that of the borrowed employee doctrine. Under the borrowed employee doctrine, the status of the surgeon as potential master controller poses questions of facts to be determined on a case-by-case basis, paying

[90] *Captain-of-the-Ship Doctrine*, "In medical-malpractice law, the doctrine imposing liability on a surgeon for the actions of assistants who are under the surgeon's control but who are employees of the hospital, not the surgeon." BLACK'S LAW DICTIONARY (10th ed. 2014).

particular attention to manufacturing defects. In the past, judges have rejected the doctrine and held the surgeon liable, but they have also left room for ordinary applications of the rule: if the surgeon has control of the drone in the operating room, then the surgeon is vicariously liable. If future judges find a surgeon liable for the actions of a drone, the tort would fall under the category of a non-delegable duty.[91] The doctrine of non-delegable duty examines whether the decision was based upon special duties[92] undertaken by those who care for helpless persons rather than upon control. Accordingly, the courts might try to apply non-delegable duty to the surgeon, but this cannot legally be done under the doctrine of strict liability. If future judges apply non-delegable duties as a matter of policy, then the law would be cleared of such captain-of-the-ship terminology.

The following scenario provides a sound demonstration of the suitable application of strict liability to drone-related cases in which captain-of-the-ship terminology plays a complicating role. Previously, hospitals had the protection of charitable immunities, under which hospitals could not be held liable or sued for their employees' negligence, which practice signaled that non-delegable duties that were seen as uncompelling.[93] These past hospital immunities have strongly concluded these matters in the form of damage caps.[94] In addition, medical doctors and hospitals are in a position to contract for indemnity of the surgeon in such cases; as such, a non-delegable duty is not without some purpose to the plaintiff where it is recognized as such or imposed under the captain-of-the-ship doctrine.[95]

II. DRONE DEFECTS UNDER PRODUCT LIABILITY

A. Proposed Drone Product Liability

At the intersection between drone technology and product liability, there are four main theories: (1) strict liability in product defects, (2) breach of warranty,[96] (3) misrepresentation,[97] and (4)

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[91] *Nondelegable Duty*, BLACK'S LAW DICTIONARY (10th ed. 2014).

[92] *Special Duties Doctrine*, "The rule that a government entity (such as a state municipality) can be held liable for an individual plaintiff's injury when the entity owed a duty to the plaintiff but not to the general public. This is an exception to the public-duty doctrine. The special-duty doctrine applies only when the plaintiff has reasonably relied on the governmental entity's assumption of the duty." BLACK'S LAW DICTIONARY (10th ed. 2014).

[93] DOBBS ET AL., *supra* note 24, § 31.8 (citing *e.g.*, Nazar v. Branham, 291 S.W.3d 599 (Ky. 2009); Starcher v. Byrne, 687 S.2d 737 (Miss. 1997); Harris v. Miller, 438 S.E.2d 731 (N.C. 1994)).

[94] *See* DOBBS ET AL., *supra* note 24, § 23.3 (citing Lewis v. Physicians Ins. Co. of Wisconsin, 627 N.W.2d 484 (Wis.2001)).

[95] *Id.*

[96] *Breach of Warranty*, BLACK'S LAW DICTIONARY (10th ed. 2014).

[97] *Misrepresentation*, BLACK'S LAW DICTIONARY (10th ed. 2014).

negligence.[98] With regard to the application of the strict liability standard to drones, judges should observe the theories of misrepresentation and negligence on the part of drone operators, drone manufacturers, and drone distributors. It seems most suitable that strict liability should be applied to drones due to the frequency of daily interactions between humans and artificial intelligence.

The Restatement of Product Liability offers some insight on the issue of product liability as applied to drone technology. Specifically, the Restatement[99] provides a test for determining strict liability for defective products. Under Section 402A, manufacturers and distributors are not categorically liable for all harm caused by their defective products. The plaintiff must prove under litigation that: (a) the defendant was in the business of selling products, (b) he sold or otherwise supplied the product in question, (c) the product was expected to and did reach the consumer without substantial change, (d) the product was defective when it left the defendant's hands, and (e) the product's defect was a factual cause of physical harm to the plaintiff and (f) a proximate cause as well.[100]

Because manufacturers and distributors are held strictly liable for defective products, drone manufacturers and distributors may alleviate the pressures of this liability by spreading their losses across their business through insurance and by increasing prices.[101] If the manufacturer is aware that a certain quality standard exists and he or she ignores this standard or otherwise breaks it, then they are liable in the court's eyes. However, this strategy of imposing strict liability tends to raise costs for the consumer, due to the manufacturer or distributor anticipating lawsuits resulting from potential injury.[102] Therefore, those drone manufacturers or distributors enter the market with cheaper materials which people perceive as being safer. This position is perceived as weighing risks and utilities as the "cheapest cost avoider."[103] Generally, drone operators, drone designers, and drone manufacturers would prefer contracts to escape liability for a drone. In alignment with the fairness rationale, consumers of drone

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[98] David G. Owen, Products Liability Law § 2.1 (2d ed. 2008).

[99] DOBBS ET AL., *supra* note 24, § 33.1 (citing RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 1 (AM. L. INST. 1998)).

[100] RESTATEMENT (SECOND) OF TORTS § 402A (AM. L. INST. 1965).

[101] RESTATEMENT (SECOND) OF TORTS § 402A(2) (AM. L. INST. 1965).

[102] RESTATEMENT (SECOND) OF TORTS §§ 402A(1), (2)(b) & (c) (AM. L. INST. 1965).

[103] *See* DOBBS ET AL., *supra* note 24, § 33.2 (citing Guido Calabresi & Jon T. Hirschoff, *Toward a Test for Strict Liability in Torts*, 81 YALE L. J. 1055 (1972) ("An arbitrary initial bearer of accident costs would (in the absence of transaction and information costs find it most worthwhile to 'bribe' in order to obtain that modification of behavior which would lessen accident costs most.")).

technology are likely to rely heavily on the manufacturer's representation of their non-hazardous and non-high-risk drone technology and will thus be under the impression that the manufacturer's product is safe to use.[104]

Taken altogether, while various theories of liability currently exist for drones, the Restatement's defective liability and 402A principles make it clear as to which liabilities are likely worth consideration. Specifically, the Restatement deciphers strict liability by highlighting manufacturing defects as well as negligence or other similar tests for design and warning defects.[105] Within the last several decades, courts have followed the comments of the older Second Restatement of Torts § 402A without referencing the newer Restatements for strict liability approaches.[106] However, the Third Restatement better addresses issues in determining product liability outside of strict liability and negligence.[107] The Third Restatement adds that the risk of harm to operators through defects must be foreseeable by the design and warnings.[108] Most courts apply strict liability to cases involving manufacturing defects, yet leave negligence principles to design and warnings claims.[109] Let us imagine that a drone stops functioning according to its pre-programmed purposes or suffers some sort of debilitating internal damage. The plaintiff has experienced economic loss in accordance with the Restatement definition; however, no physical harm has been inflicted on a person or on another piece of property.[110] The only harm was on the drone itself. In this scenario, the only recourse a plaintiff could claim is a breach of warranty or contract.[111] However, the plaintiff will have no claim on a defective drone if the statute of limitations has expired under contract or if the contract excludes or limits the liability of the drone,[112] thereby enabling

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[104] *See* DOBBS ET AL., *supra* note 24, § 33.2 (citing William L. Prosser, *The Assault upon the Citadel* (Strict Liability to the Consumer), 69 YALE L. J. 1099, 1123 (1960)).

[105] RESTATEMENT (SECOND) OF TORTS § 402A (AM. L. INST. 1965).

[106] DOBBS ET AL., *supra* note 24, § 33.2 (citing Fuchsgruber v. Custom Accessories, Inc., 628 N.W.2d 833 (Wis. 2001)). A hydraulic jack handle broke, and plaintiff sued the manufacture, distributor, and seller after they were injured. There can be little room for courts to make changes themselves for there are a few states statues that embed the Restatement Second Torts § 402A language).

[107] RESTATEMENT (THIRD) OF TORTS: PRODUCT LIABILITY § 2(1) (AM. L. INST. 1998).

[108] DOBBS ET AL., *supra* note 24, § 33.4 (citing RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY §§ 1, 2(b) & (c) (AM. L. INST. 1998).

[109] RESTATEMENT (SECOND) OF TORTS § 402A (AM. L. INST. 1965); *See* DOBBS ET AL., *supra* note 25, § 33.8.

[110] RESTATEMENT (THIRD) OF TORTS: PRODUCT LIABILITY § 7 (AM. L. INST. 1998).

[111] *See* DOBBS ET AL., *supra* note 24, § 33.6 (citing Denny v. Ford Motor Co., 87 N.Y.2d 248 (1995)).

[112] DOBBS ET AL., *supra* note 24, § 33.4 (citing Seely v. White Motor Co., 63 Cal. 2d 9 (1965)).

the economic loss rule.[113] Note that physical harm or injury to a person under the economic loss rule does not bar that person from tort recovery for economic losses.[114]

The same principle applies if a defective drone causes damage under the other-property rule.[115] If a defective drone explodes by itself, the economic loss rule would govern the claim and the owner would be required to sue based on warranty.[116] However, if the defective drone exploded adjacent to a building, then the building's owner could claim damages to the building, because the building falls under the other-property rule – which states that a tort recovery is unavailable if the only damage caused by a product defect is to the product itself.[117] Additionally, if a virtual bot, which is considered a drone under the proposed definition, were to physically or electronically destroy computer-encrypted data through malicious or defective virtualized commands, this computer data would not be considered by the courts to be intangible property and the economic loss rule would also apply to the owner of the computer-encrypted data[118]. Therefore, the drone's master controller or designer would be held strictly liable for physical damages or harm to the computer-encrypted data.[119] A similar strict liability standard can be applied to cases in which an algorithm-as-computer-program is involved. According to the current law, drones that are algorithm-based cannot be considered tangible. Consequently, if a drone were to contain an algorithmic-based intelligence and the algorithm ceases to function as a virtual bot, then one could not sue for economic loss because the drone could not be considered tangible property.[120]

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[113] *Economic-Loss Rule*, BLACK'S LAW DICTIONARY (10th ed. 2014).

