

**DR. DRONELOVE:  
HOW WE SHOULD ALL LEARN TO STOP WORRYING AND LOVE  
COMMERCIAL DRONES**

*Nicholas Ryan Turza\**

*While manufacturers, entrepreneurs, and customers wait on the dilatory FAA to create formal rules governing commercial drone integration into the U.S. airspace, states have begun to regulate drones on their own accord. However, the direction of state legislation risks the benefits of an emerging industry worth billions—an industry in which the United States has a natural advantage. Other nations are already benefiting from their own embrace of drones. America could also reap similar benefits if the FAA took initiative and allowed this new technology to take flight.*

**I. INTRODUCTION**

When Amazon revolutionized American retail goods fifteen years ago, its doubters were legion and included some of its own investors.<sup>1</sup> But Amazon's founder, Jeff Bezos, seemed like a visionary by the turn of the millennium.<sup>2</sup> Today, all retailers, even those with brick-and-mortar locations, live in an online shopping world. Amazon led the online shopping revolution several years ago, and it may be about to change American business once again. On December 1, 2013, Amazon announced it was developing Amazon Prime Air, a service that delivers lightweight Amazon goods to customers via unmanned aerial vehicles ("UAVs"), or

---

\* J.D. Candidate, University of North Carolina School of Law, Class of 2015; M.P.P. Candidate, Sanford School of Public Policy, Duke University, Class of 2015. The author appreciates the work of his editors, particularly the tireless efforts of Laura Arredondo-Santisteban and the year-long support of Holly Bannerman.

<sup>1</sup> See Robert Spector, AMAZON.COM: GET BIG FAST 84–105, 165, 242–43 (2002) (describing this skepticism due to Bezos's unorthodox business strategy).

<sup>2</sup> Jeff Bezos was Time's Person of the Year in 1999. Joshua Cooper Ramo, *Jeffrey Preston Bezos: 1999 Person of The Year*, TIME (Dec. 27, 1999), available at content.time.com/time/magazine/article/0,9171,992927,00.html#ixzz2rdsVynL.

drones.<sup>3</sup> In thirty minutes or less, Amazon could deliver your brand new iPad or Snuggie right to your front door.

Amazon's announcement helped Americans begin to view drones as instruments of commerce rather than deadly weapons of war or spying tools for police. While Amazon's *60 Minutes* interview thrust the idea of drone delivery into the national conversation, retail delivery by drone is a sideshow compared to the proven benefits drones offer the fields of agriculture, industry, film, and journalism.<sup>4</sup> Other nations have already integrated commercial drones into their own airspace, reaping the benefits of not only the technology itself, but also the expanding drone manufacturing industry.<sup>5</sup>

This Recent Development argues that policymakers, primarily the Federal Aviation Administration ("FAA") and state governments, should proactively craft a practical legal framework for the integration of commercial drones. The FAA has been slow to act, aside from enforcing a ban that currently grounds any commercial drone enterprise, whether for farming soybeans in Idaho or filming blockbusters in California.

As a corollary assertion, this Recent Development also argues against a fearful U.S. mindset that misunderstands the benefits commercial drone integration offers. Drone employment by the

---

<sup>3</sup> See Doug Gross, *Amazon's Drone Delivery: How Would It Work?*, CNN (Dec. 2, 2013, 5:56 PM), <http://www.cnn.com/2013/12/02/tech/innovation/amazon-drones-questions/> (reporting on the potential service). UAVs are commonly referred to as "drones." Other terms, sometimes quoted herein, include unmanned aircraft system ("UAS") and remotely piloted vehicle ("RPV"), though most people associate the latter with hobbyists.

<sup>4</sup> Alistair Blair, *Amazon Testing Delivery by Drone, CEO Bezos Says*, USA TODAY (Dec. 1, 2013), <http://www.usatoday.com/story/tech/2013/12/01/amazon-bezos-drone-delivery/3799021/>. For the video of the interview, see *Amazon Unveils Futuristic Delivery Plan by Drone*, CBS NEWS, available at <http://www.cbsnews.com/news/amazon-unveils-futuristic-plan-delivery-by-drone/>. For questions of the accuracy of some of the reporting regarding Bezos's announcement, see Dan Lyons, *First Victim of Amazon Drones: The Credibility of CBS and 60 Minutes*, HUFFINGTON POST (Dec. 2, 2013, 1:46 PM), [http://www.huffingtonpost.com/dan-lyons/amazon-drones-60-minutes\\_b\\_4372910.html](http://www.huffingtonpost.com/dan-lyons/amazon-drones-60-minutes_b_4372910.html). Regarding the broad potential of drones, see *infra* Part V.A.

<sup>5</sup> See *infra* Part V.B.

U.S. military against unsuspecting terrorist targets unfairly frames how Americans view the technology.<sup>6</sup> Many Americans are skeptical, if not outright scared, of having drones flying over suburbia invading their backyard barbeque privacy.<sup>7</sup> Comparative commercial drone use overseas calls into question the sensibleness of anti-drone sentiment that swept state legislatures in 2013 and the reasonableness of FAA's slow progress. Americans should be less frightened of falling drones or peeping quadcoptors and more concerned with losing innovative jobs to rivals in an emerging twenty-first century industry. Those rivals will not only enjoy more jobs, but will also enjoy gains in productivity, safety benefits, a more expansive freedom-of-the-press, and other immeasurable and yet-discovered advantages drone services will offer in the future.

The Recent Development is structured as follows. Part II introduces drone technology and its commercial applications. Part III provides background about the evolving federal law that governs the flight of aircraft generally, but focuses on laws that regulate commercial drones in particular. Part IV examines the hostility against drones shown in legislation passed at the state and local level, and in bills proposed in the U.S. House of Representatives. Part V explores the benefits of commercial drones in locations overseas where they are legally permissible. Part VI argues that the benefits of commercial drones should trump the fears and explains how the law can adapt to this new commercial technology, just as it has done for similar technologies in the past.

## II. A PRIMER ON COMMERCIAL DRONES

Unmanned flying machines are known by different names but the word "drone" has captured the imagination of U.S. popular culture.<sup>8</sup> However, the use of the term "drone" is perhaps a

---

<sup>6</sup> See *infra* Part II (regarding U.S. drone use against terrorist targets overseas).

<sup>7</sup> See *infra* Part IV.

<sup>8</sup> See, e.g., Wells C. Bennett, *Unmanned at Any Speed: Bringing Drones into Our National Airspace*, ISSUES IN GOVERNANCE STUDIES (Brookings Inst., D.C.), at 1 (Dec. 2012), available at [http://www.brookings.edu/~media/Research/Files/Papers/2012/12/14%20drones%20bennett/1214\\_drones\\_bennett.pdf](http://www.brookings.edu/~media/Research/Files/Papers/2012/12/14%20drones%20bennett/1214_drones_bennett.pdf) (noting how the word is commonly used in the vernacular rather than technical alternatives). See also Ben Zimmer, *The Flight of 'Drone' From Bees to Planes*,

misnomer because, contrary to the original definition<sup>9</sup> of the word, someone—a human someone—pilots the drone from the ground.<sup>10</sup> Drones are simply remotely piloted planes, helicopters, or any other type of aircraft that function without an onboard pilot.<sup>11</sup>

---

WALL ST. J. (July 26, 2013, 7:36 PM), <http://online.wsj.com/news/articles/SB10001424127887324110404578625803736954968> (tracing the historical etymology of the word drone from observation of honey bees in Britain in the 16th century to unpiloted target aircraft flown by the Royal Navy in the 1930s, and then subsequent adoption by the U.S. military and into American culture).

<sup>9</sup> The primary definition of “drone” is a “male bee or ant which serves only in a reproductive capacity and does no work.” WEBSTER’S NEW WORLD COLLEGE DICTIONARY 416 (3d ed. 1997). The implication with “drone” is that the action is done mindlessly. See 4 THE OXFORD ENGLISH DICTIONARY 1067 (2d ed. 1989) (defining “drone” as “[t]o act or behave like a drone bee” further clarifying “[t]o proceed in a sluggish, lazy, or indolent manner”).

<sup>10</sup> Originally, drones did *not* have any remote human pilot, but that was in their infancy when militaries used them for wind-up aerial target practice like shooting ducks at a carnival. See Zimmer, *supra* note 8. Now, the FAA includes remote piloting as one of three elements comprising an “Unmanned Aircraft System.” *Integration of Civil Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) Roadmap*, FAA 8 (2013), available at [http://www.faa.gov/about/initiatives/uas/media/uas\\_roadmap\\_2013.pdf](http://www.faa.gov/about/initiatives/uas/media/uas_roadmap_2013.pdf). Technology could evolve on this point, as the military is considering developing highly sophisticated drones that can accomplish missions through automated piloting. See Peter Finn, *A Future for Drones: Automated Killing*, WASH. POST (Sept. 19, 2011), [http://www.washingtonpost.com/national/national-security/a-future-for-drones-automated-killing/2011/09/15/gIQAVy9mgK\\_story.html](http://www.washingtonpost.com/national/national-security/a-future-for-drones-automated-killing/2011/09/15/gIQAVy9mgK_story.html) (reporting on the military’s successful test of such a drone).

