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Recreational UAVs: Going Rogue with Pennsylvania's Strict Products Liability Law Post-*Tincher*

Lindsey E. Buckley*

INTRODUCTION

In the early hours of January 26, 2015, an unmanned aerial vehicle (UAV) crash-landed on the White House lawn.¹ Unidentified and operating illegally, the downed UAV prompted a White House lockdown and Secret Service investigation.² The UAV's owner, who loaned it to a friend, was not in possession of the device when the accident occurred.³ He stated that his friend lost control of the recreational UAV and it inexplicably flew toward the White House.⁴ The owner pointed to well-documented technical problems with the DJI Phantom quadcopter, suggesting that a glitch in the controls led the UAV to go rogue.⁵ Fortunately, no injuries were reported. However, suppose we find ourselves instead in the open farmlands of central Pennsylvania. Another drone falls from the sky, except this time injuring a young child admiring the new technology as it flies overhead. What avenues of legal redress could an innocent bystander seek under Pennsylvania's strict products liability law? Would she qualify as a "user" of the UAV under the intended user doctrine? Moreover, is this mishap a result of user error or a design defect? What evidence may the manufacturer proffer in a strict liability suit to prove user error or defend against theories of defects?

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¹ Pamela Brown & Jim Acosta, *First on CNN: No charges against White House drone flyer*, CNN (Mar. 18, 2015, 6:52 PM), <http://www.cnn.com/2015/03/18/politics/white-house-drone-charges/>.

² Byron Tau, *Crash Near White House a Blow to Drone Lobbyists*, THE WALL STREET JOURNAL (Jan. 26, 2015, 4:18 PM), <http://blogs.wsj.com/washwire/2015/01/26/crash-near-white-house-a-blow-to-drone-lobbyists/tab/print>.

³ Jim Acosta & Cassie Spodak, *Drone maker says it's 'highly unlikely' White House drone malfunctioned*, CNN (Jan. 30, 2015, 4:47 PM), <http://www.cnn.com/2015/01/30/politics/drone-malfunction-creators-says-highly-unlikely/index.html>.

⁴ *Id.*

⁵ *Id.*

Is Pennsylvania prepared to answer these questions under its current strict products liability scheme? UAVs were among the top-selling gifts during the 2014 holiday season.⁶ They can be purchased from manufacturers' websites,⁷ mass suppliers such as Amazon,⁸ and hobby stores.⁹ Arcades even offer UAVs as prizes.¹⁰ With the rising popularity of UAVs and increased consumer access, the aforementioned questions will almost inevitably be presented in Pennsylvania courts over the next few years.

On November 19, 2014, the Supreme Court of Pennsylvania issued its opinion in *Tincher v. Omega Flex, Inc.*, where the court reversed decades of strict products liability case law.¹¹ Although *Tincher* essentially wipes the strict products liability slate clean by overruling *Azzarello v. Black Brothers* and expressly declining to adopt the *Restatement (Third) of Torts*, thereby reaffirming its use of the *Restatement (Second)*, the court left many questions unanswered.¹² Ordinary citizens expect products liability law to be firmly established by 2015, especially regarding centuries-old products such as pipes;¹³ however, this is not the case. This Article will elucidate such issues in Pennsylvania's current products liability scheme and discuss why these issues must be addressed before new technology outpaces the governing law.

Part I of this Article provides a brief overview of UAV terminology, technology, present and future trends in autonomy, and the anomaly of rogue UAVs. Part II addresses the federal regulations concerning commercial and recreational UAVs. Part III summarizes Pennsylvania's strict products liability landscape before and after *Tincher*. Part IV evaluates the inherent intersections between UAV technology and the state of post-*Tincher* products liability law. Part V concludes that the public policy behind Pennsylvania's strict liability doctrine

⁶ Loic Pialat, *Drones Are Becoming Popular Christmas Gifts For Kids*, BUSINESS INSIDER (Dec. 22, 2014, 5:01 AM), <http://www.businessinsider.com/afp-in-united-states-drones-take-off-as-christmas-gifts-2014-12>.

⁷ PARROT, <https://us.store.parrot.com/en/>.

⁸ AMAZON, <http://www.amazon.com/b?node=9699105011>.

⁹ HORIZON HOBBY, <http://www.horizonhobby.com/category/multicopter>.

¹⁰ Bobby Oliver, *From pigs to Pikachu: The best boardwalk prizes you can win this summer*, NJ.COM (June 02, 2015, 10:37 AM), http://www.nj.com/entertainment/index.ssf/2015/06/jersey_shore_boardwalk_prizes_new_stuff_big_stuff.html.

¹¹ See *Tincher v. Omega Flex, Inc.*, 104 A.3d 328 (Pa. 2014).

¹² *Id.* at 409–10.

¹³ *Id.* at 336.

survives, and the availability of advancing technology in the marketplace will present significant issues to Pennsylvania's future strict products liability scheme.

I. UAVs

When it comes to aerial robotics, the terminology of the three categories of pilotless aircrafts—unmanned aerial vehicles (“UAVs”), remotely piloted vehicles (“RPVs”), and drones—require further clarification.¹⁴ “Some people use the terms RPV and UAV interchangeably, but . . . the ‘remotely piloted vehicle’ is piloted or steered (controlled) from a remotely located position so an RPV is always a UAV.”¹⁵ On the other hand, “a radio-controlled model aircraft is used only for sport and must remain within the sight of the operator. The operator is usually limited to instructing the aircraft to climb or descend and to turn to the left or . . . right.”¹⁶ Thus, “a UAV, which may perform autonomous or preprogrammed missions, need not always be an RPV.”¹⁷ The power source, “which provides dynamic lift and thrust based on aerodynamics, is controlled by autonomous navigation or remote-control navigation Therefore, neither a rocket . . . nor a cruise missile . . . belong in this category.”¹⁸ As opposed to an RPV, a UAV will have a varying degree of automated intelligence.¹⁹ Thus, a UAV is capable of communicating with “its controller and . . . return payload data. If any fault occurs in any of the sub-systems or components, the UAV may be designed automatically to take corrective action and/or alert its operator.”²⁰ In the past, RPVs and UAVs were grouped together and referred to as “drones” because both types are pilotless aircrafts controlled by radio signals.²¹ Today, the modern UAV developer and user community draws sharp distinctions between UAVs and drones.²² A drone is required to “fly out of sight of the operator, but has zero intelligence, merely being launched into a pre-programmed mission on a pre-programmed course and a return

¹⁴ PAUL FAHLSTROM & THOMAS GLEASON, INTRODUCTION TO UAV SYSTEMS 7 (4th ed. 2012).