[114] *See* Krummel v. Bombardier Corp., 206 F.3d 548 (5th Cir. 2000).

[115] *Other-Property Rule*, "The principle that a tort recovery is unavailable if the only damage caused by a product defect is to the product itself." BLACK'S LAW DICTIONARY (10th ed. 2014); *See* East River S.S. Corp. v. Transamerica Delaval, Inc., 476 U.S. 858 (1986); RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 21 cmt. e (1998)).

[116] *See* DOBBS ET AL., *supra* note 24, § 33.6 (citing Denny v. Ford Motor Co., 87 N.Y.2d 248 (1995)).

[117] DOBBS ET AL., *supra* note 24, § 33.3 (citing *e.g.*, A.J. Decoster Co. v. Westinghouse Elec. Corp., 634 A.2d 1330 (Md. 1994).

[118] Am. Online, Inc. v. St. Paul Mercury Ins. Co., 347 F.3d 89, 94 (4th Cir. 2003) ("As stored on a hard drive, data consists of the arrangement "of hundreds of thousands of atoms" of "cobalt, iron, and other magnetic materials" in a perceivable and unique pattern. The data consists of small electromagnets in certain alignments. Once data is stored in a cell of a hard drive, that cell is physically different from a cell without data, and the physical differences between the two cells can be detected through the use of certain tools. Data stored on a hard drive is visible with the use of a microscope.").

[119] Am. Family Ins. Co. v. Hewlett-Packard Co., No. 1:10-cv-01124-JMS-DML, 2011 WL 4550155 (S.D. Ind. 2011)).

[120] Am. Online, Inc. v. St. Paul Mercury Ins. Co., 347 F.3d 89, 94 (4th Cir. 2003) (holding that

B. Proposed Manufacturing and Design Defects Liability

Consumers should not only rely on overly-simplistic methods to determine a breach in warranty or a violation of strict liability. Restatement (Second) of Torts § 402A has long been the foundation of the consumer-contemplation test — a method of imposing product liability on a manufacturer if the evidence shows that a product's danger is greater than that which a reasonable consumer expects.[121] Under this test, a drone would likely be found to be defective if it placed the seller into an unreasonably dangerous condition that would not be obvious to the sophisticated user.[122] Examples of such an unreasonably dangerous condition would include a drone that was supposed to be weatherproof, but had exposed wires or a drone programmed with the wrong set of protocols and performed a task not originally intended by the drone's designer. However, the customer-contemplation test could help many courts to determine if a manufacturer's product representation appears to be worth the consumers' time when entertaining a purchase.[123] When a plaintiff discovers hidden product flaws, the consumer-contemplation test would favor the plaintiff under the strict liability standard.[124] For instance, if a consumer wanted to buy a flying drone but instead found that the flying drone came with a sharp metal shard molded into the plastic of the flyer's body, each party to this case would likely recognize that molded plastic components should not contain sharp metal shards. Therefore, even if the manufacturer did not discover this inconsistency, both parties would likely recognize that liability would fall upon the manufacturer.[125]

Courts have often used a risk-utility test in place of the consumer-contemplation test to determine a breach in warranty[126] or violation of strict tort liability theories.[127] Some courts have given the plaintiff the choice of using the risk-utility test to help in determining consumer expectations when the consumer-contemplation test itself does not

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computer data, software and systems were not "tangible" property, under policy provisions covering liability for property damage).

[121] *Consumer-Contemplation Test*, "A method of imposing product liability on a manufacturer if the evidence shows that a product's danger is greater than that which a reasonable consumer would expect." BLACK'S LAW DICTIONARY (10th ed. 2014).

[122] *See* DOBBS ET AL., *supra* note 24, § 33.6 (citing RESTATEMENT (SECOND) OF TORTS § 402A. cmt. g (AM. L. INST. 1965)).

[123] *Id*. (citing Marshall S. Shapo, The Law of Products Liability § 1.02 and passim (4d ed. 2002)).

[124] *Id*. (citing *Cf*. 2 DAN B. DOBBS, PAUL T. HAYDEN & ELLEN M. BURBLICK, THE LAW OF TORTS § 462 (2d ed. 2011 & Supp.)).

[125] *See id.*

[126] *Id*. (citing Denny v. Ford Motor Co., 663 N.E.2d 730639730 (N.Y. 1995)).

[127] *Id*. (citing Potter v. Chicago Pneumatic Tool Co., 694 A.2d 1319 (Conn. 1997)).

prove the product's defect.[128] A plaintiff who brings a suit against a manufacturer for manufacturing defects does not need to prove that the manufacturer, the designer, or the distributor was negligent.[129] Thus, if a plaintiff was hurt by a defective drone, he or she need only show (1) that the drone was defective at the time when the drone left the defendant's possession, (2) that it was expected that the drone reached the consumer without change, and (3) the consumer received the drone under the belief that the device would not have likely caused them harm. The plaintiff can prove that the defect has caused the product to differ from its intended design.[130] A plaintiff can also prove that a defect exists by showing that the drone malfunctioned or that the product was improperly made. However, the mere existence of a defect does not suffice to establish liability where a deviation from the norm has not resulted in any product malfunction.[131]

Under the doctrine of strict liability, if a plaintiff provides direct evidence that his or her drone is defective, then the courts may resort to the use of circumstantial evidence.[132] No standard rule of law currently exists for providing evidence applicable to drone defects in cases against all manufacturers, designers, or distributor of drones. Each case of malfunctioning drones has focused on the relevant individual defect, specifically upon either the defect's apparentness or the lack thereof.[133] Courts have largely agreed that if a drone is compliant with industry standards, it is unlikely to be negatively affected by its environment and should not display any signs of defects.[134]

This assumption, regarding drone compliance with industry standards, extends to the causation of harm principle. Consider a situation in which a drone not only exploded but the explosion also caused the plaintiff to lose an eye.[135] It would be more appropriate for the courts to apply the consumer-contemplation test to cases involving

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[128] *See id.* (citing DeLaney v. Deere and Co., 999 P.2d 930 (Kan. 2000)).

[129] *Id.*

[130] RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2(a) (AM. LAW INST. 1998)); DOBBS ET AL., *supra* note 25, § 33.7 (citing Casey v. Toyota Motor Engineering & Mfg. North America, Inc. 770 F.3d 332 (5th Cir. 2014)).

[131] DOBBS ET AL., *supra* note 24, § 33.7 (citing Burley v. Kytec Innovative Sports Equipment, Inc. 737 N.W.2d 397 (S.D. 2007)).

[132] *Circumstantial Evidence*, BLACK'S LAW DICTIONARY (10th ed. 2014).

[133] DOBBS ET AL., *supra* note 24, § 33.7 (citing Christopher H. Hall, Annotation, Strict Products Liability: Product Malfunction or Occurrence of Accident as Evidence of Defect, 65 A.L.R. 4th 356 (1989)).

[134] *See id.* (citing Parsons v. Ford Motor Co., 85 S.W.3d 323 (Tex. App. 2002)).

[135] Styers v. Winston Coca-Cola Bottling Co., 80 S.E.2d 253 (1954).

manufacturing defects rather than upon design defect scenarios.[136] Many difficulties arise from applying the consumer-contemplation test to design defect cases.[137] In a scientific or technical case, for example, the consumer-contemplation test might be too vague.[138] Furthermore, the consumer-contemplation test might prove challenging to the understanding and abilities of jurors who have no experience with a new type of drone. The new drone's defects might be apparent to a discerning judge, but if evidence exists which indicates that consumers could not anticipate the severity of harm that could result from these defects, a pronouncement of liability would likely follow. The consumer-contemplation test could also create bias within a jury based on a drone's appearance. For example, if a drone looks harmless or if a drone looks dangerously menacing in spite of its safety features. Without a demonstration of a drone's capabilities (likely conducted by one or more technical witnesses), a jury would not know if the drone in question could cause harm. While courts sometimes perceive the average consumer's ignorance of the existence of a potentially safer design as a good reason for denying liability, such reasoning is not rightfully applicable to matters of drone liability.[139] When determining if a defect in a drone actually existed, the obvious dangers of a design defect is a primary factor. Therefore, the consumer-contemplation test is almost always applied in such cases.[140]

Courts could use many tests when contemplating the attribution or exclusion of liability to a dangerous drone. For example, courts have applied the risk-utility test to design defects, especially when the plaintiff alleges the existence of a design defect rather than a manufacturing flaw.[141] To prove that a design is defective, a court may also include the risk-utility test as one part of a two-part test (with the consumer-contemplation test forming the second part) or as only one of a series of tests which the product needs to fail in order to qualify as defective.[142] These tests have been integrated into statutes[143] and into the Restatement (Third) of Torts for Product Liability.[144] However, most courts have used the risk-utility test because it is simple to apply;

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[136] *See* DOBBS ET AL., *supra* note 24, § 33.8

[137] *See* DOBBS ET AL., *supra* note 24, § 33.6

[138] DOBBS ET AL., *supra* note 24, § 33.8 (citing *e.g.*, Morson v. Superior Court, 90 Cal. App.4th 755 (2001)).

[139] *Id*. (citing Am. Tobacco Co. v. Grinnell, 951 S.W.2d 420 (Tex. 1997)).

[140] *See* DOBBS ET AL., *supra* note 24, § 33.6

[141] DOBBS ET AL., *supra* note 24, § 33.9 (citing Ray v. BIC Corp., 925 S.W.2d 527 (Tenn. 1996)).

[142] *Id*. (citing Hernandez v. Tokai Corp., 2 S.W.3d 251 (Tex. 1999)).

[143] *Id*. (citing N.C. GEN. STAT. § 99B-6 (b)).