<sup>11</sup> The FAA defines unmanned aircraft as “[a] device used or intended to be used for flight in the air that has no onboard pilot . . . [including] all classes of airplanes, helicopters, airships, and translational lift aircraft that have no onboard pilot.” *Interim Operational Approval Guidance 08-01, Unmanned Aircraft Systems Operations in the U. S. National Airspace System*, FAA 4 (Mar. 13, 2008), available at [http://www.faa.gov/about/office\\_org/headquarters\\_offices/ato/service\\_units/systemops/aaim/organizations/uas/coa/faq/media/uas\\_guidance08-01.pdf](http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/uas/coa/faq/media/uas_guidance08-01.pdf). *Popular Science* perhaps provides the easiest definition: “If it flies and it’s controlled by a pilot on the ground, it fits under the everyday-language definition of drone.” Kelsey D. Atherton, *Flying Robots 101: Everything You Need To Know About Drones*, POPULAR SCIENCE (Mar. 7, 2013, 3:30 PM), <http://www.popsci.com/technology/article/2013-03/drone-any-other-name>.

Piloting occurs by way of a joystick operator, GPS navigation, or, in the future, onboard visual sensors.<sup>12</sup>

Drones entered American popular culture through media coverage of the military's overseas use of drone aircraft against terrorist targets.<sup>13</sup> The U.S. military first used drones in overseas operations with mixed results in the 1990s<sup>14</sup> before accepting drones as successful additions to the U.S. arsenal late in President Clinton's administration.<sup>15</sup> Their use as a weapon of counterterrorism began after the 9/11 terrorist attacks, and the growth of that use was gradual during the Bush Administration.<sup>16</sup> President Obama, perhaps surprising some observers given the pacifist tenor of his 2008 campaign,<sup>17</sup> not only accepted the use of drones as a lethal solution to terrorists in ungoverned territories in Pakistan and Yemen, but he also greatly increased targeted drone strikes.<sup>18</sup> That increase in use, coupled with a parallel rise in the

---

<sup>12</sup> See Chris Andersen, *How I Accidentally Kickstarted the Domestic Drone Boom*, WIRED (June 22, 2012, 6:32 AM), [http://www.wired.com/dangerroom/2012/06/ff\\_drones/all/](http://www.wired.com/dangerroom/2012/06/ff_drones/all/) (explaining drone mechanics).

<sup>13</sup> *Id.*

<sup>14</sup> See Michael E. Ruane, *Setbacks Leave Pilotless Plane With An Uncharted Course The Spy Aircraft Worked Well In The Persian Gulf, But Not In Bosnia*, PHILADELPHIA INQUIRER, Aug. 28, 1995, available at [http://articles.philly.com/1995-08-28/news/25707805\\_1\\_uav-persian-gulf-aircraft](http://articles.philly.com/1995-08-28/news/25707805_1_uav-persian-gulf-aircraft) (contrasting the success and failure of initial drone use in Desert Storm to the use in the Bosnian conflicts).

<sup>15</sup> Compare Otto Kreisher, *Unmanned Spy Plane Built Here Joins Pentagon's Arsenal Today*, SAN DIEGO UNION-TRIBUNE, at A11 (Feb. 20, 1997), available at NewsBank, Record Number UTS1305761, with Chris Collins, *Report To Congress Says Navy Commanders Don't Want Hunter*, USA TODAY, at A10 (Dec. 5, 1995).

<sup>16</sup> See Lev Grossman, *Drone Home*, TIME (Feb. 11, 2013), available at <http://content.time.com/time/magazine/article/0,9171,2135132,00.html#ixzz2q91LWAZe> (noting the growth of the Pentagon's drone fleet).

<sup>17</sup> See Jeff Zeleny, *As Candidate, Obama Carves Antiwar Stance*, N.Y. TIMES (Feb. 26, 2007), [http://www.nytimes.com/2007/02/26/us/politics/26obama.html?pagewanted=all&\\_r=0](http://www.nytimes.com/2007/02/26/us/politics/26obama.html?pagewanted=all&_r=0) (reporting how then-Senator Barack Obama framed himself as the antiwar candidate in contrast to rival primary candidates who had voted in favor of the Iraq war).

<sup>18</sup> See Tom Curry, *Obama Continues, Extends Some Bush Terrorism Policies*, NBCNEWS.COM (Jun. 6, 2013, 11:27 AM), [http://nbcpolitics.nbcnews.com/\\_news/2013/06/06/18804146-obama-continues-extends-some-bush-terrorism-](http://nbcpolitics.nbcnews.com/_news/2013/06/06/18804146-obama-continues-extends-some-bush-terrorism-)

collateral damage, triggered ethical criticism of the U.S. government's reliance on the method.<sup>19</sup> Because this strategy, and the criticism, has become somewhat synonymous with the aircraft, drone proponents face a general public that associates the term drone with uses far from innocuous, commercial purposes.<sup>20</sup>

No one should confuse commercial drones, which are privately owned and used for private purposes, with military and law enforcement drones.<sup>21</sup> In comparison to military drones, commercial

---

policies (describing the extent to which President Obama, just in his first term, executed six times more targeted killing missions than over President Bush's entire presidency).

<sup>19</sup> See, e.g., Fred Kaplan, *Missing the Mark*, SLATE.COM (Feb. 7, 2013, 6:43 PM), [http://www.slate.com/articles/news\\_and\\_politics/war\\_stories/2013/02/brennan\\_hearings\\_the\\_senate\\_intelligence\\_committee\\_asked\\_all\\_the\\_wrong\\_questions.single.html](http://www.slate.com/articles/news_and_politics/war_stories/2013/02/brennan_hearings_the_senate_intelligence_committee_asked_all_the_wrong_questions.single.html) (scrutinizing a "Department of Justice White Paper" that supposedly reformed the military's drone employment after the President attempted to adjust policies to appease critics of targeted killings by drones); see also Harold Koh, Legal Adviser, U.S. Dep't of State, Address at the Annual Meeting of the American Society of International Law 12–14 (March 25, 2010) (transcript available at <http://www.lawfareblog.com/wp-content/uploads/2013/01/Speech-by-Harold-Hongju-Koh-State-Department-Legal-Adviser-at-the-Annual-Meeting-of-the-American-Society-of-International-Law-Mar-25-2010.pdf>) (responding to this criticism by justifying the use of drones for lethal actions against terrorists both in terms of international and domestic law).

<sup>20</sup> See Brian Fung, *Why Drone Makers Have Declared War On The Word 'Drone'*, WASH. POST (Aug. 16, 2013, 10:07 AM), <http://www.washingtonpost.com/blogs/the-switch/wp/2013/08/16/why-drone-makers-have-declared-war-on-the-word-drone/> ("The drone industry—sorry, the *unmanned aerial systems* industry—is in the midst of a massive rebranding campaign. For most Americans today, the word 'drone' conjures images of lethal spy planes raining missiles down on targets in foreign theaters of war. But that perception doesn't bode well for a burgeoning set of drone companies looking to shake up the civil aviation sector.") (emphasis in the original).

<sup>21</sup> Commercial drones, for the purpose of this Recent Development, include all non-hobbyist and non-research private uses of unmanned aircraft. The phrase is accepted in media use, such as the sources in these footnotes, but the FAA has traditionally used different terms, lumping commercial drones into its category of "civil drones" which includes all drones that are not "public" drones, drones "owned and operated by the government of a state, the District of Columbia, or a territory or possession of the U. S. or a political subdivision." *Unmanned Aircraft (UAS) Questions and Answers*, FED. AVIATION ADMIN. <http://www.faa>.

drones are cheaper, widely available to consumers, and, obviously, lack munitions such as hellfire missiles.<sup>22</sup> More importantly, the difference with law enforcement drones, under the law, is the simple difference of purpose that mirrors “aviation law’s longstanding distinction” dividing those aircraft used for private endeavors from aircraft used for a government purpose.<sup>23</sup> The difference in purpose is critical because, as discussed below in Part IV, the potential use of drones by law enforcement for surveillance fuels distrust among civil libertarians fearful that government drones will violate their privacy and other civil liberties.<sup>24</sup> The other difference is legality: under federal law, government operated drones are routinely given waivers to fly, while commercial drones are illegal.<sup>25</sup>

---

gov/about/initiatives/uas/uas\_faq/ #Qn5 (last visited Mar. 6, 2014) (answering that “What’s the difference between public and civil aircraft?”).

<sup>22</sup> See Chris Anderson, *We Shouldn't Fear Personal Drones*, TIME (Jan. 31, 2013), <http://ideas.time.com/2013/01/31/why-we-shouldnt-fear-personal-drones/?iid=op-main-lead> (“Personal versions are small, cheap and easy to use. They cost as little as \$300 and are GPS-guided fully-autonomous flying robots . . . . They fly themselves, from takeoff to landing, and can even follow the terrain for miles. There are already more in the hands of amateurs than the military, and some of the uses may surprise you. Civilian drones don’t just do the ‘dull, dirty and dangerous’ jobs better; they can also make the expensive ones cheaper.”).

<sup>23</sup> Bennett, *supra* note 8, at 2-3, n.7 (citing FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 331(4), 126 Stat. 11, 73 (2012)).