¹⁵ *Id.*

¹⁶ REG AUSTIN, UNMANNED AIRCRAFT SYSTEMS: UAVS DESIGN, DEVELOPMENT AND DEPLOYMENT 3 (1st ed. 2010).

¹⁷ FAHLSTROM & GLEASON, *supra* note 14.

¹⁸ KENZO NONAMI, FARID KENDOUL, SATOSHI SUZUKI, WEI WANG & DAISUKE NAKAZAWA, AUTONOMOUS FLYING ROBOTS 7 (2010).

¹⁹ AUSTIN, *supra* note 16.

²⁰ *Id.*

²¹ FAHLSTROM & GLEASON, *supra* note 14.

²² *Id.*

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to base. It does not communicate and the results of the mission . . . are usually not obtained . . . until it is recovered at base.”²³ The UAV community uses the term “drone” to refer only to “vehicles that have limited flexibility for accomplishing sophisticated missions and fly in a persistently dull, monotonous, and indifferent manner, such as a target drone.”²⁴ Despite such distinctions and lack of technical correctness, the general public and media have adopted the term “drone” as a convenient and colloquial term for UAVs.²⁵

A UAV is a powered vehicle that does not carry a human operator, can be operated autonomously or remotely, can be expendable or recoverable, and can carry a lethal or non-lethal payload.²⁶ The aircraft is just one component of the aggregate unmanned aircraft system (“UAS”).²⁷ The complete system consists of (1) a control station that houses the operators of the system; (2) the aircraft carrying the payload; (3) the system of communication between the control station and the aircraft, which typically consists of radio transmission; and (4) support equipment which may include maintenance and transport items.²⁸

The most common UAV aircraft platforms available to consumers are fixed-wing and rotary-wing UAVs.²⁹ Fixed-wing UAVs are “unmanned airplanes (with wings) that require a runway to take-off and land, or catapult launching.”³⁰ Rotary-wing UAVs (or propeller-based systems), unlike fixed-wing UAVs, can fly in every direction and hover in fixed positions.³¹ The size of UAVs can range from that of a large insect to an aircraft weighing more than 14,950 pounds with a wingspan of more than 130 feet.³² UAVs carry payloads, or attachable accessories,

²³ AUSTIN, *supra* note 16, at 3.

²⁴ FAHLSTROM & GLEASON, *supra* note 14.

²⁵ *Id.*

²⁶ Jay Gundlach, *Designing Unmanned Aircraft Systems: A Comprehensive Approach*, AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS EDUCATION SERIES 2 (2012).

²⁷ AUSTIN, *supra* note 16, at 1.

²⁸ *Id.*

²⁹ NONAMI ET AL., *supra* note 18, at 9–11.

³⁰ *Id.* at 9.

³¹ Press, *UAV: Fixed Wing or Rotary?*, SUAS NEWS (Sept. 24, 2013), <http://www.suasnews.com/2013/09/25214/uav-fixed-wing-or-rotary/>.

³² *RQ-4 Global Hawk*, U.S. AIR FORCE (Oct. 27, 2014), <http://www.af.mil/AboutUs/FactSheets/Display/tabid/224/Article/104516/rq-4-global-hawk.aspx>.

including, but not limited to, cameras, thermal imaging devices, sensors,³³ laser radars, guns, pepper spray, and bubble machines.

A. UAV and Operator Communication

A UAV's communications system provides the data uplink and downlink between the aircraft and the control station.³⁴ The uplink transmits data from the control station to the aircraft, including flight path and control of payload,³⁵ while the downlink transmits data from the aircraft to the control station, such as images, payload data, status information, and position information.³⁶ The transmission medium is typically radio frequency.³⁷

Communication with external systems can be achieved using systems housed with the control station.³⁸ Such communication between external systems led to one of the first fully autonomous, self-organized UAV flocks.³⁹ These fully autonomous UAVs “navigate themselves based on the dynamic information received from other robots in the vicinity. [They] do not use central data processing or control . . . [and] the necessary computations are carried out by miniature on-board computers.”⁴⁰

B. Autonomy

Autonomous UAVs may be the latest consumer trend and will likely be hitting the navigable airspace (“NA”) soon.⁴¹ Several UAVs, such as the Zano, Hexo+, and AirDog, boast autonomy, surpassed their crowd funding stages, and will be available for pre-order.⁴² Autonomous robots are capable of performing

³³ *Id.*

³⁴ AUSTIN, *supra* note 16, at 12–13.

³⁵ *Id.*

³⁶ AUSTIN, *supra* note 16.

³⁷ *Id.* at 12.

³⁸ *Id.* at 10.

³⁹ G. VÁSÁRHELYI ET AL., *Outdoor flocking and formation flight with autonomous aerial robots* (Feb. 14, 2014), available at <https://hal.elte.hu/flocking/browser/trunk/public/references/vasarhelyi/Vasarhelyi2014outdoor.pdf?format=raw>.

⁴⁰ *Id.*

⁴¹ Gannon Burgett, *AirDog: The Foldable, Autonomous GoPro Drone that Always Keeps You in the Shot*, PETAPIXEL (June 18, 2014), <http://petapixel.com/2014/06/18/airdog-foldable-personal-gopro-drone-always-keeps-view/>.

⁴² AIR DOG, <https://www.airdog.com/>; ZANO, <http://flyzano.com/>; HEXO+, <http://hexoplus.com/>.

tasks without continuous human guidance in unstructured environments.⁴³ Autonomy is never absolute, but rather relative to the envisioned environment in which the agent will interact.⁴⁴ Depending upon the demands under various conditions in a given environment, an intelligent autonomous robot will make independent, competent decisions.⁴⁵ Finding a consensus as to the levels of autonomy among the UAV community is a feat in itself; nonetheless, the following table is an attempt to define the levels of autonomy:

| Locus of authority | UAV computer authority | Computer level of authority | Levels of human-machine interface |
|-------------------------------------|-----------------------------------|-----------------------------|--|
| Computer monitored by human | Full | 5b | Computer does everything autonomously |
| Computer monitored by human | Full | 5a | Computer chooses action, performs it and informs human |
| Computer backed-up by human | Action unless revoked | 4b | Computer chooses action and performs it unless human disapproves |
| Computer backed-up by human | Action unless revoked | 4a | Computer chooses action and performs it if human approves |
| Human backed-up by computer | Advice and, if authorised, action | 3 | Computer suggests options and proposes one of them |
| Human assisted by computer | Advice | 2 | Computer suggests options to human |
| Computer assists human if requested | Advice only if requested | 1 | Human asks computer to suggest options and human selects |
| Human | None | 0 | Whole task done by human except actual operation |

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Within the context of UAV technology, autonomy refers to a very high level of automation where a number of subsequent decision branches are programmed into the on-board computer, thus enabling a UAV to make progressive decisions without reference to the operator.⁴⁷ In the event that a subsystem or component fails, a UAV may be designed to automatically take corrective action and alert its operator.⁴⁸ Attempts have been made to implement on-board decision-making

⁴³ Nirmal Baran Hui & Dilip Kumar Pratihar, *Design and Development of Intelligent Autonomous Robots*, in *STUDIES IN COMPUTATIONAL INTELLIGENCE, 275 INTELLIGENT AUTONOMOUS SYSTEMS: FOUNDATIONS AND APPLICATIONS* 30, 30 (Dilip Kumar Pratihar & Lakhmi C. Jain eds., 2010).