[144] *Id*. (citing RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2, cmts. a & f (AM. LAW INST. 1998)).

it easily allows reasonable people to decipher the evidence, and it not only determines negligence but also the defect's magnitude.[145] In administering the risk utility test, courts have looked to seven factors: (1) the usefulness and desirability of said product, (2) the probability and magnitude of possible injury, (3) alternative available known substitutes, (4) the manufacturer's ability to remove the unsafe character, (5) the user's ability to avoid the dangers of the product, (6) the extent to which the user can be reasonably aware of the danger, and (7) the ability of the manufacturer to spread the loss.[146] The Restatement of Products Liability puts the burden of proof on the plaintiff to show that the manufacturer or designer could have minimized the dangers of the product by implementing alternative designs.[147]

After the court has used the risk-utility test to impute strict liability for product flaws or manufacturing defects, ordinary negligence[148] liability generally applies.[149] While a court might use several rules in determining a liability case, the negligence liability of the design will likely remain.[150] The unknown manufacturing risks in a design could mean the difference between an ordinary negligence case or a liability case for a design flaw.[151] Although a few states have integrated one or more of these rules into their statutes, the higher courts ultimately use the risk-utility test when determining and applying ordinary negligence to design defects.[152]

C. Proposed Defective Warning Liability

As discussed above, if a defect does not cause physical harm but causes economic harm[153] to a person or property, then courts will usually dismiss tort litigation pertaining to strict liability, negligence,[154] and fraud.[155] Accordingly, a drone manufacturer, designer, or distributor must not only provide the risks of a defective design flaw or

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[145] DOBBS ET AL., *supra* note 24, §§ 33.6 & 33.8

[146] DOBBS ET AL., *supra* note 24, § 33.8 (citing Jon W. Wade, *On the Nature of Strict Tort Lability for Products*, 44 MISS. L. REV. 825, 837 (1973)).

[147] RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 16 (AM. LAW INST. 1998).

[148] *Ordinary Negligence*, BLACK'S LAW DICTIONARY (10th ed. 2014).

[149] DOBBS ET AL., *supra* note 24, § 33.9

[150] *See* DOBBS ET AL., *supra* note 24, §§ 33.12 & 33.17

[151] *Id*. (citing 2 DAN B. DOBBS, PAUL T. HAYDEN & ELLEN M. BURBLICK, THE LAW OF TORTS § 462 (2d ed. 2011 & Supp.)).

[152] *See* DOBBS ET AL., *supra* note 24, § 33.12.

[153] *Economic-Loss Rule*, BLACK'S LAW DICTIONARY (10th ed. 2014).

[154] DOBBS ET AL., *supra* note 24, § 33.3 (citing Jay M. Zitter, Annotation, *Strict Products Liability: Recovery for Damage to Product Alone*, 72 A.L.R. 4th 12 (1989)).

[155] *Id*. (citing Digicorp, Inc. v. Ameritech Corp., 662 N.W.2d 652 (Wis. 2003)).

defective manufacturing errors, but also reasonable warnings about the foreseeable risk of harm caused by their products.[156] Drones can be dangerous, so drone operators should be able to make informed decisions based on the warnings that can come with a specific drone. Although dangerous drones are built for specific tasks, the danger can be minimized by issuing a warning which reduces the magnitude of the risk or injury to the drone's master controller or operator by influencing them to use better safety tactics. A drone operator can act as a drone's master controller by identifying and fixing the same sort of problems as those typically addressed by the master controller, even if they never purchased the drone themselves. Therefore, courts expect a warning to the operator to avoid finding strict liability.[157]

However, not all warnings may stimulate better safety practices. Warning signs posted in a drone's area of productivity will likely fail to protect all employees or passersby given the vagaries of human nature (exhaustion and lack of attention are especially common culprits). [158] While drone manufacturers could incorporate an inexpensive sensor into the drone, the drone could become mistakenly defective in lieu of this design addition.[159] If a drone manufacturer, distributor, or designer foresees that a safety mechanism is not practical, then a proper warning can achieve safety for the operator.[160] For example, a drone operator or master controller could use gloves to prevent the electricity from a remote controller from shocking the drone operator. The drone's remote controller is not defective in this manner and the drone operator or master controller was able to shield themselves with very little effort and without having to sacrifice practical functionality.

Warning defect claims are considered, alongside ordinary negligence and design defect cases, under the risk-utility analysis.[161] Some courts have held that, because manufacturers can provide

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[156] DOBBS ET AL., *supra* note 24, § 33.8 (citing RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2(c) (1998); Payne v. ABB Flexible Automation, Inc., 116 F.3d 480 (8th Cir. 1997); Powers v. Taser Int'l, Inc., 174 P.3d 777 (Ariz. Ct. App. 2007).)). The materials supplied with *Taser* was described as "less-lethal" weapon in which the Taser been (1) tested on animals with no findings of having no effect on heart rhythms, and (2) deployed on more than 3000 persons with no long-term effects. However, the materials supplied with the Taser warned of short-term injuries from a fall could occur, noting most significant injuries to date had been "cuts, bruises and abrasions." Arizona Hindsight Test was applied, due to shock, an officer in training, compression fracture to their spinal disc.

[157] *See id.* (citing Patch v. Hillerich & Bradsby Co., 361 Mont. 241, 257 P.3d 383 (Mont. 2011)).

[158] *See* DOBBS ET AL., *supra* note 24, §§ 33.6 & 33.8.

[159] *See* DOBBS ET AL., *supra* note 24, § 33.6.

[160] RESTATEMENT (THIRD) OF TORTS (PRODUCTS LIABILITY) § 2(c) (AM. LAW INST. 1998).

[161] RESTATEMENT (THIRD) OF TORTS (PRODUCTS LIABILITY) §§ 2(i)(b), (i)(c) & (k) (AM. LAW INST. 1998); *Risk-Utility Analysis*, BLACK'S LAW DICTIONARY (10th ed. 2014).

warnings through media or other engraving techniques on their product with little cost, even a remote warning about the risks should be found somewhere on the product.[162] However, others have argued that verbose warnings overburden the product user and hinder the user's knowledge of the product by discouraging a full reading of the warning.[163] In most cases, a court will require a decision to be rendered in order for the court to determine the accuracy of a warning.[164] Excessive details in a warning label do not mean that the warning has improved, nor should these details be meant to mislead the user about the product's characteristics.[165] According to the Third Restatement of Torts § 2, if a manufacturer has not provided any warning that would be clearly decipherable by a reasonable person, then the warning is legally considered to be non-existent and can be assessed as such by a jury.[166]

It is difficult to determine the known risks of a product, especially with new technologies such as drones. A drone may not require a warning because the attendant risks are commonly known,[167] obvious to the drone operator or to the drone's owner, or if the warning has been otherwise conveyed through the chain of distribution.[168] This is vastly different from a design problem.[169] If a drone manufacturer produces two drones, only one of which is safe to use, and makes those dangers known, the manufacturer does not have to provide separate warnings for each drone.[170] However, if another drone is cheaply made and dangerous, the drone manufacturer's choice does not provide him or her with immunity because the drone's danger is apparent and obviously defective.[171] Only on simple products is there no duty to provide warnings about obvious dangers.[172]

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[162] DOBBS ET AL., *supra* note 24, § 33.13 (citing Ross Labs. Div. of Abbott Labs. v. Thies, 725 P.2d 1076 (Alaska 1986)).

[163] *Id*. (citing TSC Indus., Inc. v. Northway, Inc., 426 U.S. 438 (1976)).

[164] DOBBS ET AL., *supra* note 24, § 33.14 (citing *e.g.*, Koruba v. Am. Honda Motor Co., 935 A.2d 787 (N.J. App. Div. 2007)).

[165] DOBBS ET AL., *supra* note 24, § 33.14 (citing Brochu v. Ortho Pharmaceutical Corp., 642 F.2d 652, 657 (1st Cir. 1981); *See* DAVID G. OWEN, PRODUCTS LIABILITY LAW § 9.3 (2d ed. 2008)).

[166] DOBBS ET AL., *supra* note 24, § 33.13 (citing *see,* e.g., Moore v. Ford Motor Co., 332 S.W.3d 749 (Mo. 2011)).

[167] *See* DOBBS ET AL., *supra* note 24, § 33.13 (citing *e.g.*, *In re* Prempro Prods Liab. Litig., 514 F.3d 825 (8th Cir. 2008); *cf.* Carrier v. City of Amite, 50 So. 3d 1247 (La. 2010)).

[168] *See id*. (citing Ford Motor Co. v. Rushford, 868 N.E.2d 806 (Ind. 2007)).

[169] *See* DOBBS ET AL., *supra* note 24, § 33.13.

[170] *Id.* (citing *cf.* Carrier v. City of Amite, 50 So. 3d 1247 (La. 2010)).

[171] *See* discussion *supra* Section II.B. for more details on producing defective drones.

[172] DOBBS ET AL., *supra* note 24, § 33.13 (citing Mills v. Giant of Md., LLC, 508 F.3d 11 (D.C. Cir. 2007)).

The central question of strict liability and its proper applicability to drones concerns whether a jury, comprised of reasonable people, can decipher obvious dangers.[173] Courts seem to believe that rational thinkers are able to figure out dangers and that the risks are a matter of law.[174] This approach will relieve drone manufacturers and drone designers of their warning obligations. Warnings would serve the master controller or the drone operator by providing a safer alternative to the obvious danger.[175] For example, manufacturers could provide a simple engraved statement about the dangers of the drone technology, accompanied with supplementary material providing an in-depth explanation of the dangers posed by the drone's capabilities. Warnings must clearly communicate their message, in factual content that the drone operator or master controller can understand.[176] The warning could be as simple as: "Do not fly drone without propeller guards." For a recreational flying drone, the warning would notify the flying drone operator or master controller that this drone can be dangerous, and this perception does not negate the need for the warning.[177]

Individuals dealing with drones should also evaluate whether the learned-intermediary doctrine can be applied to drone operators and master controllers. Under the learned-intermediary doctrine, drone manufacturers have an obligation to warn or must warn appropriate healthcare professionals who operate medical drones of the substantial dangers posed by their drone.[178] If the surgeon, who is acting as the master controller of the medical drone, fails to inform the patient about future risks, the patient can sue the surgeon, but not the drone manufacturer.[179] The learned-intermediary doctrine is a rule of law, and not a mere balancing act of risks and utility tests applied by a court.[180] This doctrine is applied to any medical devices, body implants, and drugs that are customarily issued alongside medical advice and supervision.[181]

Furthermore, when considering the learned-intermediary doctrine, a special danger exists when drone manufacturers or

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[173] *Id*. (citing *e.g*., Keogh v. W.R. Grasle, Inc., 816 P.2d 1343 (Alaska 1991)).