<sup>24</sup> See RICHARD M. THOMPSON II, CONG. RESEARCH SERV., R42701, DRONES IN DOMESTIC SURVEILLANCE OPERATIONS: FOURTH AMENDMENT IMPLICATIONS AND LEGISLATIVE RESPONSES, Summary (Apr. 3, 2013), *available at* <http://www.fas.org/sgp/crs/natsec/R42701.pdf> (“In the 113th Congress, several measures have been introduced that would restrict the use of drones at home. Several of the bills would require law enforcement to obtain a warrant before using drones for domestic surveillance, subject to several exceptions. Others would establish a regime under which the drone user must file a data collection statement stating when, where, how the drone will be used and how the user will minimize the collection of information protected by the legislation.”).

<sup>25</sup> See *infra* Part III.B.

### III. BACKGROUND OF FEDERAL LAW FOR AVIATION AND COMMERCIAL DRONE AIRCRAFT

Unlike other bodies of law, aviation law is relatively new and largely composed of federal regulations from the FAA. Congress created the FAA to regulate airspace, but a body of common law, which addresses individual property rights of landowners, precedes modern aviation and airspace laws. Today, the aspects of aviation law that will either hinder or advance the integration of commercial drones into the U.S. economy are not statutory, but rather are a combination of regulation, and, somewhat oddly, the common law.

#### A. *Ad Coelum, Causby, and the Common Law of Torts*

Before civilization began launching any type of aircraft, manned or unmanned, into the atmosphere, common law adopted the Roman maxim of *cujus est solum ejus est usque ad coelum et ad inferos* to answer the question of who owned the heavens and the earth.<sup>26</sup> This common law maxim established that the landowner owned all the space above and below his or her property, and any such interference would constitute a trespass.<sup>27</sup>

The advent of aviation challenged this notion when landowners located under the routes of aircraft used this common law premise to bring a litany of trespass and nuisance claims into courts against aircraft operators.<sup>28</sup> Initially, the courts lacked direction from

---

<sup>26</sup> See *Keeping Current—Property*, PROB. & PROP., Nov.–Dec. 2008, at 31 (“In law school many of us learned the old common-law maxim ‘cujus est solum, ejus est usque ad coelum et ad inferos,’ which is usually translated as meaning that the rights of the surface owner extend upwards to the heavens (ad coelum) and downward to the center of the earth (ad inferos).”).

<sup>27</sup> See *id.*

<sup>28</sup> See Walter S. King, *The Fifth Amendment Takings Implications of Air Force Aircraft Overflights and the Air Installation Compatible Use Zone Program*, 43 A.F. L. REV. 197, 198 (1997) (“These cases caught the American courts without a coherent legal doctrine with which to address the clashes between landowners and aviators. ‘To hold that every overflight was an actionable trespass would hamper the young industry and the military’s ability to train; yet, to allow every low-flying barnstormer to terrorize rural communities with no consequence seemed an equally bad alternative.’”) (citing and quoting Cahoon, *infra* note 41, at 161–62).

Congress, which later enacted the Air Commerce Act of 1926 in an effort to prevent the ancient rule from sundering the progress of modern aviation. The Air Commerce Act established the United States government was the “complete and exclusive” sovereign of airspace navigated by aircraft.<sup>29</sup> Congress then delegated the task of determining at what height navigable airspace begins to the Civil Aeronautics Authority, the FAA’s predecessor, which established the threshold at five hundred feet.<sup>30</sup>

In 1946, the Supreme Court fielded a Fifth Amendment challenge regarding the alleged taking of a North Carolina farmer’s airspace by a nearby Greensboro airport in *United States v. Causby*.<sup>31</sup> The Court sided with the plaintiffs,<sup>32</sup> who suffered from roars of low altitude bomber landings that were literally scaring their chickens to death.<sup>33</sup> Despite this narrow ruling for the farmers, *Causby* established a ceiling for landowner rights in relation to aircraft flying above.<sup>34</sup> In his majority opinion, Justice William O. Douglas employed language broadly backing the principles of the 1926 Air Commerce Act, and decisively nullified the ancient Roman doctrine as having “no place in the modern world,” at least with respect to the air above land.<sup>35</sup> Justice Douglas proclaimed that the United States would henceforth govern the heavens above

---

<sup>29</sup> *Id.* at 199 (citing 67 CONG. REC. 9386 (1926); Air Commerce Act of 1926, Pub. L. No. 69-254, 44 Stat. 568).

<sup>30</sup> *Id.* at 199.

<sup>31</sup> 328 U.S. 256 (1946).

<sup>32</sup> *Id.* at 267 (agreeing with the Court of Claims “that a servitude has been imposed upon the land”).

<sup>33</sup> *Id.* at 260 (“Since the United States began operations in May, 1942, its four-motored heavy bombers . . . come close enough at times to appear barely to miss the tops of the trees and at times so close to the tops of the trees as to blow the old leaves off. As a result of the noise, respondents had to give up their chicken business. As many as six to ten of their chickens were killed in one day by flying into the walls from fright. . . . The result was the destruction of the use of the property as a commercial chicken farm.”).

<sup>34</sup> *Id.* at 266 (“The airspace, apart from the immediate reaches above the land, is part of the public domain. We need not determine at this time what those precise limits are. Flights over private land are not a taking, unless they are so low and so frequent as to be a direct and immediate interference with the enjoyment and use of the land.”).

<sup>35</sup> *Id.* at 261.

through an equally simple maxim of law: “The air is a public highway, as Congress has declared.”<sup>36</sup>

In the legislative history for the Air Commerce Act of 1926, the House of Representatives specifically alluded to the Court’s jurisprudence on navigable waters under the interstate commerce clause.<sup>37</sup> Cases regarding navigable waterways, such as *Scranton v. Wheeler*,<sup>38</sup> established the paramount importance of commerce as “the basis of the power to regulate navigation and navigable waters and streams.”<sup>39</sup> By supporting the purpose of the Air Commerce Act of 1926 in *Causby*, Justice Douglas implicitly supported Congress’s analogy of the regulation of navigable airspace to the regulation of navigable waters under the interstate commerce clause.<sup>40</sup> Accordingly, from the dawn of aviation U.S. law has handled the regulation of airspace in the same way it views the regulation of navigable waterways: not as real estate where

---

<sup>36</sup> *Id.*

<sup>37</sup> See King, *supra* note 28, at 199 (“In fact, most of the provisions of the law were modeled on and often paraphrased from existing maritime laws. The House Report accompanying the bill stated: ‘... The declaration of what constitutes navigable air space is an exercise of the same source of power, the interstate commerce clause, as that under which Congress has long declared in many acts what constitute navigable or nonnavigable waters. The public right of flight in the navigable air space owes it[s] source to the same constitutional basis which, under the decisions of the Supreme Court, has given rise to a public easement of navigation in the navigable waters of the United States regardless of the ownership of the adjacent or subjacent soil.’”).

<sup>38</sup> In reference to the case itself, see 179 U.S. 141 (1900), but in reference to this connection, see King, *supra* note 28 at 201 (“In reaching this decision, the Court deferred to Congress’ conclusion that the airspace above the United States is a valuable public resource analogous to the navigable waters of the United States, an area where Congress’ vast authority to regulate is clearly recognized. The Supreme Court described Congress’ authority to regulate the navigable waters under the Commerce Clause, in *Scranton v. Wheeler*.”).

<sup>39</sup> *Scranton*, 179 U.S. at 160.

<sup>40</sup> See King *supra* note 28, at 199 (“As part of the Act, Congress established the ‘navigable airspace’ to provide the public with rights to the airspace above the United States analogous to those enjoyed by the public in the use of navigable waters.”) (citing 67 CONG. REC. 9891 (1926)).

ownership rights would be overriding,<sup>41</sup> but as an important channel of commerce.

*Causby* also addressed the practical problem of low-altitude flights that *did* implicate property rights by establishing how far up those property interests ran from the ground.<sup>42</sup> Though *Causby* dealt with a government taking, the holding also guided the adjudication of trespass claims against the private operation of aircraft.<sup>43</sup> The *Causby* standard, which established that a landowner must have “exclusive control of the immediate reaches of the enveloping atmosphere,”<sup>44</sup> now dictates the limits of tortious claims in state courts.<sup>45</sup>

As a result, to establish a trespass claim against aircraft above, a claimant must generally meet two elements.<sup>46</sup> First, the claimant must show that the invasion occurred within the “immediate

---

<sup>41</sup> See Colin Cahoon, *Low Altitude Airspace: A Property Rights No-Man's Land*, 56 J. AIR L. & COM. 157, 176–77 (1990) (describing how most courts applied *Causby*'s holding by either adopting an “ownership to a fixed height” zone theory of landowner rights, or an “effective possession” theory, which was even more limiting of landowners’ rights in relation to aircraft flights); see also *id.* at 165–66 (describing the two theories).

<sup>42</sup> *United States v. Causby*, 328 U.S. 256, 264 (1946) (“Otherwise buildings could not be erected, trees could not be planted, and even fences could not be run. . . . The landowner owns at least as much of the space above the ground as he can occupy or use in connection with the land.”) (citing *Hinman v. Pacific Air Transport*, 84 F.2d 755 (9th Cir. 1936)).