⁴⁴ Wolfgang Bibel, *General Aspects of Intelligent Autonomous Systems*, in *STUDIES IN COMPUTATIONAL INTELLIGENCE, 275 INTELLIGENT AUTONOMOUS SYSTEMS: FOUNDATIONS AND APPLICATIONS* 5, 8 (Dilip Kumar Pratihar & Lakhmi C. Jain eds., 2010).

⁴⁵ Dilip Kumar Pratihar & Lakhmi C. Jain, *Towards Intelligent Autonomous Systems*, in *STUDIES IN COMPUTATIONAL INTELLIGENCE, 275 INTELLIGENT AUTONOMOUS SYSTEMS: FOUNDATIONS AND APPLICATIONS* 1, 1 (Dilip Kumar Pratihar & Lakhmi C. Jain eds., 2010).

⁴⁶ ALAN F. HILL, FIONA CAYZER & PETER R. WILKINSON, *EFFECTIVE OPERATOR ENGAGEMENT WITH VARIABLE AUTONOMY* (2007).

⁴⁷ AUSTIN, *supra* note 16, at 300.

⁴⁸ *Id.* at 3.

capability using artificial intelligence in order to provide autonomy of operation.⁴⁹ Advantages of on-board automation include the reduction of operator workload, possible operator errors, and the use of radio bandwidth.⁵⁰ Nevertheless, a fully autonomous UAV may not be desirable; considering its intelligence, it may refuse to complete a mission or exhibit undesirable behaviors to the operator.⁵¹

C. *Rogue Drones*

A simple search for “drone flyaways” on YouTube reveals footage captured by thousands of UAV cameras, proffering evidence that these aerial robots take on minds of their own and uncontrollably zip away from their operators.⁵² UAVs can go rogue for a number of reasons, including, but not limited to, software glitches, poor global positioning system (“GPS”) data, lost connection to controllers, and electromagnetic interference.⁵³ Even tall buildings, cell phone towers, and solar flares can interfere with the satellite-based GPS and on-board compasses.⁵⁴ UAVs will potentially go rogue when a user neglects to calibrate the UAV’s compass or configure the fail-safe functions.⁵⁵ The issue of rogue UAVs is problematic not only for UAV operators who may lose their pricey investments, but also for UAV manufacturers, distributors, and the general public. The general public is a relevant party to this issue because it consists of individuals who will be required to navigate the legal landscape in order to assert or defend against claims that UAVs cause personal injuries to innocent civilians.

UAVs are a relatively new technology in the marketplace. Pertinent to the White House UAV incident, a DJI spokesman released statements suggesting that had these events resulted in a products liability trial, DJI’s main defense would be misuse even though the company admitted that their products are prone to mishaps and that anomalies exist in their systems.⁵⁶ This manufacturer admitted the

⁴⁹ *Id.* at 299.

⁵⁰ *Id.* at 300.

⁵¹ *Id.*

⁵² *Rogue Drone Cuts Ladies Arm* (Feb. 11, 2015), https://www.youtube.com/watch?v=szTkg_78sF0.

⁵³ Jack Nicas, *What Happens When Your Drone Escapes*, THE WALL STREET JOURNAL (Dec. 8, 2014, 7:51 PM), <http://www.wsj.com/articles/what-happens-when-your-drone-escapes-1418086281>.

⁵⁴ *Id.*

⁵⁵ *Id.*

⁵⁶ Brown & Acosta, *supra* note 1 (“For anyone to even consider operating a personal UAV in this area is almost unfathomable and displays a remarkable lack of awareness We think a rogue ‘flyaway’ scenario highly unlikely given the reported circumstances We watch for and actively address any real anomalies in our systems.”).

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company works to resolve such anomalies, thus indicating that UAV technology is not firmly solidified and is not as safe as possible. With any new technology, there will, at a minimum, be anomalies. The question, however, is whether these anomalies are enough to give rise to a products liability claim.

II. FEDERAL UAV GUIDANCE

In February 2015, the Federal Aviation Administration (“FAA”) released its long-anticipated Small UAS Notice of Proposed Rulemaking (“NPRM”), which is specifically applicable to UAVs used for private commercial purposes.⁵⁷ The notice and comment period for the NPRM ended on April 24, 2015.⁵⁸ The provisions highlight the FAA’s concerns regarding the integration of commercial UAS operation into the NA. The proposed rules are divided into four sections: operational limitations, operator certification and responsibilities, aircraft requirements, and model aircraft.⁵⁹

The FAA’s overarching safety concern for a UAS is apparent in the proposed rules. The responsibilities of the UAS’ operator in regard to safety are central in that every section explicitly touches on the roles of the operator. For example, the UAS “must remain close enough to the operator for the operator to be capable of seeing the aircraft with vision unaided by any device other than corrective lenses” and UAS “may not operate over any persons not directly involved in the operation.”⁶⁰ Under the “Aircraft Requirements” section, the FAA requires that an “operator must maintain a small UAS in condition for safe operation and prior to flight must inspect the UAS to ensure that it is in a condition for safe operation.”⁶¹ The element of human control over the UAS is central to legal use of commercial UAS; accordingly, the FAA is indubitably unprepared to embrace purely autonomous UAS for commercial purposes. Nonetheless, the “Model Aircraft” section of the “Overview” states that the “[p]roposed rule would not apply to model

⁵⁷ *Regulations will Facilitate Integration of Small UAS into U.S. Aviation System*, FEDERAL AVIATION ADMINISTRATION (Mar. 27, 2015, 12:00 PM), https://www.faa.gov/news/press_releases/news_story.cfm?newsId=18295.