[174] *Id*. (citing Sollami v. Eaton, 772 N.E.2d 215 (Ill. 2002)).

[175] *See* DOBBS ET AL., *supra* note 24, § 33.13.

[176] *See id.*

[177] *Id*. (citing Liriano v. Hobart Corp., 170 F.3d 264 (2d Cir. 1999)).

[178] *See* Sparks v. Mena, 294 S.W.3d 156 (Tenn. Ct. App. 2008); DOBBS ET AL., *supra* note 25, § 33.15 (citing *e.g*., Simon v. Wyeth Pharm., Inc., 989 A.2d 356 (Pa. Super. 2009)).

[179] *See id.* (citing Hansen v. Baxter Healthcare Corp., 764 N.E.2d 35 (Ill. 2002).

[180] *Id*. (citing Richard C. Ausness, *Learned Intermediaries and Sophisticated Users: Encouraging the Use of Intermediaries to Transmit Product Safety Information*, 46 SYRACUSE L. REV. 1185 (1996)).

[181] *See id.* (citing Craft v. Peebles, 893 P.2d 138 (Haw. 1995)).

distributors regularly sell drones to master controllers.[182] This same danger is also present when drone operators work with a specific drone that is designed to perform a certain task.[183] Typically, master controllers or drone operators of drones which are bought for a specific task will foresee the dangers posed by these drones, while others who are unfamiliar with those specific drones may not be as knowledgeable.[184] Manufacturers, distributors, and designers should not omit warnings on these devices altogether based on an assumption that sophisticated master controllers or drone operators are tech savvy enough to understand the dangers that the drone could poses to an unsuspecting passerby or the operator. After all, courts have not always applied the learned-intermediary rule because their analysis of each individual case differs.[185] In making a warning claim, the plaintiff must prove that more clear or reasonable warnings were needed to prevent injury.[186] Thus, no superseding causes can insulate the defendant from liability for their drone. Yet, this is different than product defect cases.[187] Before allowing a warning claim to move forward, courts will first determine if a plaintiff has read and followed all the warnings supplied with the drone; thus, the plaintiff must prove that no warning was provided.[188] The same principle applies to defendants, manufacturers, designers, and distributors of drones if they failed to warn intermediaries of the inadequacies of a proper warning and led sophisticated users to rely on their own knowledge or to pass up on the warning.[189] The plaintiff's inference or presumption about the warnings and dangers of said drone warnings would signal to a jury that a factual cause issue is at hand; otherwise, the evidence would show that the plaintiff did not take the proper precautions described in the warning supplied by the manufacturer, distributor, or seller of the drone.[190] If the plaintiff failed to read the content-inadequate warning,

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[182] DOBBS ET AL., *supra* note 24, § 33.15.

[183] Payne v. ABB Flexible Automation, Inc., 116 F.3d 480, ___ (8th Cir. 1997).

[184] DOBBS ET AL., *supra* note 24, § 33.15 (citing *See, e.g.,* First Nat'l Bank and Trust Corp. v. Am. Eurocopter Corp., 378 F.3d 682 (7th Cir. 2004)).

[185] DOBBS ET AL., *supra* note 24, § 33.15 (citing Vitanza v. Upjohn Co., 778 A.2d 829 (Conn. 2001) (distinguishing the learned-intermediary rule and the sophisticated users rule)).

[186] *See* DOBBS ET AL., *supra* note 24, § 33.16.

[187] *See* discussion *supra* Section II.B.; DOBBS ET AL., *supra* note 24, § 33.16 (citing *e.g.* Riley v. American Honda Motor Co., 856 P.2d 196 (Mont. 1993)).

[188] *See* DOBBS ET AL., *supra* note 24, § 33.16 (citing East Penn. Mfg. Co. v. Pineda, 578 A.2d 1113, 1124 (D.C. Cir. 1980)).

[189] *Id*. (citing Coffman v. Keene Corp., 628 A.2d 710 (N.J. 1993)). *see* discussion *supra* Section I.C.

[190] *See* DOBBS ET AL., *supra* note 24, § 33.16 (citing Fanham v. Bombardier, Inc., 640 A.2d 47 (Vt. 1997)).

their claim can then be rebutted by the evidence that, their co-workers or employer could have understood it and therefore would have adequately advised the plaintiff of the drone's dangers.[191] However, if a warning is inadequately displayed, then the plaintiff's burden in this scenario would be to point out that, if the warning had been adequately displayed, then it would have caught the plaintiff's attention, thereby allowing them to avoid the danger altogether.[192] Where courts have accepted this scenario, they have generally applied the presumption in the same manner as in cases where no warning existed.[193]

Drone designers, drone manufacturers, and drone distributors seeking to counter-argue that the plaintiff did not read the provided warnings could attempt to prove that the plaintiff would have ignored the warning's advice if they had read it.[194] In these types of cases, the plaintiff must prove that even if a warning had been present, it would not have adequately reminded them about the foreseeable dangers of the drone's actions. [195] This chain of arguments would lead the court to believe that the plaintiff's actions were in keeping with those of a reasonable person, so the courts would likely issue a verdict ruling a warning on the drone would have made no difference at all upon the plaintiff's circumstances.[196] By the same token, if the proper warning was ineffective due to the plaintiff's lack of awareness about the foreseeable harms, a failure to warn would not therefore be the factual cause of harm and the plaintiff could not recover.[197]

Where superseding causes have insulated a defendant from liability for a failure to warn, the plaintiff's injury must have been sustained within the proximate cause that the warning was meant to avoid. [198] Consider the following scenario: a plaintiff should be properly warned that operating a drone coated in hazardous chemicals could cause them to develop cancer via exposure to the prolonged radiation emitted by these chemicals. Even if the plaintiff's exposure to radiation could be limited through the use of protective gear, the plaintiff should still be informed about the hazards posed by the drone's special coating. Failure to warn the plaintiff that the drone's special

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[191] DOBBS ET AL., *supra* note 24, § 33.8 (citing Ferebee v. Chevron Chem. Co., 736 F.2d 1529 (D.C. Cir. 1984)).

[192] *See* DOBBS ET AL., *supra* note 24, § 33.16 (citing Jimenez v. Sears, Roebuck & Co., 904 P.2d 861 (Ariz. 1995); Idaho Code § 6-1305).

[193] *Id*. (citing East Penn Mfg. Co. v. Pineda, 578 A.2d 1113, 1124 (D.C. 1990)).

[194] *Id*. (citing Jimenez v. Sears, Roebuck & Co. 904 P.2d, 861 (Ariz. 1995)).

[195] *See* DOBBS ET AL., *supra* note 24, § 33.16.

[196] *See id*. (citing Conti v. Ford Motor Co., 743 F.2d 195 (3d Cir. 1984)).

[197] *See id*. (citing Shelcusky v. Garjulio, 797 A.2d 138 (N.J. 2002)).

[198] *See* DOBBS ET AL., *supra* note 24, § 15.16.

coating would expose the plaintiff to radiation and could result in liability if the plaintiff developed an injury.[199] Similarly, if the plaintiff broke her leg while working with the drone and kept their job in a machine-related accident, then the master controller would not be liable for failure to warn.[200] Factual cause for failure to warn would be applicable in that scenario, though this assumes that the plaintiff would have taken the necessary precautions or found an alternative way to work with the drone.[201] The drone operator's physical injury, suffered at the drone's hands, is not within the risk that the warning on the drone was designed to avoid. Although the drone operator was not notified about the drone's special coating, courts are likely to hold that there should be adequate warnings for additional foreseeable causes.[202]

III. SCALING DOWN DRONE LIABILITY

A. Proposed Reduction of Strict Liability

Strict liability could be allocable in certain drone tort cases; however, this is not a constant rule. The Second Restatement gives courts guidelines for determining uncertainty if a claim is considered abnormally dangerous.[203] However, a common consensus on the best known practices of drone operation does not currently exist; as a result, it is unknown whether strict liability does in fact minimize risks. Drone operators, masters, or master controllers who perform tasks with the best known practices of proper technical operation, or who operate drones in an environment deemed safer, could reduce high-risk activities to reduce the possibility of harm and thus minimize strict liability.[204] As such, it may be more beneficial to target those activities which entail pervasive risks, due to the lack of strict liability, rather than seek to limit the hazards posed by high-risk activities. Thus, because of the constantly-evolving nature of technology, the economic value of drone use may indeed be greater than the value of more

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[199] *See* DOBBS ET AL., *supra* note 24, § 33.16 (citing Shelcusky v. Garjulio, 797 A.2d 138 (N.J. 2002).

[200] *See* DOBBS ET AL., *supra* note 24, § 33.16.

[201] *Id.*

[202] *See* DOBBS ET AL., *supra* note 24, § 33.16 (citing Eagle-Pincher Indus., Inc. v. Balbos, 604 A.2d 445 (Md. 1992); In re Levaquin Products Liability Litigation, 700 F.3d 1161 (8th Cir. 2012)).

[203] *See* DOBBS ET AL., *supra* note 24, § 32.9 (citing Matkovic v. Shell Oil Co., 707 P.2d 2 (Mont. 1985)).