<sup>43</sup> ALISA M. DOLAN & RICHARD M. THOMPSON II, CONG. RESEARCH SERV., R42940, INTEGRATION OF DRONES INTO DOMESTIC AIRSPACE: SELECTED LEGAL ISSUES 10 (Apr. 4, 2013), available at <http://www.fas.org/sgp/crs/natsec/R42940.pdf> (“Although *Causby* arose from a Fifth Amendment takings claim, its articulation of airspace ownership standards is also often used in determining state law tort claims such as trespass and nuisance.”).

<sup>44</sup> 328 U.S. at 264.

<sup>45</sup> See RESTATEMENT (SECOND) OF TORTS § 159 (1965) (explaining in commentary that the “*Causby* holding has been held to supersede state law on the matter, so that liability for entry into the air space henceforth becomes a matter of Federal law. So far as aviation is concerned, private rights in the upper air no longer exist.”).

<sup>46</sup> *Id.* (establishing the two elements in Subsection 2 of the restatement provision).

reaches of the airspace” above to the claimant’s land.<sup>47</sup> Court opinions veer away from the formalism of a fixed height to define this standard, such as the FAA’s 500-foot navigable altitude; they instead focus on the impact of the flights on landowners’ reasonable use of the land below.<sup>48</sup> Accordingly, the law effectively defines this vague standard by the claim’s second element,<sup>49</sup> which is substantial interference with the “use and enjoyment of his land.”<sup>50</sup>

After *Causby*, only owners of properties near an airport could prove the necessary “substantial interference” with their property rights to sue. Piloted fixed-wing<sup>51</sup> aircraft—when not taking off or landing—fly too high for any landowner’s claim against their operation above to be valid.<sup>52</sup> Rotary-wing aircraft do not have similar restrictions and can fly safely and legally underneath the

---

<sup>47</sup> *Id.* (establishing this as the first of two elements for trespass by an overflying aircraft).

<sup>48</sup> DOLAN & THOMPSON, *supra* note 43, at 11 (“[T]o constitute an actionable trespass, an intrusion has to be such as to subtract from the owner’s use of the property.”) (citing, as representative of the general and prevailing rule, *Geller v. Brownstone Condominium*, 82 Ill. App. 3d 334, 336–37 (1980)).

<sup>49</sup> See RESTATEMENT (SECOND) OF TORTS § 159 (1965) (explaining in commentary that the *Causby* holding “has been held to supersede state law on the matter, so that liability for entry into the air space henceforth becomes a matter of Federal law. So far as aviation is concerned, private rights in the upper air no longer exist.”).

<sup>50</sup> *Id.* (establishing this as the second of two elements for trespass by an overflying aircraft).

<sup>51</sup> A fixed-wing aircraft has, literally, wings that do not move (i.e., a traditional airplane). In contrast, a rotary-wing aircraft uses blades that spin on a rotor, such as a helicopter. For a graphic explanation of the difference, see *F4U Corsair—How Do Airplanes Fly?*, CONNECCT KIDS, STATE OF CONNECTICUT (Feb. 23, 2010, 3:12 PM), <http://www.kids.ct.gov/kids/cwp/view.asp?q=330926> (providing helpful visuals and reference to further NASA links).

<sup>52</sup> This is not only a fact of common-sense safe operation, but also the reality of FAA regulation through the regulation of the FAA. The FAA requires operation at a minimum of 500 feet, the ‘line’ where navigable airspace begins, and in congested areas that minimum altitude rises to “1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.” See DOLAN & THOMPSON, *supra* note 43, at 2–3 (citing 14 C.F.R. § 91.119 (a) and (b) (2012)).

navigable airspace threshold.<sup>53</sup> In comparison to their fixed-wing brethren, they can easily avoid trespass claims by choice because they do not need to rise or descend through a lateral trajectory (over, for example, parcels of land adjacent to their landing zones).<sup>54</sup> In other words, helicopter pilots concerned about agitating landowners below can deliberately fly up into navigable airspace and then laterally across.

Though the government has established a clear domain above five hundred feet for the public highway of flight, commercial drones may need to fly at sub-navigable airspace altitudes for the duration of their flights.<sup>55</sup> Intuitively, drones would then risk running afoul of the very claims traditional aircraft avoid from their altitude and, in the case of helicopters, their vertical lift.

However, unique advantages of drones could also make them less susceptible to trespass and nuisance claims. Tort claims against modern aircraft usually arise because of the industrial scale of the activity: jet-powered commercial airliners repeatedly landing and taking off from a large airport can legitimately impact a landowner's property with their noise and vibration.<sup>56</sup> In contrast, the drones currently foreseen for commercial use<sup>57</sup> are far smaller, lighter, and quieter, and they are likely to have dispersed routes and a rotary-wing design to retain the aforementioned vertical lift and landing capabilities that minimize the nuisance of helicopters

---

<sup>53</sup> See DOLAN & THOMPSON, *supra* note 43, at 3 (citing 14 C.F.R. § 91.119 (d) (2012)).

<sup>54</sup> *Id.* at 3 n.24 (citing the reasoning, explained in *People v. Sabo*, 185 Cal. App. 3d 845, 852 (1986), to show that even when a helicopter is legally below “navigable airspace” it is nonetheless “lawfully operated” so long as it “hover[s] above the surface of the land in such fashion as not to constitute a hazard to persons or property”).

<sup>55</sup> *Id.* at 12 (“Low-flying drones are more likely to invade the immediate reaches of the surface property, thus satisfying part of the requirement for a takings or trespass claim.”).

<sup>56</sup> *Id.* at 11–12 (describing how these factors are greater with modern aircraft than can reasonably be foreseen with drone aircraft, “especially given that current case law heavily emphasizes the impact of the flight on use and enjoyment of the surface property”).

<sup>57</sup> See *infra* Part V.A. (Section on Drone Uses).

relative to traditional airplanes.<sup>58</sup> Accordingly, properly flown commercial drones do not offer any more threat of tort problems than current aircraft, and far less than the bombers in *Causby*, despite their lower flight altitudes. Integration of commercial drones into the national airspace poses little risk of many of the legal concerns associated with private property rights.

B. *The Federal Aviation Administration Crawls Forward on Commercial Drones*

Since 2007, FAA regulations, while sometimes sidestepped by small-scale drone enthusiasts and academic researchers,<sup>59</sup> have effectively barred drone aircraft for commercial purposes.<sup>60</sup> The FAA enacted a moratorium because the agency recognized “non-military UAS were morphing from recreational playthings into genuine aircraft able to fly hundreds of miles, reach elevations above 10,000 feet and carry a sizable payload[.]”<sup>61</sup> As the FAA

---

<sup>58</sup> DOLAN & THOMPSON, *supra* note 43, at 12 (“If drone use remains decentralized and is not organized around an ‘airport,’ then drones are less likely to fly repeatedly over the same piece of property, creating fewer potential takings, trespass, or nuisance claims. Additionally, the majority of drones are more likely to operate like helicopters, taking off and landing vertically, than like traditional fixed-wing aircraft. This method of takeoff reduces the amount of surface the aircraft would have to fly over before reaching its desired flying altitude, minimizing the potential number of property owners alleging physical invasion of the immediate reaches of their surface property.”).

<sup>59</sup> Interview with Lars Soltman, aeronautics engineering doctoral student, North Carolina State University, in Raleigh, N.C. (stating that non-hobbyist researchers generally work with the FAA to perform non-commercial drone test flights); *see also* Hon. Brian Stern & Matthias Rubekeil, *Coming Home to Roost - Domestic Use of Unmanned Aerial Vehicles*, R.I. B.J., November/December 2013, at 5, 9 (“[H]obbyists or enthusiasts . . . are neither required nor able to obtain COAs or special airworthiness certificates. . . . [Hobbyists can] operate their drones under the FAA model aircraft advisories as long as they abstain from flying their aircraft for business purposes.”) (citing Federal Aviation Administration, Model Aircraft Operating Standards, Advisory Circular 91-57 (1981)).

<sup>60</sup> FAA, *Unmanned Aircraft Operations in the National Airspace System*, 72 Fed. Reg. 6689 (Feb. 13, 2007) available at [http://www.faa.gov/about/initiatives/uas/reg/media/frnotice\\_uas.pdf](http://www.faa.gov/about/initiatives/uas/reg/media/frnotice_uas.pdf).

<sup>61</sup> Rick Newman, *Despite Amazon’s Big Plans, the Feds Are Grounding the Drone Industry*, YAHOO! FINANCE (Dec. 16, 2013, 10:38 AM), <http://finance>.

recognized that these machines were becoming legitimate aircraft rather than simply remote-controlled toys, it also assessed that they failed critical legal criteria to fly in U.S. airspace. Such legal criteria focused on the fact that drones could not “see and avoid” other aircraft.<sup>62</sup> The nature of drones, at least given the level of sophistication of drone technology at the time of the FAA’s 2007 ban, made “see and avoid” an impossible criterion given the narrow perspective offered by a drone’s camera lens:<sup>63</sup> “Not even the most lens-laden drone can ‘see’ neighboring air traffic like an ordinary pilot can.”<sup>64</sup> Other plainly inapplicable standards, such as window durability, highlighted the FAA’s need to draft drone-specific criteria if the agency were to insist on drones passing FAA regulations.<sup>65</sup>

The FAA *does* issue permission slips, Certificates of Authorization (“COAs”), which grant permission for drone use by government entities, such as law enforcement and other public safety entities.<sup>66</sup> The FAA has also issued handful of “experimental

---

yahoo.com/blogs/the-exchange/if-amazon-and-jeff-bezos-really-want-to-fly-drons--they-should-consider-what-happened-to-this-company-155839191.html (describing the rationale behind the rule change, and noting that “[t]his) was a de facto ban on the commercial use of drones until the FAA came up with formal rules governing their use.”).