⁵⁸ *Small UAS Notice of Proposed Rulemaking (NPRM)*, FEDERAL AVIATION ADMINISTRATION (June 1, 2015, 9:46 AM), <https://www.faa.gov/uas/nprm/>.

⁵⁹ *Overview of Small UAS Notice of Proposed Rulemaking*, FEDERAL AVIATION ADMINISTRATION (Mar. 27, 2015, 12:00 PM), https://www.faa.gov/regulations_policies/rulemaking/media/021515_sUAS_Summary.pdf.

⁶⁰ *Id.*

⁶¹ *Id.*

aircraft that satisfy all of the criteria specified in Section 336 of Public Law 112-95.⁶²

In adherence with Section 336 of the FAA Modernization and Reform Act of 2012 (Public Law 112-95), the FAA has promulgated guidance in the form of model aircraft operations limits for hobbyists, and requires that:

(1) the aircraft is flown strictly for hobby or recreational use; (2) the aircraft is operated in accordance with a community-based set of safety guidelines and within the programming of a nationwide community-based organization; (3) the aircraft is limited to not more than 55 pounds unless otherwise certified through a design, construction, inspection, flight test, and operational safety program administered by a community-based organization; (4) the aircraft is operated in a manner that does not interfere with and gives way to any manned aircraft; (5) when flown within 5 miles of an airport, the operator of the aircraft provides the airport operator and the airport air traffic control tower . . . with prior notice of the operation; and (6) the aircraft is flown within visual line sight of the operator.⁶³

Hence, under the FAA, commercial use of purely autonomous UAS is prohibited, yet recreational use of purely autonomous UAS is feasible.

III. STRICT PRODUCTS LIABILITY IN PENNSYLVANIA

Under negligence law, a plaintiff must prove that the defendant's conduct was unreasonable. This burden was sometimes unattainable in cases arising from the use of allegedly defective products. A change in legal philosophy was inspired by the development of a sophisticated and complex industrial society containing new products and technology.⁶⁴ The courts developed strict products liability law in order to advance the social policy of protecting product users and placing the

⁶² *Id.*

⁶³ *What Can I Do With My Model Aircraft?*, FEDERAL AVIATION ADMINISTRATION, https://www.faa.gov/uas/publications/model_aircraft_operators/.

⁶⁴ *Azzarello v. Black Bros. Co.*, 391 A.2d 1020, 1023 (Pa. 1978).

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burden on the manufacturer, distributor, and supplier—the parties most likely able to bear the burden.⁶⁵

A. *History of Pennsylvania Strict Products Liability Law*

The Pennsylvania Supreme Court adopted § 402A of the *Restatement (Second) of Torts* in the case of *Webb v. Zern* in 1966.⁶⁶ According to *Tincher*, § 402A was adopted in response to the policy articulated by the concurring and dissenting opinions of Justices Jones and Roberts in *Miller v. Preitz*:

The public interest in affording the maximum protection possible under the law to human life, health and safety; the inability of the consumer to protect himself; the seller's implied assurance of the safety of a product on the open market; the superior ability of the manufacturer or seller to distribute the risk of loss . . . all support the extension of the protection of strict liability beyond the food cases to those involving other consumer goods as well.⁶⁷

The court embraced the concept of strict liability in tort for defective products and adopted the language of § 402A, thereby determining the elements for a strict products liability claim to be: (1) proof a product defect existed (2) at the time the product left the manufacturer, seller, or distributor's control, and (3) that it was the cause of injury.⁶⁸ Thus, the *Webb* decision established that any seller of a product would be held strictly liable for harm caused to the user or their property if the product is in a defective condition or is unreasonably dangerous.⁶⁹ A seller will be held strictly liable only if he is in the business of selling such products, and the product is expected to reach the user or consumer without substantial change in the

⁶⁵ *Tincher*, 104 A.3d at 383.

⁶⁶ *Webb v. Zern*, 220 A.2d 853, 854 (Pa. 1966).

⁶⁷ *Tincher*, 104 A.3d at 361 (citing to *Miller*, 221 A.2d at 338–39).

⁶⁸ *Webb*, 220 A.2d at 854 (“(1) One who sells any product in a defective condition unreasonably dangerous to the user or consumer or to his property is subject to liability for physical harm thereby caused to the ultimate user or consumer, or to his property, if (a) the seller is engaged in the business of selling such a product, and; (b) it is expected to and does reach the user or consumer without substantial change in the condition in which it is sold . . . (2) The rule stated in Subsection (1) applies although . . . (a) the seller has exercised all possible care in the preparation and sale of his product, and; (b) the user or consumer has not bought the product from or entered into any contractual relation with the seller.”).

⁶⁹ *Id.*

condition in which it was sold.⁷⁰ The subsequent landmark decision of *Azzarello v. Black Brothers Co.* vehemently adhered to the fundamental principles and policy matters inferred from the adoption of § 402A.

I. *Azzarello v. Black Brothers Co.*

In *Azzarello*, the plaintiff's hand was pinched between two rubber rolls in a coating machine that was manufactured and sold by the defendant, Black Brothers.⁷¹ The plaintiff relied on the theory of strict liability under § 402A in bringing her claim.⁷² The trial court used the phrase “unreasonably dangerous”—taken verbatim from § 402A—in charging the jury.⁷³ This jury charge was the basis for the plaintiff's appeal; the *en banc* court granted the motion for a new trial.⁷⁴

On appeal, the Supreme Court of Pennsylvania held that the consideration of whether the defendant's conduct was reasonable was a reversible error in a strict liability case.⁷⁵ The *Azzarello* opinion established the longstanding principle that negligence concepts have no place in Pennsylvania strict products liability claims.⁷⁶ Additionally, whether a product was unreasonably dangerous was a question of law to be determined by the judge based on social policy considerations, balancing foreseeable risks and product utility in the light most favorable to the plaintiff.⁷⁷ Only after the judge determined whether the product was unreasonably dangerous could the jury decide whether the product was defective: lacking any element necessary to make the product safe.⁷⁸

The *Azzarello* court's reasoning behind separating negligence and strict liability was best articulated in *Phillips v. Cricket Lighters*: “Strict liability focuses solely on the product, and is divorced from the conduct of the manufacturer With such a cause of action, it would be the height of illogic to introduce a test which examines whether the manufacturer acted with due care.”⁷⁹ The *Azzarello*

⁷⁰ *Id.*

⁷¹ *Azzarello*, 391 A.2d at 1022.

⁷² *Id.*

⁷³ *Id.*

⁷⁴ *Id.* at 1023.

⁷⁵ *Id.* at 1027.