[204] *See* DOBBS ET AL., *supra* note 24, § 32.7 (citing Mark Geistfeld, *Should Enterprise Liability Replace the Rule of Strict Liability for Abnormally Dangerous Activities?*, 45 UCLA L. REV. 611 (1998)).

traditional methods when carrying out high-risk tasks due to the logical difficulty of eliminating all potential risks.

In the circumstance in which a plaintiff is participating in abnormally dangerous actions and a third-party intervenes and so causes the plaintiff to suffer an injury, the Third Restatement applies the ordinary scope-of-risk rule.[205] This standard typically applies in cases where the dangers lead courts to impose strict liability upon the third party who triggered the injury.[206] At a minimum, whenever the intervening actor is not guilty of causing injuries, the Second Restatement requires the perspective that the intervention of others is an invariable element of the risk inherent in abnormally dangerous actions.[207] Whenever a particular action is less likely to result in injury given intervention by a third party, any relevant harm or injury should preferably be pin-pointed by case-by-case inquiries.[208]

When determining the parameters of strict liability, however, courts typically prioritize the Second Restatement, which limits strict liability to such cases as the performance of an abnormally dangerous action[209] or the harboring of an animal which causes harm to others,[210] without giving the flexibility of ordinary contributory negligence as a defense.[211] In the event that a plaintiff was negligently unable to foresee the imminent danger, the logical conclusion would be that the plaintiff was not stopped from pursuing their desired course of action by their negligence.[212] With regard to statutes[213] that contribute to the Second Restatement, previous defendants have successfully claimed that the plaintiff took the risk upon herself[214] or was responsible for contributory negligence by knowingly and unreasonably exposing herself to the dangers of injury in a strict liability situation.[215]

Additionally, under the Third Restatement and the Second Restatement's comparative responsibility principle, a plaintiff's contributory negligence often provides the justifiable basis for a

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[205] *Id*. (citing RESTATEMENT (THIRD) OF TORTS: LIABILITY FOR PHYSICAL AND EMOTIONAL HARM § 29, cmt. 1 (AM. LAW INST. 2010)).

[206] *Id.*

[207] *Id*. (citing RESTATEMENT (SECOND) OF TORTS § 522 (AM. LAW INST. 1977)).

[208] *Id*. (citing Klein v. Pyrodyne Corp., 117 Wash. 2d 1, 17 (1991)).

[209] DOBBS ET AL., *supra* note 24, § 32.9 (citing RESTATEMENT (SECOND) OF TORTS § 524 (AM. LAW INST. 1977)).

[210] *Id*. (citing RESTATEMENT (SECOND) OF TORTS § 515 (AM. LAW INST. 1977)).

[211] RESTATEMENT (SECOND) OF TORTS § 524 (AM. LAW INST. 1977).

[212] DOBBS ET AL., *supra* note 24, § 32.9 (citing Matkovic v. Shell Oil Co., 218 Mont. 156 (Mont. 1985)).

[213] *Id*. (citing Donner v. Arkwright-Boston Mfrs. Mut. Ins. Co., 358 So.2d 21 (Fla. 1978)).

[214] *Id*. (citing RESTATEMENT (SECOND) OF TORTS § 523 (AM. LAW INST. 1977)).

[215] *Id*. (citing RESTATEMENT (SECOND) OF TORTS §§ 515, 524 (AM. LAW INST. 1977)).

decrease in his or her chances of recovery.[216] No division exists between assumption of risk and comparative fault, which are independent from contributory negligence, and in turn, dependent upon the comparable reduction-of-damages rule.[217] Crucially however, strict liability is invalidated if the plaintiff looks to acquire an advantage of his own by signing a strict liability contract,[218] and also in accordance with some kind of authority, in cases where the plaintiff participates in the strict-liability situation.[219] Generally, courts are unlikely to acknowledge strict liability under a Third Restatement analysis if the plaintiff could have decreased the associated risk of the action in question to a rationally acceptable amount by exercising reasonable care.[220] Therefore, even if a plaintiff has caused personal injury to themselves through their own negligence, the Second and Third Restatements justify recovery by a plaintiff whose own unique strict liability action is not initially attached to the defendant's negligence.[221]

B. Known Intervention

In drone-human interactions, courts may understand who or what had control over the risks of a claim by first ascertaining the hierarchy of the chain of command over the drone. This understanding would take into account the particulars of a drone case in which the dangers are not necessarily produced by the defendant's decisions and/or actions.[222] Despite the inherent flaws in a rule of law which almost always absolves negligent plaintiffs, the plaintiff is not negligent when they rely upon the apparent safety furnished by the actions of the defendant.[223] Stopping by a zoo is never an act of negligence, any more so than would be a defendant's operation of a zoo. After all, the assumption of a dangerous animal's possible escape is not automatically present if the zoo is well-maintained. The plaintiff, with

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[216] *Id*. (citing RESTATEMENT (THIRD) OF TORTS: LIABILITY FOR PHYSICAL AND EMOTIONAL HARM § 25 (AM. LAW INST. 2010)).

[217] *Id*. (citing RESTATEMENT (THIRD) OF TORTS: LIABILITY FOR PHYSICAL AND EMOTIONAL HARM § 25, cmt. e. (AM. LAW INST. 2010)).

[218] *Id*. (citing RESTATEMENT (THIRD) OF TORTS: LIABILITY FOR PHYSICAL AND EMOTIONAL HARM § 24(a) (AM. LAW INST. 2010)).

[219] *Id*. (citing Pullen v. West, 92 P.3d 584 (Kan. 2004)).

[220] *Id*. (citing RESTATEMENT (THIRD) OF TORTS: LIABILITY FOR PHYSICAL AND EMOTIONAL HARM § 20, cmt. h (AM. LAW INST. 2010)).

[221] *Id*. (citing RESTATEMENT (SECOND) OF TORTS §§ 515, cmt. b 524, cmt. a (AM. LAW INST. 1977)).

[222] *See id*.

[223] *See id*. (citing William K. Jones, *Strict Liability for Hazardous Enterprise*, 92 COLUM. L. REV. 1705 (1992)).

knowledge of a potential but unlikely danger and who refuses to relocate or re-orient their property or organization, is not absolutely responsible in the event that an escape does occur.[224] Regardless of whether the plaintiff is properly permitted to be in their present location, they do not become responsible by remaining there.[225] In fact, the defendant might potentially have a duty to protect the plaintiff from their own negligence, in which scenario the plaintiff's negligence is without defense.[226]

Many rationales for industry standards exist in the absence of applicable government tests.[227] However, the courts could instead adjust the analysis to inquire whether the danger posed by the defendant's activity arose under unique and unlikely circumstances. Likewise, the courts could also attempt to determine whether the danger was the product of an interaction with a plaintiff who possessed a selection of control over these risks.[228] To a certain extent, the courts should limit these characterization conditions. Hence, a defendant whom the plaintiff failed to stress the comparable risks would be a good one-way risk candidate for strict liability.

Where a plaintiff proves that a design characteristic triggers injuries, courts in a limited number of states have shifted the burden of justifying the design of a product to the defendant.[229] In *Baker v. Lull Engineering Co.*, the plaintiff was operating a heavily-loaded high-lift industrial-loader and ended up being injured by falling lumber.[230] Upon examination, two of the loader's design characteristics appeared to be defective.[231] The court ruled that the plaintiff would be able to recover if the product qualified as defective under the standards of either the consumer expectations or the risk-utility tests.[232] The risk-utility test offered an additional advantage: if the plaintiff could prove that the product's design characteristics caused his injury, then the defendant would be responsible for providing adequate justification for the design under the risk-utility approach.[233] The *Baker* court required the defendant to prove that the design of their product could not have

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[224] *Id*. (citing RESTATEMENT (SECOND) OF TORTS §§ 515(2), 524(2) (AM. LAW INST. 1977)).

[225] DOBBS ET AL., *supra* note 24, § 32.9 (citing Leroy Fibre Co. v. Chicago, Milwaukee & St. Paul Ry. Co., 232 U.S. 340 (1914)).

[226] *See* DOBBS ET AL., *supra* note 24, §§ 16.2, 16.6.

[227] *See* DOBBS ET AL., *supra* note 24, § 33.19 (citing Colo. Rev. Stat. Ann. § 11-1-63).

[228] DOBBS ET AL., supra note 24, § 32.9 (citing William K. Jones, *Strict Liability for Hazardous Enterprise*, 92 COLUM. L. REV. 1705 (1992)).

[229] DOBBS ET AL., supra note 24, § 33.12 (citing Baker v. Lull Eng'g Co., 20 Cal. 3d 413 (1978)).

[230] *Id*.

[231] *Id*.

[232] *Id*.

[233] *Id*. (citing Pannu v. Land Rover North AmericaN. Am., Inc., 191 Cal. App.4th 1298 (2011)).

been altered to increase its safety at a reasonable cost.[234] No such burden of proof was placed upon the plaintiff. Strict liability and negligence[235] require differing burdens of proof in cases where the courts use both the risk-utility test and the burden-shifting rule.[236] Most courts to consider negligence have rejected this burden-shifting rule[237] in accordance with the Third Tort of Product Restatement.[238]

A statutory adoption of the negligence standard would most likely have a substantive impact. Courts enforce the negligence standard by holding manufacturers liable for the known avoidable risks of a design defect.[239] But a statute could limit a manufacturer's negligence if their product met the state-of-the-art industry standard.[240] Industry standards have been held as tests; however, the courts do not adopt industry standards as their own tests. Thus, some statutes foreclose liability for scientifically unknown risks.[241]

There are two competing statutory approaches to the state-of-the-art industry standard.[242] One approach provides that the defendant is not liable for the product's design and its method of manufacturing at the time of the state of the art standard.[243] The other approach presumes the product to be non-defective if it conforms to either "generally recognized and prevailing standards" or to the state of the art standard.[244] There is a disjunction that distinguishes state statutes from the state-of-the-art industry standards, which exculpates the product if either is established.[245] Without the benefit of an interpretation or simple end results, these types of statutes do not necessarily suggest that the industry's peculiar unique techniques could diminish the boundaries of the drone industry's liability. State-of-the-art statutes draw challenges regarding the burden of proof from time to time.[246]

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[234] *Id*. (citing Baker v. Lull Eng'g Co., 20 Cal. 3d 413 (1978)).