<sup>62</sup> See 14 C.F.R. § 91.113 (2013) (mandating “vigilance [of] each person operating an aircraft so as to see and avoid other aircraft”).

<sup>63</sup> Memorandum, *Unmanned Aircraft Systems Operations in the U.S. National Airspace System—Interim Approval Guidance*, FAA 2 (Sept. 16, 2005) available at [http://www.eoss.org/faa/AFS\\_400\\_UAS\\_POLICY\\_05\\_01.pdf](http://www.eoss.org/faa/AFS_400_UAS_POLICY_05_01.pdf) (“If [drone] operators were held rigorously to the ‘see and avoid’ requirements of Title 14, Code of Federal Regulations (14 CFR) part 91.1131, Right-of-Way Rules, there would be no [drone] flights in civil airspace.”).

<sup>64</sup> Bennett, *supra* note 8, at 12.

<sup>65</sup> See *id.* at 11 (citing 14 C.F.R. § 23.775).

<sup>66</sup> DOLAN & THOMPSON, *supra* note 43, at 12 (“Drones operated by federal, state, or local agencies must obtain a certificate of authorization or waiver (COA) from the FAA. After receiving COA applications, the FAA conducts a comprehensive operational and technical review of the drone and can place limits on its operation in order to ensure its safe use in airspace.”) (citing FAA’s process explained on its website, [www.faa.gov/about/initiatives/uas/cert](http://www.faa.gov/about/initiatives/uas/cert)).

certificates”<sup>67</sup> to allow research on safe drone flight, but these waivers are explicitly for non-commercial ventures.<sup>68</sup> Essentially, the FAA’s current stance is that it will not open the sky generally for commercial drone flight because drones do not meet the safety standards created for piloted planes.<sup>69</sup>

Following the December 2013 publicity of Amazon’s Prime Air program, the FAA publicly clarified that it has only authorized a single commercial drone operation, which is in the Arctic,<sup>70</sup> and that, in general, autonomous drone operation “is not currently allowed in the United States.”<sup>71</sup> The use of the word “currently” in the FAA’s clarification heralds the work of the agency in drafting a regulatory framework that will permit the safe integration of

---

<sup>67</sup> The full name of these waivers are “special airworthiness certificates in the experimental category.” *Unmanned Aircraft Operations in the National Airspace System*, 14 CFR Part 91, Docket No. FAA-2006-25714, 4 DEP’T OF TRANSP., available at [http://www.faa.gov/about/initiatives/uas/reg/media/frnotice\\_uas.pdf](http://www.faa.gov/about/initiatives/uas/reg/media/frnotice_uas.pdf) (“Under FAA policy, operators who wish to fly an unmanned aircraft for civil use must obtain an FAA airworthiness certificate the same as any other type aircraft. The FAA is currently only issuing special airworthiness certificates in the experimental category. Experimental certificates are issued with accompanying operational limitations (14 CFR § 91.319) that are appropriate to the applicant’s operation. The FAA has issued five [such certificates] for the purposes of research and development, marketing surveys, or crew training.”).

<sup>68</sup> *Id.* (“UAS issued experimental certificates may not be used for compensation or hire.”).

<sup>69</sup> See Bennett, *supra* note 8, at 12 (“Of course, simply because a drone cannot satisfy every jot and tittle of federal aviation law does not mean it can never be operated safely. The FAA long has recognized this, by authorizing domestic UAS operations on a case-by-case basis. The agency’s approach has been to consider individual requests to exempt UAS from otherwise prohibitive aviation rules.”).

<sup>70</sup> Brendan Sasso & Keith Laing, *Door-To-Door Drones Spook Lawmakers*, THE HILL (Dec. 2, 2013, 8:32 PM), <http://thehill.com/blogs/hillicon-valley/technology/191844-door-to-door-drones-spook-lawmakers> (publishing the FAA statement as a response to the newspaper’s inquiry following the Amazon segment on 60 Minutes).

<sup>71</sup> Scott Mayerowitz, *Amazon’s Delivery Drones: An Idea That May Not Fly*, ASSOCIATED PRESS (Dec. 3, 2013, 12:06 AM), <http://bigstory.ap.org/article/amazoncom-sees-delivery-drones-future> (publishing the FAA statement).

commercial drones into the national airspace system.<sup>72</sup> Congress mandated the FAA complete this framework of drone integration by September 30, 2015, through the Federal Aviation Administration Modernization & Reform Act of 2012 (“FMRA”).<sup>73</sup> However, Congress’s failure to include penalties in the bill for the FAA’s failure to meet interim benchmarks puts the 2015 deadline into question.<sup>74</sup> The FAA already failed to meet one significant “deadline” within the first year after the statute was effective<sup>75</sup> and has interpreted other benchmarks broadly to meet them on technicalities.<sup>76</sup> The FAA finally met the benchmark it first missed—the August 2012 deadline for a test program<sup>77</sup>—a year

---

<sup>72</sup> For the most explicit, comprehensive, and updated public benchmark towards this goal, see FAA, INTEGRATION OF CIVIL UNMANNED AIRCRAFT SYSTEMS (UAS) IN THE NATIONAL AIRSPACE SYSTEM (NAS) ROADMAP, FIRST EDITION, (2013).

<sup>73</sup> See FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 332, 126 Stat. 11, 73 (2012). (mandating that the Department of Transportation “develop a comprehensive plan to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system”).

<sup>74</sup> See Bennett, *supra* note 8, at 3 (“In places, FMRA employs vaguely worded objectives, and it doesn’t always require the agency to take precisely measurable steps. There is no penalty for tardiness in the statute, for example. If the FAA misses a must-do-by date, the agency may have to reckon with congressional pressure and stakeholder disapproval. But there’s no formal compliance mechanism to hurry the agency along. In this and other ways, FMRA leaves the FAA some room to maneuver, and can sow confusion about precisely what the agency must achieve between now and 2015.”).

<sup>75</sup> Saurabh Anand, *Hovering on the Horizon: Civilian Unmanned Aircraft*, 26 THE AIR & SPACE LAW.1 (2013). The FMRA required the FAA to “establish the test site program by August 10, 2012” but the FAA had failed by the end of the year “to select operators to set up and manage the test sites.” *Id.*

<sup>76</sup> See Bennett, *supra* note 8, at 7–8 (citing a Government Accountability Office report on the FAA’s progress showing FAA had “not yet accomplished” August 12, 2012 benchmarks, despite the FAA’s claims to the contrary, and offering the FAA’s “loose language” as the explanation of the discrepancy).

<sup>77</sup> *Id.* at 8. Acting Administrator Michael Huerta wrote that:

[C]onsistent with FMRA’s language, the UAS test site program in fact had been ‘established on March 9, well in advance of the August 12, 2012, deadline[;]’ the FAA also had sought and received comments from interested members of the public. As a nitpicky, textual matter, the agency thus had not flouted FMRA—at least in Huerta’s view. The

and half later when it announced six test sites throughout the nation in early 2014.<sup>78</sup>

Supporters of drone integration applaud the steps the FAA *has* taken, if belatedly, but they lament the speed of the FAA's development and its reluctance to take more initiative in permitting more than the single Arctic commercial venture.<sup>79</sup> In particular, the FAA has not "use[d] the authority granted by Congress in Section 333 of the [FMRA] to allow for some limited [commercial drone] operations before the rule is finalized, especially in areas where there is little risk to manned aircraft or people on the ground, such as around power lines, pipelines and rural farms."<sup>80</sup> The FAA's sluggish bureaucracy and excessive caution, however, are not the only hindrances to the progress of commercial drones.

#### IV. AMERICANS' HOSTILITY TO COMMERCIAL DRONES

Americans' hostility to drones likely originates from their stigmatized association with the death and destruction they harbinger overseas to terrorist targets.<sup>81</sup> This stigma may have lit

---

GAO and Congressional Research Service both disagreed, and concluded the FAA had missed a deadline.)

*Id.*

<sup>78</sup> *Fact Sheet—Unmanned Aircraft Systems (UAS)*, FED. AVIATION ADMIN. (Jan. 6, 2014), [http://www.faa.gov/news/fact\\_sheets/news\\_story.cfm?newsId=14153](http://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=14153) (naming the six sites, half of which are universities and none of which are commercial enterprises, and noting the primary role that "geographic and climatic diversity" played in the selection).