⁷⁶ *Id.*

⁷⁷ *Azzarello*, 391 A.2d at 1026–27.

⁷⁸ *Id.* at 1027.

⁷⁹ *Phillips v. Cricket Lighters*, 841 A.2d 1000, 1007 (Pa. 2003) (citing to *Azzarello*, 391 A.2d at 1023–24).

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court determined that the use of the term “unreasonably dangerous” in jury instructions incorrectly indicated to the jury that the consumer had the burden of proving an element of negligence.⁸⁰ In citing the California Supreme Court, placing the burden of proof of a negligence element on an injured plaintiff is unwarranted, and the supplier’s liability is limited “by the necessity of proving that there was a defect in the manufacture or design of the product, and that such defect was a (legal) cause of the injuries.”⁸¹ The court also relied on the notion that negligence and strict liability are antithetical to each other, a concept that was derived by a New Jersey court in *Glass v. Ford Motor Co.*⁸²

In its final remarks, the court concluded, “[T]he jury may find a defect where the product left the supplier’s control lacking any element necessary to make it safe for its intended use or possessing any feature that renders it unsafe for the intended use.”⁸³ Thus, in strict liability cases, juries were instructed as follows:

The supplier of a product is the guarantor of its safety. The product must, therefore, be provided with every element necessary to make it safe for its intended use, and without any condition that makes it unsafe for its intended use. If you find that the product, at the time it left the defendant’s control, lacked any element necessary to make it safe for its intended use or contained any condition that made it unsafe for its intended use, then the product was defective, and the defendant is liable for all harm caused by such defect.⁸⁴

The language of this jury instruction mimicked the language used in *Azzarello*.⁸⁵ This jury instruction eventually led to the exclusion of evidence and defenses that incorporated negligence concepts—such as comparative negligence defenses, evidence of compliance with industry standards, and evidence of reasonable conduct on behalf of the manufacturer or supplier—from being presented to juries

⁸⁰ *Tincher*, 104 A.3d at 367.

⁸¹ *Azzarello*, 391 A.2d at 1025.

⁸² *Id.* (citing *Glass v. Ford Motor Co.*, 304 A.2d 562, 564 (N.J. Super. Ct. Law Div. 1973)).

⁸³ *Azzarello v. Black Bros. Co.*, 391 A.2d 1020, 1027 (1978).

⁸⁴ PENNSYLVANIA STD. CIV. J.I. 8.02 (3d ed. 2005).

⁸⁵ *Azzarello*, 391 A.2d at 1027.

for consideration.⁸⁶ The holding in *Azzarello* initiated a pattern of rulings in Pennsylvania case law that puzzled the masses.⁸⁷

2. *The Issues That Followed Under Azzarello*

As a result of the rigorous negligence-strict liability dichotomy set forth in *Azzarello*, negligence evidence and theories were deemed inadmissible in strict liability cases. Inadmissible “state of the art” evidence included scientific unknowability, industry standards, and government standards.⁸⁸ In 1985, the Superior Court of Pennsylvania decided *Carrecter v. Colson Equipment*, holding that under *Azzarello*, manufacturers were barred from introducing evidence that safer means were scientifically unknowable.⁸⁹ “What a defendant ‘should have known’ is a classic negligence inquiry which our courts have held unequivocally does not belong in a products liability action.”⁹⁰ In 1987, the Supreme Court of Pennsylvania issued its opinion in *Lewis v. Coffing Hoist Division*, holding evidence of industry customs and standards to be inadmissible in strict liability actions, citing *Azzarello*.⁹¹ The court stated that “evidence of industry standards . . . go to the reasonableness of the [defendant’s] conduct in making its design choice.”⁹² It concluded that such evidence of industry standards would have improperly brought concepts of negligence law into the case.⁹³ *Hicks v. Dana*, decided in 2009 by the Superior Court, held that “governmental regulations are inadmissible in strict liability cases . . . based upon the general premise that the introduction of such evidence has the effect of shifting the jury’s attention from the existence of a defect to the reasonableness of the manufacturer’s conduct, which is irrelevant in strict liability actions.”⁹⁴

A significant portion of the Superior Court’s 1997 opinion in *Riley v. Warren Mfg., Inc.* focused on the intended user doctrine: the requirement that a plaintiff prove that he is a user or consumer of the product in order to prove a claim under

⁸⁶ See *Carrecter v. Colson Equip. Co.*, 499 A.2d 326, 330 (Pa. Super. 1985); *Lewis v. Coffing Hoist Division*, 528 A.2d 590, 594 (Pa. 1987); *Estate of Hicks v. Dana Companies, LLC*, 984 A.2d 943, 965 (Pa. Super. 2009).

⁸⁷ *Tincher*, 104 A.3d at 376.

⁸⁸ *Carrecter*, 499 A.2d at 330; *Lewis*, 528 A.2d at 594; *Dana*, 984 A.2d at 965.

⁸⁹ *Carrecter*, 499 A.2d at 330.

⁹⁰ *Id.*

⁹¹ *Lewis*, 528 A.2d at 594.

⁹² *Id.*

⁹³ *Id.*

⁹⁴ *Dana*, 984 A.2d at 965.

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§ 402A in Pennsylvania.⁹⁵ This requirement is derived from the *Restatement*, which defines “user” as follows:

“User” includes those who are passively enjoying the benefit of the product, as in the case of passengers in automobiles or airplanes, as well as those who are utilizing it for the purpose of doing work upon it, as in the case of an employee of the ultimate buyer who is making repairs upon the automobile which he has purchased.⁹⁶

However, casual bystanders and passers-by that came in contact with and were injured by exploding products have been denied recovery.⁹⁷ In 2009, the U.S. Court of Appeals for the Third Circuit, in *Berrier v. Simplicity Mfg.*, inaccurately predicted that the Supreme Court of Pennsylvania would adopt the *Restatement (Third)* to provide for bystander recovery by permitting a cause of action in strict liability to all foreseeable persons affected by a defective product.⁹⁸

From 1966 to 2014, Pennsylvania’s lower courts attempted to maneuver the convoluted landscape of strict products liability law. *Tincher* gave Pennsylvania’s high court another opportunity to decide whether to officially adopt the *Restatement (Third)*, clarify the state of bystander recovery, and examine evidentiary considerations in strict liability actions.