[235] *Id*. (citing Green v. Smith & Nephew AHP, Inc., 245 Wis. 2d 772, 629 N.W.2d 727 (2001)).

[236] *Id*. (citing *e.g.* Ray v. Bic Corp., 925 S.W.2d 527 (Tenn. 1996)).

[237] *Id*.

[238] *Id*. (citing RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY §§2(b), cmt. c, cmt. D, cmt. f (1998)).

[239] DOBBS ET AL., supra note 24, § 33.19 (citing ARIZ. REV. STAT. § 12-683; N.C. GEN STAT. § 99B-1.1, 99B-4 & 99B-6; N.J. STAT. ANN. § 2A:58C-3; OHIO REV. CODE ANN. § 2307.75(A)).

[240] DOBBS ET AL., supra note 24, § 33.19 (citing ARIZ. REV. STAT. § 12-683; N.C. GEN STAT. § 99B-1.1, 99B-4 & 99B-6; N.J. Stat. Ann. § 2A:58C-3; OHIO REV. CODE ANN. § 2307.75(A)).

[241] *Id*. (citing ARK. CODE ANN. § 16-116-104).

[242] *Id*. (citing KY. REV. STAT. § 411.310(2); ARIZ. REV. STAT. § 12-683(1)).

[243] *Id*. (citing *e.g.*, ARIZ. REV. STAT. § 12-683(1)).

[244] *Id*. (citing KY. REV. STAT. § 411.310(2)).

[245] *Id*. (citing KY. REV. STAT. § 411.310(2)).

[246] *See id*. (citing ARIZ. REV. STAT. § 12-683; Mo. Stat. § 537.764(2); IOWA CODE § 668.12; LA. REV. STAT. § 9:2800.59; NEB. REV. STAT. § 25-21,182).

Insofar that a statute does not guarantee admissibility of state-of-the-art evidence without prescribing a substantive rule, it fails to specify a technique regarding the burden of proof.[247]

Manufacturing defects, as distinguished from design and warning defects, serve as the basis for strict liability.[248] This is because when a product's risk is unknowable, its current design and warning claims can be essentially unsuccessful. [249] However, certain state-of-the-art statutes could potentially reduce the chances of strict liability allegations for various kinds of product defects. Many statutes minimize the state-of-the-art defense; however, it would be a misinterpretation to permit strict liability to play a role in allegations of manufacturing defects.[250] The fact that a product's design is state-of-the-art, thus implying that the product could not likely be risk-free, does not correspondingly imply that the product's ingenuity is state-of-the-art as well.[251]

IV. DEFINING DRONES

A. Etymology of Drones

There is some confusion about the legal term of drones in the minds of judges, lawmakers, and society as a whole.[252] Therefore, we will discover the intended meaning of the term and will propose a uniform definition of the word drone.[253] Historically, the term drone[254] was first used in relation to honey bees (Apis).[255] Honey bees have three types of contributors in their society: queens, workers, and drones.[256] The queen bee is perceived to be in complete control over her hive[257] and she is surrounded by servants, or attendants, who feed her royal jelly.[258] The queen releases pheromones, chemical signals, while also sending messages through "messenger bees"[259] which can

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[247] *Id*. (citing Hughes v. Massey-Ferguson, Inc., 522 N.W.2d 294 (Iowa 1994)).

[248] DOBBS ET AL., supra note 24, § 33.19.

[249] *Id*. (citing MISS. CODE ANN. § 11-1-63).

[250] *Id*. (citing MO. REV. STAT. § 537.764).

[251] *Id*. (citing Falada v. Trinity Industries Indus., Inc., 642 N.W.2d 247 (Iowa 2002)).

[252] Govan, *supra* note 1; Alben, *supra* note 1.

[253] *See* discussion *infra* Section IV.B.

[254] MARK L. WINSTON, THE BIOLOGY OF THE HONEY BEE 39–41 (1987).

[255] *Id*. at 6.

[256] THOMAS D. SEELEY, HONEYBEE DEMOCRACY 25 (2010).

[257] WINSTON, *supra* note 254, at 1.

[258] *Id*. at 71.

[259] WINSTON, *supra* note 254, at 147 (citing Thomas D. Seeley, *Queen Substance Dispersal by Messenger Workers in Honeybee Colonies*, 5 No. 4 Behavioral Ecology and Sociobiology 391-415 (1979) (Thomas Seely proposed the term "messenger bees" for worker bees that exchange

act to control many of their behaviors.[260] Furthermore, numerous studies have verified that, although all workers strive for the survival of their queen, the queen is not all-knowing.[261] Workers collectively perform endless and diverse tasks through self-governance including, dying from stinging a colony's competing hive, tending to the brood, cleaning, and storing honey;[262] they rarely ever mate.[263] Although biologists now understand that drones are designed to mate,[264] originally drones were thought to simply be mindless honey bees, and no different than workers, who all followed orders from a centralized dictatorship: their queen.[265] By the same token, honey bees are a collection of individuals which function as an integrated whole and are unmistakably social creatures.[266]

In fact, honey bee swarms build a unanimous consensus (or, in rare cases, split) on certain decisions, such as when deciding on a new location for their hive, selecting richer nectar sources, or debating more efficient ways to strengthen the swarm.[267] There are no representatives or bees with superior voting weight, including the queen herself. Eventually, during the debate process (epitomized by the more "noisy" visual stimulus)[268] the minority loses its motivation and accepts the majority's opinion.[269] Interestingly, when a swarm makes a decision,

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information though antennations, and pheromones that are distributed all over the queen's body to transport messages throughout the colony. These worker bees will exchange information with up to 56 other worker bees)).

[260] *Id*. at 147.

[261] SEELEY, *supra* note 256, at 5.

[262] WINSTON, *supra* note 254, at 3.

[263] *Id*. at 66.

[264] WINSTON, *supra* note 254, at 41 (citing Y. Lensky et al., *Pheromonal activity and fine structure of mandibular glands of honey bee drones (Apis mellifera L.) (Inseta, Hymenoptera, Apidae)*, 31 J. INSECT PHYSIOL. 265-276 (1985) (Drones have large eyes, large flight muscles, broad wing spans, and are fed by workers of the colony).

[265] Sarah Pleuthner, *How Dominant is the Queen Bee?*, AMERICAN HONEY BEE PROTECTION AGENCY, http://honeybeekind.com/how-dominant-is-the-queen-bee/ (last visited Oct. 2, 2018).

[266] SEELEY, *supra* note 256, at 25; *Id.* at 75 (citing Martin Lindauer, *Schwarmbienen auf Wohnungssuche*, 37 ZEITSCHRIFT FÜR VERGLEICHENDE PHYSIOLOGIE, 263-324 (1955) (Ger.) *translated in* P. Kirk Visscher, 52 ANNUAL REVIEW OF ENTOMOLOGY, 255-275 (2007), http://arjournals.annualreviews.org/toc/ento/52/1) (In the 1950's scientist discovered bees where social creatures that performed "judicious imitations" to communicate with each other, instead of mindlessly taking orders from the queen.); *see* Aimee S. Dunlap et al, *Foraging Bumble Bees Weigh the Reliability of Personal and Social Information*, 26 No. 9 CURRENT BIOLOGY at 1195, 1195–1199 (2016); *Id*. at 228 (citing ROBERT. J. SHILLER, IRRATIONAL EXUBERANCE (2000); RICHARD. H. THALER et al, NUDGE (2008)).

[267] SEELEY, *supra* note 256, at 118 (citing JANE J. MANSBRIDGE, BEYOND ADVERSARY DEMOCRACY (1983)).

[268] *Id*. at 200 (citing *see* Jeffrey D. Shaller, *Neural basis of deciding, choosing, and acting*, 2 NATURE REVIEW NEUROSCIENCE, 33-42 (2001)).

[269] *Id*. at 137 (citing Martin Lindauer, Schwarmbienen auf Wohnungssuche, 37 ZEITSCHRIFT

only three to four percent of the bees actually know where to lead the other honey bees.[270] This process allows the bees to avoid the risk of creating an information cascade by evaluating independently and coming to a unanimous consensus via the promotion of ideas through observation and communication.[271] Thus, the parallels between honey bee drones and human-controlled, manufactured drones are both fitting and readily apparent.[272]

The term "robot"[273] has numerous definitions. Although most individuals view robots as machines, robots in fact possess human-like capabilities, such as sensing their environment and reacting autonomously. [274] Thus, we can conclude that the proper legal definition of a robot does not need to conform to popular culture expectations. Although robots come in virtually infinite shapes, sizes, and purposes, they do not have to fit the role of a metallic humanoid which performs tasks for its masters.

In 1935, U.S. Admiral William H. Standley saw a British demonstration of the Royal Navy's new remote-control aircraft for target practice, the DH 82B Queen Bee. Once he returned stateside, Standley charged Commander Delmer Fahrney with developing something similar for the Navy. Fahrney adopted the name 'drone' to refer to these aircraft in homage to the Queen Bee. The term fit, as the drone could only function when controlled by an operator on the ground or in a "mother" plane.[275]

FÜR VERGLEICHENDE PHYSIOLOGIE, 263-324 (1955) at 296 (Ger.) translated in P. Kirk Visscher,52 ANNUAL REVIEW OF ENTOMOLOGY, 255-275 (2007), http://arjournals.annualreviews.org/toc/ento/52/1).

[270] *Id*. at 182 (citing Madeleine Beekman et al, *How does an informed minority of scouts guide a honey bee swarm as it flies to its new home?*, 71(1) ANIMAL BEHAVIOR, 161–171 (2006) (author states honey bees are ignorant who follow the majority opinion)).