<sup>79</sup> See Keith Long, *Drone Makers Want FAA To Start Use Now*, THE HILL (Jan. 27, 2014, 3:43 PM), <http://thehill.com/blogs/transportation-report/aviation/196528-drone-makers-want-faa-to-start-use-now> (observing how the professional association that represents "the unmanned systems and robotics community" notes the FAA's completion of FMRA milestones, but that the association still stresses that the FAA should do more under the law).

<sup>80</sup> *Id.* (quoting the association's President in an open letter to the FAA).

<sup>81</sup> See Grossman, *supra* note 16 (discussing the history of military drones and the uncertainty in international law of the ethics of their employment, particularly for "signature strikes" against unknown targets that match characteristic profiles of generic terrorists). Grossman summarizes the current situation, stating "signature strikes" against unknown targets that match characteristic profiles of generic terrorists. *Id.* Grossman further states:

the flame, but many Americans also fear the use of drones by law enforcement for surveillance, viewing such practices as violations of their civil liberties.<sup>82</sup> Given the technological capabilities of drones, combined with enhancements to digital camera technology, the potential abuse of drones for improper surveillance is a valid concern.<sup>83</sup> Public polling indicates only cautious support of drones with enthusiasm muted based upon potentially invasive use by law enforcement.<sup>84</sup> Many law enforcement agencies have proven eager to use drones' surveillance capabilities in the course of their work.<sup>85</sup> The result is a bipartisan fear of drone employment, shared

---

Bottom line: the U.S. seems to be struggling to adapt its 20th century moral code of warfare to the 21st century practice of sending flying robots into other countries to kill people. It appears that drones are evolving faster than Americans' ability to understand how, legally and ethically, to use them.

*Id.*

<sup>82</sup> See *Domestic Drones*, AM. CIVIL LIBERTIES UNION, <https://www.aclu.org/blog/tag/domestic-drones> (last visited Feb. 27, 2014) ("U.S. law enforcement is greatly expanding its use of domestic drones for surveillance. Routine aerial surveillance would profoundly change the character of public life in America. Rules must be put in place to ensure that we can enjoy the benefits of this new technology without bringing us closer to a 'surveillance society' in which our every move is monitored, tracked, recorded, and scrutinized by the government."). For an example of some Americans even more concerned than the ACLU, see <http://dronepatrol.thesleuthjournal.com/>.

<sup>83</sup> See Grossman, *supra* note 16 ("The GAO report also mentioned 'privacy concerns over the collection and use of UAS-acquired data.' A lot of people share those concerns. Drones are the most powerful surveillance tool ever devised, on- or offline. A Reaper drone equipped with the Air Force's appropriately named Gorgon Stare sensor package, for example, can surveil an area 2½ miles across from 12 angles at once. Its field of view swallows entire cities. The Pentagon's Defense Advanced Research Projects Agency (DARPA) has produced an imaging system called ARGUS that can pick out an object 6 in. long from 20,000 ft. in the air.").

<sup>84</sup> See THOMPSON, *supra* note 24, at 1 (citing U.S. SUPPORTS SOME DOMESTIC DRONE USE, BUT PUBLIC REGISTERS CONCERN ABOUT OWN PRIVACY 1, MONMOUTH UNIV. POLLING INSTITUTE (2012)).

<sup>85</sup> See Hunter Stuart, *Drone List Released By FAA Shows Which Police Departments Want To Fly Unmanned Aerial Vehicles*, HUFFINGTON POST (Feb. 8, 2012, 10:36 PM), [http://www.huffingtonpost.com/2013/02/08/drone-list-domestic-police-law-enforcement-surveillance\\_n\\_2647530.html](http://www.huffingtonpost.com/2013/02/08/drone-list-domestic-police-law-enforcement-surveillance_n_2647530.html) ("Seventeen police departments and sheriff's offices across the country have also filed [for

among both Democrats and Republicans weary of government abuse of drone capabilities and convinced that “unmanned aircraft on American soil infringes upon fundamental privacy interests and the ability to freely associate with others.”<sup>86</sup> But for many politicians from both parties, privacy fears are the driving issue in domestic drone debate.<sup>87</sup> Unsurprisingly, when the FAA missed its deadline to establish test sites, the agency partially blamed privacy accommodation.<sup>88</sup>

In response to the concern that drones threaten constitutional rights to privacy, local and state governments have begun to act independently to ban drone use. Idaho enacted the nation’s first state-wide ban on law enforcement’s use of surveillance drones without a warrant; the ban began on July 1, 2013.<sup>89</sup> Virginia

---

FAA permission to use drones.]”); *see also* Carol Cratty, *FBI Uses Drones for Surveillance in U.S.*, CNN.COM (June 20, 2013, 7:27 AM), <http://www.cnn.com/2013/06/19/politics/fbi-drones/> (reporting on the use by federal law enforcement).

<sup>86</sup> *See* THOMPSON, *supra* note 24, at 1 (citing bipartisan efforts in Congress); *see also* Cameron Cloar, *Drones Cast Lengthening Shadows One Year After Passage of FAA Modernization and Reform Act*, BLOOMBERG BNA, available at <http://www.nixonpeabody.com/127088> (noting how the ACLU and the Tea Party lobbied in favor of the drone moratorium that Virginia enacted in 2013).

<sup>87</sup> *See* Eric Engleman & Alan Levin, *Drone Spying in U.S. Skies Prompts Privacy Plans Slowing Flights*, BLOOMBERG NEWS (Feb. 13, 2013, 1:43 PM), <http://www.bloomberg.com/news/2013-02-13/drone-spying-in-u-s-skies-prompts-privacy-plans-slowing-flights.html> (“Lawmakers from both parties are seeking privacy safeguards for drone activities in U.S. skies. Representative Ed Markey, a [Mass.] Democrat, Representative Ted Poe, a Texas Republican, and Senator Rand Paul, a Kentucky Republican, plan to reintroduce separate drone privacy measures this year. Senate Judiciary Chairman Patrick Leahy, a Vermont Democrat, said last month he will scrutinize police use of drones.”).

<sup>88</sup> *Id.* (“The FAA missed its Dec. 31 target for naming six test sites for drone flights, citing in part the need to address privacy issues.”).

<sup>89</sup> *See* Allie Bohm, *The First State Laws on Drones*, AM. CIVIL LIBERTIES UNION (Apr. 14, 2013, 3:13PM), <https://www.aclu.org/blog/technology-and-liberty-national-security/first-state-laws-drones>. For the Idaho ban, *see* S.B. 1134, 62nd Leg., 1st Reg. Sess. (Idaho 2013), available at <http://www.legislature.idaho.gov/legislation/2013/S1134E2.pdf> (“Absent a warrant, and except for [emergency response situations], no person, entity or state agency shall use [a drone] to intentionally conduct surveillance of, gather evidence or

enacted a two-year moratorium with similar language that came into effect on the same day.<sup>90</sup> The American Civil Liberties Union (“ACLU”) supports the adoption of similar state legislation nationally.<sup>91</sup> The ACLU focuses its anti-drone campaign on law enforcement’s use (and abuse) of drone technology,<sup>92</sup> though the organization’s phobia of police drones overall seeps into its view of commercial drones.<sup>93</sup> However, when the FAA announced the six test sites necessary for the agency to move forward on its schedule of creating a national drone regulatory framework, the ACLU conceded that four of the six states selected as test sites had already enacted drone legislation to protect personal privacy.<sup>94</sup> This shows how states can both reasonably regulate law enforcement drones while still recognizing the value in—and acting in support of—commercial drone integration.

Reasonable regulation can facilitate the stable growth of any new mode of commerce. However, some actions taken by state and local governments regarding drone regulation arose from fear rather than prudent governance. Most famously—or infamously—is the tiny municipality of Deer Trail, Colorado, which issued \$25

---

collect information about, or photographically or electronically record specifically targeted persons or [property] . . .”).

<sup>90</sup> Bohm, *supra* note 89. For the Virginia moratorium, see H.B. 2012, 2013 Sess. (Va. 2013), available at <http://lis.virginia.gov/cgi-bin/legp604.exe?131+sum+HB2012> (amending VA. CODE ANN. § 15.2-836).

<sup>91</sup> See Allie Bohm, *Status of Domestic Drone Legislation in the States*, AM. CIVIL LIBERTIES UNION (Feb. 15, 2013, 3:13 PM), <https://www.aclu.org/blog/technology-and-liberty/status-domestic-drone-legislation-states>.

<sup>92</sup> See AM. CIVIL LIBERTIES UNION, *supra* note 82 (“Rules must be put in place to ensure that we can enjoy the benefits of this new technology without bringing us closer to a ‘surveillance society’ in which our every move is monitored, tracked, recorded, and scrutinized by the government.”).

<sup>93</sup> Jay Stanley, *Amazon and Drones*, AM. CIVIL LIBERTIES UNION (Dec. 3, 2013, 8:04 AM) <https://www.aclu.org/blog/technology-and-liberty/amazon-and-drones> (addressing the Amazon announcement with great caution, and stating the ACLU’s hope that “the company will see clearly that the fate of this technology is inextricably tied to the privacy questions that surround it . . .”).