B. Tincher v. Omega Flex, Inc.

The Supreme Court of Pennsylvania issued the landmark decision of *Tincher* in November 2014, and its holdings will inevitably change the future of Pennsylvania strict products liability law.⁹⁹ In what has become the seminal case in this area of law, Chief Justice Castille penned the 137-page majority opinion that explicitly overruled *Azzarello*, clarified and established two alternative theories plaintiffs may use for their cause of action, and reaffirmed Pennsylvania’s use of the *Restatement (Second)*.¹⁰⁰

⁹⁵ Riley v. Warren Mfg., Inc., 688 A.2d 221, 227 (Pa. Super. 1997).

⁹⁶ *Id.*

⁹⁷ *Id.*

⁹⁸ Berrier v. Simplicity Mfg., 563 F.3d 38, 46–56 (3d Cir. 2009).

⁹⁹ *Tincher*, 104 A.3d at 328.

¹⁰⁰ *Id.* at 410.

I. *Overruled Azzarello*

The facts of *Tincher* surround a lightning strike near the Tincher family home, which punctured the corrugated stainless steel tubing that transported natural gas to their fireplace; Omega Flex manufactured and sold the tubing.¹⁰¹ The lightning strike melted the tubing and ignited the natural gas, which resulted in a fire that caused significant damage to the plaintiffs' home and belongings.¹⁰² Because the Supreme Court of Pennsylvania had not adopted the *Restatement (Third)*, the trial court declined to charge the jury in accordance with that treatise, and the jury ultimately issued a verdict in favor of the plaintiffs.¹⁰³ Omega Flex filed a motion for post-trial relief, based upon the trial court's failure to apply the *Restatement (Third)*; yet the trial court denied the motion and entered a judgment on the verdict.¹⁰⁴ Omega Flex appealed to the Superior Court, which agreed with the trial court.¹⁰⁵ The issue allowed on appeal to Supreme Court of Pennsylvania was whether the court should replace the strict liability analysis of § 402A with the analysis of the *Restatement (Third)*.¹⁰⁶

The court unanimously decided to overrule *Azzarello*, finding its methods to be “impracticable and inconsistent with the theory of strict liability.”¹⁰⁷ *Azzarello* “articulate[d] governing legal concepts which fail to reflect the realities of strict liability practice and to serve the interests of justice.”¹⁰⁸ *Tincher* explicitly disapproved of the process by which *Azzarello* arrived at its unfounded holdings.¹⁰⁹ According to *Tincher*, the rule established by *Azzarello* “is that negligence concepts and rhetoric—although addressed in the negative by the *Restatement*—somehow affected a plaintiff's burden of proof in all strict liability cases, regardless of the

¹⁰¹ *Id.* at 336.

¹⁰² *Id.*

¹⁰³ *Id.* at 340–41.

¹⁰⁴ *Id.* at 341–42.

¹⁰⁵ *Id.* at 343.

¹⁰⁶ *Id.*

¹⁰⁷ *Id.* at 406.

¹⁰⁸ *Id.* at 376.

¹⁰⁹ *Id.* at 377–78 (“The Court parsed the language of the Second Restatement, particularly the terms ‘defective condition’ and ‘unreasonably dangerous,’ for a precise meaning and the reporter’s intent in the utilization of those terms But, Section 402A does not articulate legal ‘requirements’ as a statute may; and, moreover, the ‘intent’ of the reporter is, of course, not due the same weight as a pronouncement of legislative intent in statutory construction. . . . The *Azzarello* Court seemed to engage in a statutory-type construction of Section 402A, including by proceeding to presume every part of Section 402A effective.”).

pertinent facts.”¹¹⁰ Chief Justice Castille hinted at judicial overreaching, since the facts of *Azzarello* did not necessitate the broad pronouncement that negligence-related verbiage in jury instructions would burden a plaintiff with an additional and unwarranted burden of proof in every case.¹¹¹ Furthermore, the *Azzarello* court made a giant logical leap in assuming that every lay jury would “relate reasonableness and other negligence terminology, when offered in a strict liability charge to a ‘heavier,’ negligence-based burden of proof.”¹¹² The Chief Justice took further issue with *Azzarello* in that it depended not on the *Restatement* or any source of Pennsylvania law for support in its holding, but rather depended upon decisions of the Supreme Court of California and New Jersey’s *Glass* decision, which was ultimately rejected by the New Jersey Supreme Court.¹¹³

The jury instructions that resulted “discouraged the exercise of judicial discretion in charging the jury . . . and likely stunted the development of the common law in this area from proceeding in a more logical experience-based and reason-bound fashion.”¹¹⁴ This is because trial courts are not necessarily qualified in conducting the social policy inquiries into the risks and utilities of the vast array of products available on the market and deciding whether a product is unreasonably dangerous as a matter of law, as required by *Azzarello*.¹¹⁵ Accordingly, “a strict reading of *Azzarello* is undesirable because it would encourage trial courts to make either uninformed or unfounded decisions of social policy that then substantially determine the course and outcome of the trial.”¹¹⁶ The court went on to emphasize and explain the supplier’s duty to the consumer to provide a product free from a defective condition,¹¹⁷ and then illuminated the two alternative approaches under which a plaintiff may now prove a product defect: the consumer expectations test¹¹⁸ and the risk-utility test.¹¹⁹

¹¹⁰ *Id.* at 377.

¹¹¹ *Id.*

¹¹² *Id.*

¹¹³ *Id.* at 377–78.

¹¹⁴ *Id.* at 379.

¹¹⁵ *Id.* at 380.

¹¹⁶ *Id.* at 381.

¹¹⁷ *Id.* at 383.

¹¹⁸ *Id.* at 387.

¹¹⁹ *Id.* at 389.

2. *Consumer Expectations and Risk-Utility Tests*

Plaintiffs may now show that a product is in a defective condition by proving: (1) the danger is unknowable and unacceptable to the average or ordinary consumer (i.e., consumer expectations test),¹²⁰ or (2) a reasonable person would conclude that the probability and seriousness of harm caused by the product outweigh the burden or costs of taking precautions (i.e., risk-utility test).¹²¹ Under the risk-utility analysis, the court balances seven factors to determine whether the magnitude of the harm caused by the product's condition outweigh the costs of the design.¹²² A plaintiff may also proceed using both tests to assert his cause of action.¹²³ Thus, it is no longer necessary for the trial court to make a determination as to whether the product is "unreasonably dangerous," and even the preliminary question of its defectiveness is now to be submitted to the jury.¹²⁴ Juries may now use the risk-utility analysis in deciding the defectiveness of products.¹²⁵

3. *Pennsylvania Declines to Adopt the Restatement (Third)*

The justices were divided by a vote of 4-2 in declining to adopt the *Restatement (Third)* framework; it explicitly emphasized that the decision to adopt the *Restatement (Third)* belongs to the legislature.¹²⁶ The *Restatement (Third)* is allegedly more defendant-friendly, since it permits the introduction of evidence that the defendant exercised reasonable care to make the product safe, and that a

¹²⁰ *Id.* at 387.