[271] *Id*. at 228 (citing ROBERT J. SHILLER, IRRATIONAL EXUBERANCE (2000); RICHARD. H. THALER ET AL., NUDGE (2008)).

[272] CAPTAIN LINWOOD S. HOWETH, USN, HISTORY OF COMMUNICATIONS-ELECTRONICS IN THE UNITED STATES NAVY 479 (1963) (citing Letter from Commander Aircraft Battle Force to the Chief of Naval Operations (Apr. 22, 1933); Memorandum from Plans Division Div., Bureau of Aeronautics (Aug. 19, 1933); Fleet Training Division, Office Div., Off. of the Chief of Naval Operations, Targets & Rafts Files, (1935–36) (unpublished manuscript); Letter from Adm. W. H. Standley to Rear Adm. D. S. Fahrney (Mar. 9, 1953)).

[273] KAREL ČAPEK, R.U.R. [ROSSUM'S UNIVERSAL ROBOTS] (1921) (The word "robot" was derived from the Czech word "robota," which translates into "drudgery" or "forced labor."").

[274] PAUL J. SPRINGER, MILITARY ROBOTS AND DRONES: A REFERENCE HANDBOOK 1 (2013) (citing SIDNEY PERKOWITZ, DIGITAL PEOPLE FROM BIONIC HUMANS TO ANDROIDS 4 (2004)).

[275] HOWETH, *supra* note 272, at 479-81 (citing Letter from Commander Aircraft Battle Force to the Chief of Naval Operations (Apr. 22, 1933); Memorandum from Plans Div., Bureau of Aeronautics (Aug. 19, 1933); Fleet Training Div., Off. of the Chief of Naval Operations, Targets & Rafts Files, (1935–36) (unpublished manuscript); Letter from Adm. W. H. Standley to Rear Adm. D. S. Fahrney (Mar. 9, 1953)).

A drone is a preprogrammed machine that carries out tasks with limiting degrees of human interaction. [276] From a third-party perspective, drones can be perceived as making decisions on their own. However, a true drone cannot make wholly independent decisions.[277] Most drones do not have a fundamental need for learning-algorithms or over abundant sensory inputs to carry out their tasks. If a drone has sensory gear, such gear, benefits its master controller as an extension of itself. [278] A master controller is either a programmer, service provider, or even a piece of internal programming, all of which have the ability to override the operator. Paul J. Springer believes that the concept of autonomy means that a machine must be able to carry out a task independent of human intervention.[279] Therefore, a drone would fail Springer's autonomy test.

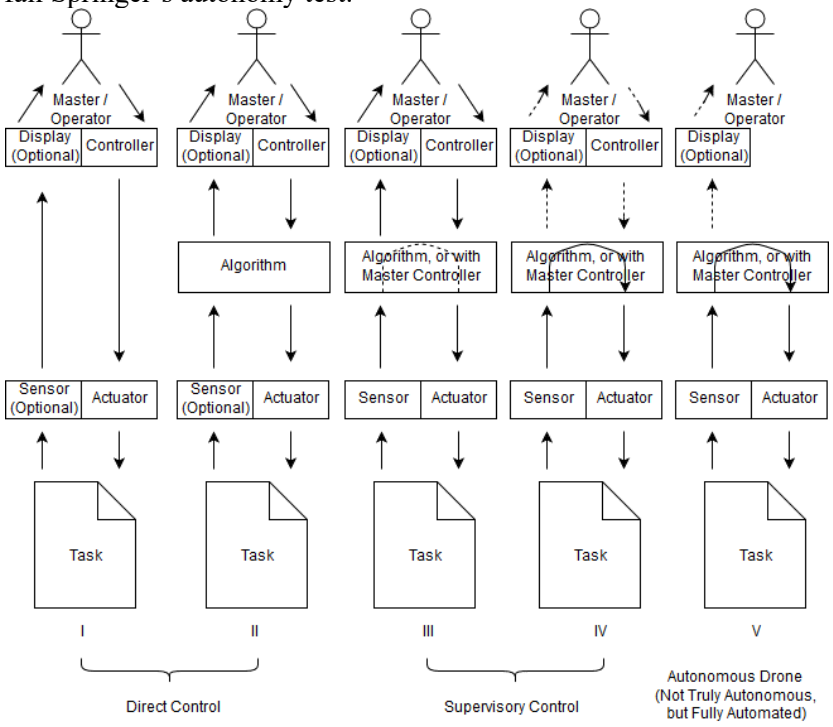

FIGURE 1. SCALING DRONE AUTONOMY[280]

[276] *See* SICILIANO, ET. AL., *supra* note 5, at 1111 fig. 44.2; *See infra* Figure 1.

[277] SICILIANO, ET. AL., supra note 5, at 308, 346.

[278] *See id.* at 718.

[279] SPRINGER, *supra* note 274, at 4.

[280] SICILIANO ET. AL., *supra* note 5, at 1111 (citing THOMAS B. SHERIDAN: TELEROBOTICS, AUTOMATION, AND HUMAN SUPERVISORY CONTROL (1992) (Figure 1. The Scope of Drone

Unmanned aircrafts are the most recognized limited autonomous system in aviation. Springer believes that a machine's reaction timing and speed is greater than that of a human and so a significant percentage of UAV accidents are likely due to human error—for example, the pilot.[281] A master controller has limited sensory input from the aircraft.[282] With human input, an aircraft can choose its own flight path, estimate conflicting airspace, and select its own vectors for targeting or following vehicles on land, sea, or air.[283] For the layman, when considering a drone's capability to perform such actions, their minds immediately jump to the next logical question: if a drone is able to choose its flight path or select a targeting vector, then is it not simply a matter of time before a robot or a drone will decide for itself to take a human life? In such an instance, who would have granted the drone the right to make that decision?

In this regard, the presumption that artificial intelligence ("A.I.") comes with a degree of freedom of choice raises the question of whether A.I.s will emulate human thinking.[284] However, a machine must function independently without an operator to be truly autonomous. To this extent, a "robotic" is known as a hybrid of a drone and of a robot.[285] Robotics have a limited degree of decision-making abilities and interaction with their environment and are still under the command and control of a human operator.[286]

Our current definition of A.I. requires the inability for a human to tell the difference between another human and the machine.[287] Because A.I. does not suffer from fatigue or boredom, its decision-making capabilities are more predictable, as they are based on statistics rather than a response to emotions.[288] A.I.s cannot at this time be creative problem-solvers; however, they can mimic solutions used by their programmers.[289]

Autonomy is variation from *Siciliano's Spectrum of Teleoperation Control Modes* flow chart. A drone's autonomy ascends from left to right (II-V). In (I), demonstrates pure machinery without any programming; this is not a drone. In (V), the device relies on its own set of pre-programmed commands or with a Master Controller that has almost non-existent observation/monitoring from its Master. In (III-V), the dashed lines represent possible intermittent communications.)).

[281] SPRINGER, *supra* note 274, at 2 (citing KEVIN W. WILLIAMS, A SUMMARY OF UNMANNED AIRCRAFT ACCIDENT/INCIDENT DATA: HUMAN FACTORS IMPLICATIONS (2004)).

[282] *See* SICILIANO ET. AL., *supra* note 5, at 1540.

[283] *Id.* at 1748.

[284] *See* ALAN M. TURING, COMPUTING MACHINERY AND INTELLIGENCE, 434 (Oxford University Press, 59th ed.,1950)

[285] SICILIANO ET. AL., *supra* note 5, at 1789.

[286] *Id.* at 1919.

[287] *See* Turing, *supra* note 284, at 435.

[288] SICILIANO ET. AL., *supra* note 5, at 334.

[289] SPRINGER, *supra* note 274, at 3 (citing VINCENT J. VAN JOOLEN, ARTIFICIAL INTELLIGENCE

Nevertheless, an autonomous device can malfunction, perhaps due to faulty programming, and go against its operator or master or cause errors. Springer suggests that autonomous weapons should not be incorporated into robotics and drones, due to the fact that they are expendable, unlike humans.[290] Drones can perform tasks that are too dangerous for humans to undertake. As Clarke famously stated, "any sufficiently advanced technology is indistinguishable from magic."[291] Clarke believed that, to the minds of a population unfamiliar with the function or development of a high-technology device, magic is a perfectly acceptable explanation for the presence and workings of said device.[292]

Robots are commonly viewed as physical entities or a race of some kind that are controlled, pre-programmed, or self-reliant. However, many people hold the misconception that robots, and so drones as well, are necessarily metallized machines with a humanoid appearance. History reveals that the word "robot" was first used in a play, written by Karl Capek in 1921, called "R.U.R. (Rossum's Universal Robots)."[293] The play is about mechanical men who were built to work on factory assembly lines and eventually rebelled against their human masters.[294] These mechanical men obtained their name from the Czech word for slave.[295] Additionally, in 1928, Alan H. Reffel, an engineer, coined the stereotypical robot characteristics from his creation, known as Eric Robot.[296] Reffel's depiction of Eric Robot started the classic Hollywood horror film portrayal of robots as having white bulbs painted red for eyes, stiff, motorized leg movements, a body made out of aluminum, and, lastly, an electronic voice which appears to be autonomous or otherwise directly under human control.[297] Altogether, these popular culture depictions have influenced the common perception of both robots and drones, most critically in a misleading or even confusing fashion.

AND ROBOTICS ON THE BATTLEFIELDS OF 2020? Carlisle, PA: Army War College (2000)).

[290] *Id.*

[291] *Id*. at 5 (citing ARTHUR C. CLARKE, PROFILES OF THE FUTURE: AN INQUIRY INTO THE LIMITS OF THE POSSIBLE 21 (revised ed. 1973).)).

[292] *Id.*

[293] Joshua Fried et. al., ROBOTICS: A BRIEF HISTORY, http://cs.stanford.edu/people/eroberts/courses/soco/projects/1998-99/robotics/history.html (last visited Jun. 20, 2017).