<sup>94</sup> Allie Bohm, *Drone Test Site Selections Belie State Anti-Privacy Argument*, AM. CIVIL LIBERTIES UNION (Jan. 3, 2014, 1:40 PM), <https://www.aclu.org/blog/technology-and-liberty/drone-test-site-selections-belie-state-anti-privacy-argument>.

hunting licenses for shooters to target drones, particularly those “owned or operated by the United States federal government.”<sup>95</sup> The FAA warned the would-be Deer Trail drone hunters that shooting at such airborne aircraft could be a criminal act subject to prosecution.<sup>96</sup> Notwithstanding the FAA’s alacrity in response to Deer Trail, the FAA’s own aforementioned bureaucratic sluggishness is partially to blame. As the FAA inches forward, the spread of the technology’s availability speeds past the agency’s plodding regulatory process. State-level politicians, whether legitimately concerned about social consequences from a new technology or simply demagoguing drone stigma for votes, have sprung into action nationwide. Oregon legislators, concerned that FAA guidelines were not growing in parallel with the growth of drone interest, pondered creating their own airspace.<sup>97</sup> Many other states initiated their own exploration of a legal framework for drones, despite the FAA’s supposed efforts on that front, with Alaska launching a task force, Indiana delegating the task to a council, and Hawaii creating a drone aviation training program.<sup>98</sup>

---

<sup>95</sup> See Joan Lowry, *FAA Warns Public Against Shooting Guns At Drones*, DENVER POST (July 19, 2013, 12:47 PM), [http://www.denverpost.com/politics/ci\\_23693787/faa-warns-public-against-shooting-guns-at-drones](http://www.denverpost.com/politics/ci_23693787/faa-warns-public-against-shooting-guns-at-drones) (“The permits would cost \$25 each. The town would also encourage drone hunting by awarding \$100 to anyone who presents a valid hunting license and identifiable pieces of a drone that has been shot down.”). Regarding the focus on federal drones, see Kristen Wyatt, *Colorado Town Mulls Drone Hunts To Decry Spying*, DENVER POST (Aug. 22, 2013, 1:59 AM), [http://www.denverpost.com/news/ci\\_23915556/colorado-town-mulls-drone-hunts-decry-spying](http://www.denverpost.com/news/ci_23915556/colorado-town-mulls-drone-hunts-decry-spying).

<sup>96</sup> *Id.* (“The [FAA] reminded the public that it regulates the nation’s airspace, including the airspace over cities and towns. A drone ‘hit by gunfire could crash, causing damage to persons or property on the ground, or it could collide with other objects in the air,’ the statement said. ‘Shooting at an unmanned aircraft could result in criminal or civil liability, just as would firing at a manned airplane.’”).

<sup>97</sup> Jason Koebler, *Oregon Drone Bill Would Claim the ‘Airspace’ Above Your Shoestrings*, US NEWS (Jan. 31, 2013), <http://www.usnews.com/news/articles/2013/01/31/oregon-drone-bill-would-claim-the-airspace-above-your-shoestrings> (“Proponents of the bill are trying to get ahead of a nationwide push to set rules for unmanned aerial vehicle use by civilians, which some advocates worry could intrude on personal privacy.”).

<sup>98</sup> *2013 Unmanned Aircraft Systems (UAS) Legislation*, NAT’L CONFERENCE OF STATE LEGISLATURES, <http://www.ncsl.org/research/civil-and-criminal->

At the close of the 2013 state legislative sessions, only a small handful of state legislatures had not considered any drone bills.<sup>99</sup>

The majority of state bills considered in 2013 sought to restrain law enforcement drones, but there is evidence of a general anti-drone bias in the states absent assertive FAA governance.<sup>100</sup> Thirteen states enacted legislation regarding drone activity, and two of those bills severely restricted commercial drones, despite their supposed illegal status already under the FAA's 2007 letter.<sup>101</sup> The ACLU itself conceded that Idaho, one of the first states to effectuate a drone law, had enacted privacy provisions so sweeping "that they would likely prohibit a news station from using a drone to gather information for their traffic report absent written consent of everyone on the road."<sup>102</sup> Texas later followed suit and criminalized the use of drones with surveillance capabilities as a Class C misdemeanor.<sup>103</sup> The Texas statute includes a litany of exceptions, including permitted uses that range from showcasing

---

justice/unmanned-aerial-vehicles.aspx (last visited March 3, 2013) [hereinafter NAT'L CONFERENCE].

<sup>99</sup> The count varied slightly from two sources, with one citing seven and the other eight, but with each noting different states in the counts as well. *Compare* Bohm, *supra* note 91 (stating 43 states have, at some point, considered legislation) with Dan Soloman, *Texas's Drone Law Is Pretty Much The Opposite Of Every Other State's Drone Law*, TEXAS MONTHLY (Sep. 16, 2013, 7:24 PM), <http://www.texasmonthly.com/daily-post/texas-drone-law-pretty-much-opposite-every-other-states-drone-law> (stating only eight states have not considered legislation, but including some states that the ACLU is tracking as having considered bills) and NAT'L CONFERENCE, *supra* note 98 (noting only seven states).

<sup>100</sup> See NAT'L CONFERENCE, *supra* note 98 (showing the trends across state governments).

<sup>101</sup> See FAA, *Unmanned Aircraft Operations in the National Airspace System*, *supra* note 60.

<sup>102</sup> Bohm, *supra* note 89. Idaho's law became effective the same day as Virginia's. *Id.*

<sup>103</sup> H.B. 912, 83d Leg. (Tex. 2013); see also *Texas Restricts Civilian Drone Usage, Leaves Exclusive Rights To Authorities*, RUSSIA TODAY (Sept. 17, 2013, 11:20 AM), <http://rt.com/usa/texas-drones-new-rules-876/>.

real estate agents to, ironically, law enforcement, the entity most state drone laws target.<sup>104</sup>

Alternately, states could—and some tentatively do—embrace the commercial potential drones bring. Opportunities for individual states exist most prominently in promoting new industries. Seven state legislatures recognized the economic promise of commercial drones in 2013 and “adopted resolutions to recognize the benefits of a thriving UAS industry in their state.”<sup>105</sup> For example, Georgia’s Department of Economic Development aims to blend expertise at universities, such as Georgia Tech, with existing aerospace and farming sectors for what one drone supporter dubs a “perfect storm” for progress, prosperity and jobs.<sup>106</sup> Similarly, legislators in Sacramento passed tax incentives to entice the job-making business of drone manufacturing to California.<sup>107</sup> Both states have launched their bids to become drone hubs while limiting police drone use as a separate issue,<sup>108</sup> thus showing how a distinction between commercial use and law enforcement use of drones is possible.

## V. THE BENEFITS OF THE UNITED STATES GIVING COMMERCIAL DRONES A GREEN LIGHT

The benefits that commercial drones could serve are often lost amidst the fear non-commercial drones inspire on the American

---

<sup>104</sup> H.B. 912, 83d Leg. (Tex. 2013). Regarding the interstate comparison, *see* Bohm, *supra* note 91.

<sup>105</sup> NAT’L CONFERENCE, *supra* note 98.

<sup>106</sup> Amy Wenk, *Drone Industry Taking Off In Georgia*, ATLANTA BUSINESS CHRONICLE (Feb. 1, 2013, 6:00 AM) <http://www.bizjournals.com/atlanta/print-edition/2013/02/01/drone-industry-taking-off-in-georgia.html?page=all>.

<sup>107</sup> Allie Bohm, *Drone Legislation: What’s Being Proposed in the States?*, AM. CIVIL LIBERTIES UNION (Mar. 6, 2013, 3:15 PM), <https://www.aclu.org/blog/technology-and-liberty-national-security/drone-legislation-whats-being-proposed-states> (citing A.B. 1326, 2013-2014 Reg. Sess. (Cal. 2014) *available at* <http://legiscan.com/CA/text/AB1326/id/758287>).

<sup>108</sup> *Id.* (noting that both states require probable cause prior to police use of drones, and California’s law also “require[s] law enforcement to justify to their city councils or other local governing body their need for a drone before acquiring one” and Georgia’s bill “allows drone use only to investigate felonies—not misdemeanors”).

public. These benefits are immeasurably numerous, and are only limited by the imagination of commerce itself. A humorous hoax—the Tacocopter for the San Francisco Bay taco-loving consumer—proved that the public hungers for this science fiction to become a reality.<sup>109</sup> Multiple media organizations began to pick up on the business venture only to learn that the creators, with some humor, sought to make two critical points with their Tacocopter farce.<sup>110</sup> First, they wanted to strike at the “death robot contexts” the public often associates with drone aircraft by presenting the “safe and hilarious” concept that drones would instead bring a consumer a taco order.<sup>111</sup> Second, the creators wanted people to think about the possibility of the everyday use of drones and how they could contribute to local communities because no technological barrier prevents the operation of such an enterprise.<sup>112</sup> Instead, the barriers are simply legalization of drones and the normal challenges of any startup delivery business: “optimal routing, human safety, dealing with wind and weather, vehicle control, taco delivery handoff and taco impact, and pricing.”<sup>113</sup>

---

<sup>109</sup> As of this writing, the facetious Tacocopter site was still active. TACOCOPTER, <http://tacocopter.com/> (last visited Feb. 24, 2014).