¹²¹ *Id.*

¹²² (1) The usefulness and desirability of the product—its utility to the user and to the public as a whole; (2) the safety aspects of the product—the likelihood that it will cause injury, and the probable seriousness of the injury; (3) the availability of a substitute product which would meet the same need and not be as unsafe; (4) the manufacturer's ability to eliminate the unsafe character of the product without impairing its usefulness or making it too expensive to maintain its utility; (5) the user's ability to avoid danger by the exercise of care in the use of the product; (6) the user's anticipated awareness of the dangers inherent in the product and their availability, because of general public knowledge of the obvious condition of the product, or of the existence of suitable warnings or instructions; (7) the feasibility, on the part of the manufacturer, of spreading the loss by setting the price of the product or carrying liability insurance. John Wade, *On the Nature of Strict Tort Liability for Products*, 44 MISS. L.J. 825, 837–38 (1973); *Tincher*, 104 A.3d at 389–90.

¹²³ *Tincher*, 104 A.3d at 391.

¹²⁴ Nicolson Law Group, *PA Supreme Court Declines to Adopt Third Restatement* (Nov. 2014), <http://www.nicolsonlawgroup.com/news-a-events/product-liability/170-pa-supreme-court-declines-to-adopt-third-restatement>.

¹²⁵ *Id.*

¹²⁶ *Tincher*, 104 A.3d at 349.

plaintiff is required to prove that a reasonably safer alternative design exists in order to recover on a design defect claim.¹²⁷

The majority opinion is concerned with the common law.¹²⁸ The American Law Institute consists of legal scholars who undertake the mission of reviewing case law and refining it into “black letter” rules depicted in its series of *Restatements*.¹²⁹ The common law, however, ensures that the judiciary does not become encased in one single idea represented through such a treatise, and gives the courts power to decide issues cautiously.¹³⁰ Chief Justice Castille finds the *Restatement’s* “articulation of common law principles in terms of extrapolations from evidence relevant in the typical case . . . problematic,”¹³¹ and essentially states that the judiciary cannot allow the *Restatement (Third)* to engulf society’s understanding of products liability; leeway and the freedom for lower courts to litigate issues is crucial to the construction of an infallible products liability scheme.¹³²

The Chief Justice emphasizes that the Commonwealth of Pennsylvania is principle-based, and his concerns with the *Restatement (Third)* are due to its evidentiary-based concepts.¹³³ The *Restatement (Third)* has the potential to completely circumscribe cases and place consumers in harmful conditions.¹³⁴ The *Restatement (Third)* may deter innovation, due to the fact that revolutionary products seldom have alternative designs. How do we know the existing product is the safest it can be? Adopting the *Restatement (Third)* would categorically exempt inventors who are not in positions to make preexisting alternative designs.¹³⁵ Where a plaintiff is filing suit against a first-time designer, the plaintiff will not be able to show alternative designs unless the plaintiff becomes a professional designer himself; otherwise, he cannot meet this stringent burden of proof.¹³⁶

¹²⁷ *Id.*

¹²⁸ *Id.* at 397.

¹²⁹ Victor E. Schwartz, *The Restatement (Third) of Torts: Products Liability—the American Law Institute’s Process of Democracy and Deliberation*, 26 HOFSTRA L. REV. 743 (1998).

¹³⁰ *Tincher*, 104 A.3d at 398.

¹³¹ *Id.* at 397.

¹³² *Id.* at 399.

¹³³ *Id.* at 396–97.

¹³⁴ *Id.* at 394.

¹³⁵ *Id.* at 395.

¹³⁶ *Id.*

IV. THE INTERSECTION OF UAV TECHNOLOGY WITH THE CURRENT STATE OF PENNSYLVANIA STRICT PRODUCTS LIABILITY LAW

A. *The Negligence-Strict Liability Tango*

Tincher has left several already-loose ends untied. One of the principal effects of *Tincher* is its perceived abolishment of the separation between negligence concepts and strict liability.¹³⁷ Under *Azzarello*, defendants were not permitted to introduce evidence that brought up issues of negligence by a plaintiff.¹³⁸ While the court overruled *Azzarello*, it did not adopt the *Restatement (Third)*, which has resulted in a gray area concerning what evidence is admissible under the *Restatement (Second)* approach post-*Tincher* and post-overruling of *Azzarello*. This uncertainty has arisen because the courts that prohibited evidence of compliance with industry and government standards based their decisions on *Azzarello*.¹³⁹ With *Azzarello* and the negligence-strict liability dichotomy overruled, and evidentiary matters undecided by the court, defense attorneys will likely attempt to introduce evidence that was previously inadmissible. Such evidence includes federal regulatory standards, factors that designers or manufacturers rely on in developing their products,¹⁴⁰ technological feasibility, comparative fault,¹⁴¹ and reckless conduct.¹⁴² This is problematic for a number of reasons.

The typical instruction, Standard Civil Jury Instruction § 8.02, incorporates the description of a manufacturer's duty based on the holdings of *Azzarello* by requiring the inclusion of every element necessary to make the product safe.¹⁴³ The jury instruction is now porous since it contains language from an overruled case. In the minds of defense attorneys, "every element necessary to make the product safe" is a much higher burden to prove than complying with government standards and not necessarily supplying the product with every element to make it safe. Thus,

¹³⁷ *Id.* at 378.

¹³⁸ *Azzarello*, 391 A.2d at 1026–27.

¹³⁹ *Carrecter*, 499 A.2d at 330; *Lewis*, 528 A.2d at 594; *Dana*, 984 A.2d at 965.

¹⁴⁰ Max Mitchell, *Products Liability Cases in Pa. Face an Uncertain Road*, THE LEGAL INTELLIGENCER (Nov. 25, 2014), <http://www.thelegalintelligencer.com/id=1202677352885/Products-Liability-Cases-in-Pa-Face-an-Uncertain-Road?slreturn=20150224151852>.

¹⁴¹ James M. Beck, *'Tincher' Opens Door to Previously Excluded Negligence Evidence*, THE LEGAL INTELLIGENCER (Feb. 3, 2015), http://www.thelegalintelligencer.com/id=1202716633012/Tincher-Opens-Door-to-Previously-Excluded-Negligence-Evidence?rss=rss_pa.

¹⁴² *Mitchell*, *supra* note 140.