[294] *Id.*

[295] *Id.*

[296] John Reffell, *AH Reffell & Eric Robot (1928) – The UK's First Robot*, REFFELL FAMILY HISTORY, http://www.reffell.org.uk/people/ericrobot.php (last visited June 12, 2017).

[297] *Id.*

Like drones, robots receive orders and take action based on a given set of commands from a central location or central processing unit.[298] A robot is actually the physical shell with the appearance of a mechanical machine. However, a robot cannot be identified as a drone under the proposed definition if the robot does have an autonomous machine-learning algorithm.[299]

B. Proposed Uniform Definition of Drone

State laws have interpreted an Unmanned Aerial System (UAS) or Unmanned Aerial Vehicle (UAV) to be a "drone."[300] However, this section describes what the nature of a drone should be in tort law.

Drone generally means any algorithm that carries out an action following a command or commands. This includes commands programmed in advance and real-time commands.

Drone intelligence is an algorithm which can act in an intelligent fashion, as said algorithm is based on the intellects of the humans who constructed the algorithm.[301] Therefore, a drone possesses a minimal artificial intelligence algorithm. Per industry standard, the drone's artificial intelligence algorithm can be simplified into two categories: commanded (controlled)[302] and predetermined (list).[303] A commanded (controlled) purpose is known as input from a central location or a controller.[304] A drone's artificial intelligence relies on a controller, or master, to give the drone a set of instructions.[305] The best example to illustrate this reality is that of a radio-controlled car: whatever input is signaled to the car from the joystick, the robotic car will respond every time to these received signals.

Predetermined artificial intelligence draws from a list of pre-programmed commands.[306] The artificial intelligence in question can have the appearance of predictability, randomness, strategy, or simple reactiveness to its surrounding environment, all as defined by the

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[298] SICILIANO ET. AL., *supra* note 5, at 284.

[299] *See* discussion *infra* Section IV.B.

[300] HOWETH, *supra* note 272, at 497 (citing Letter from Commander Aircraft Battle Force to the Chief of Naval Operations (Apr. 22, 1933); Memorandum from Plans Division Div., Bureau of Aeronautics (Aug. 19, 1933); Fleet Training Division, Office Div., Off. of the Chief of Naval Operations, Targets & Rafts Files, (1935–36) (unpublished manuscript); Letter from Adm. W. H. Standley to Rear Adm. D. S. Fahrney (Mar. 9, 1953)).

[301] SICILIANO ET. AL., *supra* note 5, at 298.

[302] *Id.* at 1085.

[303] *Id.*

[304] *Id.* at 1110 (citing N. Tesla: Method of and apparatus for controlling mechanism of moving vessels or vehicles, US Patent 613809 A (1898)).

[305] *Id.*

[306] *Id.* at 292.

programmer. These types of intelligence have been viewed as either smart or illogical, depending on the outcome when said artificial intelligence interacts with a human's judgment.[307]

Regardless, drones are highly capable of causing serious bodily harm; therefore, robotic engineers and robotic scientists have proposed to adhere to Isaac Asimov's three fundamental Rules of Robotics: [308]

> 1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
> 2. A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
> 3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.[309]

Legal scholars argue that robots capable of causing serious bodily injury break the "strict" three laws of robotics developed by Asimov. [310] However, although robotic experts have referred to Asimov's science fiction works for their guidelines on robotics, such works detail concepts and devices that were merely imaginary at the time, but which are certainly no longer merely speculative.[311] As such, Asimov's rules for robots (defined as android autonomous artificial intelligence) should not apply to drone intelligence at all. Artificial intelligence engineers and scholars should not restrict the subject and rules of artificial intelligence to concepts found within Asimov's science fiction. Courts should instead hold the master operator, master, designer, or manufacturer strictly liable for the actions of the drone in question. The confines laid down by Asimov's works are much too narrow to do proper justice to the highly complex and still evolving matter of drone technology.

None of the above described robot laws are applicable to the current drone technology. Satya Nadella created Satya Nadella's A.I. Laws[312] and Mark W. Tilden presented Tilden's "Laws of Robotics."[313]

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[307] *See* Turing, *supra* note 284.

[308] *E.g.*, F. Patrick Hubbard, *'Sophisticated Robots': Balancing Liability, Regulation, and Innovation*, 66 FLA. L. REV. 1803, 1808 (2015); ISAAC ASIMOV, *Runaround* (1942), *reprinted in* I, ROBOT 37 (1977).

[309] ASIMOV, *supra* note 308.

[310] *E.g.*, *See* Hubbard, *supra* note 308.

[311] *Id.*

[312] Satya Nadella, *The Partnership of the Future*, SLATE, (June 28, 2016), http://www.slate.com/articles/technology/future_tense/2016/06/microsoft_ceo_satya_nadella_humans_and_a_i_can_work_together_to_solve_society.html.

[313] Fred Hapgood, *Chaotic Robotics*, WIRED, (Sept. 1, 1994),

However, these new ideas are neither new nor groundbreaking and fail to help advance artificial intelligence law as it pertains to the issue of strict liability. More fittingly, the Engineering and Physical Sciences Research Council (EPSRC) and the Arts and Humanities Research Council (AHRC) of Great Britain in 2011 published a set of five ethical "principles for designers, builders and users of robots":

1. Robots should not be designed solely or primarily to kill or harm humans.
2. Humans, not robots, are responsible agents. Robots are tools designed to achieve human goals.
3. Robots should be designed in ways that assure their safety and security.
4. Robots are artifacts; they should not be designed to exploit vulnerable users by evoking an emotional response or dependency. It should always be possible to tell a robot from a human.
5. It should always be possible to find out who is legally responsible for a robot.[314]

These rough guidelines have been complied by multiple scholars, engineers, and theorists and have been increasingly fine-tuned, thus rendering them much more suitable for legal consideration than the currently relied-upon science fiction works. As mankind searches for emotional companionship, it will be quite complex to implement Robotic Law Number Four and the EPSRC and AHRC principles for designers, builders, and users of robots. These examples of robotic laws furnish an excellent starting point, but by no means do they comprise a gold standard of robotic law for legal scholars.[315]

Currently, drones may or may not pass the Turing test, all without any relevant restrictions to the proposed drone definition. The Turing test was designed to observe if a human subject would be able to evaluate the true identity of the entity with whom they were interacting: an actual human being or a computer chat bot.[316] Its creator initially suggested that if the machine could convince a human of its own humanity after five minutes of conversation at least thirty percent of the time,[317] then the machine could be fairly said to have passed

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https://www.wired.com/1994/09/tilden/.

[314] Engineering and Physical Sciences Research Council, *Principles of robotics: Regulating Robots in the Real World*, ESPRC (May 15, 2016), https://epsrc.ukri.org/research/ourportfolio/themes/engineering/activities/principlesofrobotics/.

[315] ASIMOV, *supra* note 308.

[316] *See* Turing, *supra* note 284.

[317] *Id.* at 442 ("I believe that in about fifty years' time it will be possible to programme computers, … to make them play the imitation game so well that an average interrogator will not have more

Turing's test. This test measures not the machine's ability to correctly answer questions, but instead how closely the machine's answers resemble those that an average human would give.[318] Therefore, a drone could pass the Turing test[319] so long as it could convince a human subject of its human-like decision-making abilities.

In the legal world, the term drone can also be used to identify humans who smuggle drugs, such as marijuana, in the employ of an illegal business.[320] These human drones follow orders from their drug lords in an effort to provide an income for themselves and/or their families.[321] As shown, lawmakers and politicians do not use a singular meaning when they seek to identify a drone.[322] As the Seventh Circuit Judge Easterbrook wrote in one opinion, "[d]rones of the organization--the runners, mules, drivers, and lookouts--have nothing comparable to offer. They lack the contacts and trust necessary to set up big deals, and they know little information of value. Whatever tales they have to tell, their bosses will have related."[323] In this manner, it is clear that the term drone's essential definition, regardless of its use or application, is related to either something or someone who unthinkingly takes commands.

We also see the legal definition of drone being used imprecisely at the state level:

> Washington State's definition of a "Drone" holds that the term "should apply to unmanned aerial vehicles controlled by a remote operator . . . [such as a]n unmanned aircraft that is operated without the possibility of direct human intervention from within or on the aircraft".[324] By contrast, the Federal Aviation Administration ("FAA") does not define Unmanned Aircraft Vehicles ("UAVs") as "drones," holding that "[u]nmanned aircraft means an aircraft operated without the possibility of direct human intervention from within or on the aircraft."[325] As such,

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than 70 percent chance of making the right identification after five minutes of questioning.").

[318] *Id.* at 445 ("Whenever one of these machines is asked the appropriate critical question, and gives a definite answer, we know that this answer must be wrong, and this gives us a certain feeling of superiority. Is this feeling illusory? It is no doubt quite genuine, but I do not think too much importance should be attached to it. We too often give wrong answers to questions ourselves to be justified in being very pleased at such evidence of fallibility on the part of the machines.")).

[319] *See* Turing, *supra* note 284.

[320] United States v. Brigham, 977 F.2d 317, 317 (7th Cir. 1992)

[321] *Id.*

[322] *Id.*; Govan, *supra* note 1; Alben, *supra* note 1.

[323] *Id.*

[324] Alben, *supra* note 1.

[325] Govan, *supra* note 1.

the FAA definition is compatible with this Article's proposed drone definition.

CONCLUSION

As legislators work to integrate the concept of artificial intelligence into the law, courts must determine the placement of the drone master, master controller, or operator in the hierarchy of drone liability. Drone generally means any algorithm that carries out an action following a command or commands. This includes commands programmed in advance and real-time commands. In drone liability cases where the agent is unclear, courts should rely on scientific knowledge to determine the actor who is at fault. The drone manufacturers, distributors, or designers should be held to a strict liability standard for any defects. This is proven to be the case in instances of physical harm caused by a drone in which the master controller, the master, or the operator has been held strictly liable. Bearing these recommendations, future courts will be significantly better equipped to evaluate cases of drone liability.