¹⁴³ Larry E. Coben, *Pennsylvania Products Liability: Instructing the Jury*, PHILADELPHIA TRIAL LAWYERS ASSOCIATION VERDICT 7 (Special ed. vol. 2014-15).

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defendants will likely try to squeeze in evidence of industry standards under the postulation that *Azzarello* barred such evidence. Nonetheless, *Tincher* did not overrule the cases that barred industry and government standards from being introduced; *Dana* and *Lewis* are still good law.¹⁴⁴

In a strict products liability case involving personal injury by a recreational UAV, the only applicable government standard is the FAA's NPRM. A manufacturer would argue that although a UAV can be smashed into walls or people and easily rebuilt, the UAV is not unreasonably dangerous—not for the aforementioned reasons—but because the manufacturer complied with the FAA regulations. However, the FAA's regulations for recreational use pose no standards in which a UAV manufacturer could comply. The introduction of products with advanced technological capabilities into the mainstream marketplace will muddy the strict liability analysis further, especially since it is unclear whether the long-anticipated FAA standards will offer any true guidance.

Furthermore, *Tincher* declined to adopt the *Restatement (Third)*, which specifically permits evidence of industry standards.¹⁴⁵ When establishing the two new standards of proof for a strict liability claim, *Tincher* referenced its California sister court.¹⁴⁶ Since the California Supreme Court held in *Barker v. Lull* that a manufacturer's reasonableness was not a factor to consider under strict liability because it aligned more with the principles of negligence,¹⁴⁷ it is arguable that Pennsylvania will and should follow suit.

B. Bystander Recovery

Equally important, *Tincher* declined to comment or rule regarding bystander recovery in Pennsylvania.¹⁴⁸ Under the consumer expectations test, “a product is not defective if the ordinary consumer would reasonably anticipate and appreciate the dangerous condition of the product and the attendant risk of injury of which the plaintiff complains.”¹⁴⁹ Because § 402A requires that the plaintiff be a user or consumer of the product and includes those passively enjoying the benefit of the product, UAV technology has the potential to dismantle the legal landscape set forth under Pennsylvania case law. The technological capabilities of UAVs allow

¹⁴⁴ *Tincher*, 104 A.3d at 410.

¹⁴⁵ *Id.* at 375.

¹⁴⁶ *Id.* at 389 (citing *Barker v. Lull Engineering Co.*, 143 Cal. Rptr. 225, 573 P.2d at 456).

¹⁴⁷ *Barker*, 573 P.2d at 457.

¹⁴⁸ *Tincher*, 104 A.3d at 409–10.

¹⁴⁹ *Id.* at 387.

the devices to fly miles away from the UAV's operator or intended user, in which countless people may observe the aircraft fly overhead, capture photos, blow bubbles, or perform tricks; this large audience may passively enjoy the benefits of the UAV. The product at issue is no longer piping in a house that will be solely enjoyed by one family; the scope of who may passively enjoy the benefit of a UAV is growing exponentially with the advancements in the field of autonomous robotic technology.

For the entirety of the 50-year history of strict products liability law in the Commonwealth, consumer safety has been both an underlying and hovering dynamic factor. Although *Berrier* proceeded with the ideals of fairness in predicting the adoption of the *Restatement (Third)* in order to explicitly provide for bystander recovery, *Tincher's* denial of the treatise reinforced Pennsylvania's capricious injustice to injured innocent bystanders.

Society will witness purely autonomous products in the marketplace during this lifetime, and these autonomous devices inherently expand the link between the users and the products themselves. The element of human control existed at the beginning of products liability law, since individuals created the products, sold and distributed the products, and ultimately used the products. The concept and viability of autonomy removes this element of human control from the product, which is the element that has persisted throughout the history of this doctrine. Autonomy will continue to stretch the element of human control further as technology advances to artificial intelligence. The doctrine of strict liability illuminates the heightened interest of consumer safety;¹⁵⁰ this will be the essential steppingstone for future generations in crafting laws and regulations to adapt and keep abreast of quickly advancing products. Pennsylvania is a state driven by principles, not evidentiary concerns,¹⁵¹ and while considerations of use may be vitiated, the policy behind protecting the public is unwavering.

V. CONCLUSION

Major cavities exist in Pennsylvania's products liability law following *Tincher*.¹⁵² UAVs and other autonomous robots are becoming commonplace in our everyday lives. The zone of danger for bystanders is being widened as a result of the sheer nature and capabilities of this new technology. There is a potential need for heightened public policy concerns now that consumers are no longer dealing

¹⁵⁰ *Id.* at 383.

¹⁵¹ *Id.* at 398.

¹⁵² *Id.* at 381.

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with a product that affects one family; like the beer keg in *Webb*,¹⁵³ coating machine in *Azzarello*,¹⁵⁴ lighter in *Phillips*,¹⁵⁵ bulk feed trailer in *Riley*,¹⁵⁶ lawnmower in *Berrier*,¹⁵⁷ and pipes in *Tincher*.¹⁵⁸ The very real threat of rogue UAVs should move the legislature and judiciary to take the potential of bystander injuries resulting from UAVs into consideration. Because quickly advancing technology ensures that passive enjoyment will be farther-reaching than ever before, it may be necessary for the courts to carve out an exception for bystanders specifically harmed by UAVs, considering bystanders are likely to be injured by the devices. Another alternative may be amending the definition of a “user” in Pennsylvania to encompass parties susceptible to injury by UAVs. Future legislation and decisions must be made with public policy interests in mind. The most eloquent statement of the indelible public policy interest driving strict liability in Pennsylvania was stated in *Azzarello*:

The realities of our economic society as it exists today forces the conclusion that the risk of loss for injury resulting from defective products should be borne by the suppliers, principally because they are in a position to absorb the loss by distributing it as a cost of doing business. In an era of giant corporate structures, utilizing the national media to sell their wares, the original concern for an emerging manufacturing industry has given way to the view that it is now the consumer who must be protected. Courts have increasingly adopted the position that the risk of loss must be placed upon the supplier of the defective product without regard to fault or privity of contract.¹⁵⁹

Although that opinion is no longer authoritative, the palpable public policy backing strict products liability survives.

¹⁵³ *Webb*, 220 A.2d at 854.

¹⁵⁴ *Azzarello*, 391 A.2d at 1022.

¹⁵⁵ *Phillips*, 841 A.2d at 1002.

¹⁵⁶ *Riley*, 688 A.2d at 223.

¹⁵⁷ *Berrier*, 563 F.3d at 42.

¹⁵⁸ *Tincher*, 104 A.3d at 336.

¹⁵⁹ *Azzarello*, 391 A.2d at 1023–24.