<sup>110</sup> See Christinna Bonnington, *Tacocopter: The Coolest Airborne Taco Delivery System That’s Completely Fake*, WIRED (Mar. 23, 2012, 7:12 PM), <http://www.wired.com/gadgetlab/2012/03/qa-with-tacocopter/> (interviewing the creators of the site).

<sup>111</sup> *Id.* (quoting Tacocopter co-creator and MIT graduate student Star Simpson in an interview that “[t]he other motivation is that we basically only hear about quadrotors in scary contexts, and I think it does give that fear and emotional tension a safe and hilarious outlet”).

<sup>112</sup> *Id.* (“Simpson cautiously thinks something like Tacocopter could become a reality in the future, but for now, the system described by the Tacocopter website is difficult to accomplish in reality: Under FAA guidelines, commercial use of unmanned aerial vehicles, or UAVs, is only possible with an incredibly difficult-to-obtain license. If the FAA did relax its regulations, Simpson thinks ‘a network of command and recharging centers attached to kitchens capable of fulfilling demand orders could easily satisfy the taco delivery needs of a metropolitan area like San Francisco.’”).

<sup>113</sup> *Id.*

A. *The Untapped Potential of Commercial Drone Technology*

Drone applications offer possibilities just as varied, and certainly no less interesting, in industries where their use may be far more feasible and socially beneficial than eye-catching retail deliveries.<sup>114</sup> The irony is that the public perception of drones as a dangerous technology stymies the use of a tool that can actually make many industries safer.

The energy sector offers a compelling example. The BP oil spill in the Gulf of Mexico made America aware of the working hazards and environmental risks of extracting oil.<sup>115</sup> At the BP facilities in Alaska, “gas flares” burn off excess gas as a safety feature, but this same safety feature prevents inspection without rig closures that cost millions of dollars.<sup>116</sup> Drones could change the math; a BP drone could “spot a crack in one of the nozzles while it was still burning” and safely and efficiently order corrective parts without putting workers’ safety at risk.<sup>117</sup>

Similarly, when the Tokyo Electric Power Company needed insight into the dizzying problems springing from the radioactive cauldron of what was left of their Fukushima reactor, only a flying robot could safely perform the task.<sup>118</sup> Working from little more

---

<sup>114</sup> For a brief synopsis of the challenges ahead for Amazon’s Prime Air, namely safety, hacking, and theft, see Lauren Orsini, *To Deliver With Prime Air Drones, Amazon Has To Solve These 3 Problems*, READWRITE.COM (Dec. 2, 2013), <http://readwrite.com/2013/12/02/for-prime-air-to-become-a-reality-amazon-must-solve-these-problems-first#awesm=~ot4jqk09fiK5rk>.

<sup>115</sup> Beyond the environmental impact of the spill itself, the infamous Deepwater Horizon explosion and fire killed eleven oil workers on the rig BP leased. See Associated Press, *Gulf Oil Spill Deaths: The 11 Rig Workers Who Died During The BP Deepwater Horizon Explosion*, HUFFINGTON POST (Nov. 15, 2012, 4:09 PM), [http://www.huffingtonpost.com/2012/11/15/gulf-oil-spill-deaths\\_n\\_2139669.html](http://www.huffingtonpost.com/2012/11/15/gulf-oil-spill-deaths_n_2139669.html) (naming all the workers and providing a short biography of each).

<sup>116</sup> Noah Shachtman, *Flying-Robot Cops, Farmers, and Oil Riggers Get to Work*, WIRED (June 22, 2012, 6:30 AM), [http://www.wired.com/dangerroom/2012/06/ff\\_dronesatwork/#slideid-128041](http://www.wired.com/dangerroom/2012/06/ff_dronesatwork/#slideid-128041) (explaining this danger).

<sup>117</sup> *Id.* (explaining the potential safety and cost value of drone aircraft).

<sup>118</sup> Alexis C. Madrigal, *Inside the Drone Missions to Fukushima*, THE ATLANTIC (Apr. 28, 2011, 10:02 AM), <http://www.theatlantic.com/technology/archive/2011/04/inside-the-drone-missions-to-fukushima/237981/> (recounting

than a folding table, a folding chair, and an unfolded laptop, an American drone operator from Honeywell delivered the necessary images with the drone without having engineers expose themselves to the radiation.<sup>119</sup>

Distant oilrigs and radioactive disasters illustrate the advantages possible without implicating privacy or urban safety issues. In contrast, drone use by journalists would seem to strike at the very heart of these same concerns. However, well-established news organizations overseas have already begun using “helicam” drones with tremendous results in reporting important stories.<sup>120</sup> The UK’s *Guardian* used a helicam to report on severe flooding in Worcester, the BBC “hexacopter” captured the scale of the protests in Thailand, and Russia Today’s multi-year drone development delivered aerial footage of the Ukrainian civil unrest in the urban canyons of Kiev.<sup>121</sup>

These uses overseas enable journalists to provide their public service when the need for hard news is greatest—such as after a disaster—without burdening an air asset from rescuers or risking a human camera crew in the skies above dangerous terrain.<sup>122</sup> In contrast, in the United States the FAA has consistently made clear that drone journalism in runs afoul of its decree as much as any other commercial use, and the agency accordingly sends cease and desist letters to journalists operating drones for news coverage.

---

the evolving dangers and the need for information inside the now radioactively toxic heart of the plant).

<sup>119</sup> *Id.*

<sup>120</sup> Leila Haddou, *Journalism Gets Into The Act As Drones Capture Floods, Protests And Wars*, THE GUARDIAN (Feb. 12, 2014, 9:25 AM), <http://www.theguardian.com/media/media-blog/2014/feb/12/journalism-drone-capture-floods-protests-wars>.

<sup>121</sup> *Id.*

<sup>122</sup> See Leslie Kaufman & Ravi Somaiya, *Drones Offer Journalists a Wider View*, N.Y. TIMES (Nov. 24, 2013), [http://www.nytimes.com/2013/11/25/business/media/drones-offer-journalists-a-wider-view.html?\\_r=0](http://www.nytimes.com/2013/11/25/business/media/drones-offer-journalists-a-wider-view.html?_r=0) (offering the example of a photographer who used a drone over the Philippines because he “did not want to beg for a ride on a military helicopter, taking the space of much-needed aid” in the aftermath of typhoon Haiyan; his footage informed CNN viewers of the typhoon’s wrath and “discovered two bodies that were later recovered by the authorities”).

Most notably, FAA sent letters in the summer of 2013 effectively shuttering research into effective drone employment for journalism by two specialized programs at the University of Nebraska and the University of Missouri.<sup>123</sup> The schools had used the drones to report stories on a Nebraska drought and fracking's use of water taken from the Missouri River.<sup>124</sup> The FAA sent the schools legal warning shots despite the level of safety by both programs and the potential benefit for exploring the pairing of journalism with drone technology.<sup>125</sup> While the FAA told the programs at these public universities that they can pursue "public agency" COA waivers, such as those COAs available for law enforcement, the operational restraints a COA imposes greatly diminishes the schools' ability to pursue journalistic ends.<sup>126</sup>

Agriculture not only presents another field of possibilities for drone use, but it is also likely the most fitting field for affordable and safe commercial drone integration.<sup>127</sup> For example, Robert Blair, an Idaho farmer and a civic leader within his farming

---

<sup>123</sup> See Rob Walker, *The U.S. government is making it very difficult for journalists to use drones. This is a problem*, YAHOO NEWS (Aug. 28, 2013, 12:45 PM), <http://news.yahoo.com/drone-journalism-faa-restrictions-164543522.html>.

<sup>124</sup> *Id.* (linking to the stories the students reported on using the drones).

<sup>125</sup> *Id.* ("Both programs essentially operated under extremely conservative interpretations of current FAA guidance for non-commercial UAV hobbyists. They avoided populated areas; flew over public land, or private land with the permission of landowners; and kept the vehicles 400 feet and within the sight of their operators.").

<sup>126</sup> Scott Pham, *Yes, the University of Missouri is still pursuing drones*, MISSOURI DRONE JOURNALISM PROGRAM (Sept. 24, 2013), <http://www.missouridronejournalism.com/2013/09/yes-the-university-of-missouri-is-still-pursuing-drones/> ("A Certificate of Authorization comes with it a huge set of regulations that will make 'drone journalism,' as we've come to know it, all but impossible. Flight will occur only within a predetermined, relatively small, contiguous space. Our ability to travel and respond to events (key attributes of field reporting) will be entirely curtailed.").

<sup>127</sup> *Agriculture the most promising market for drones*, USA TODAY (Dec. 14, 2013, 7:37 PM), <http://www.usatoday.com/story/news/nation/2013/12/14/agriculture-market-for-drones/4025559/> ("Experts point to agriculture as the most promising commercial market for drones because the technology is a perfect fit for large-scale farms and vast rural areas where privacy and safety issues are less of a concern.").

community,<sup>128</sup> flouts the FAA prohibition through the operation of his own UAV to help with his own farm.<sup>129</sup> He argues the FAA “is not only disrespecting agriculture, they are disrespecting the public” by ignoring pro-drone input from farmers in their rule making.<sup>130</sup> His personal experience convinced him of the utility of drones in “precision agriculture.”<sup>131</sup> Before using a drone, Blair had to coordinate for an expensive pilot to photograph the health of his crops from the air in order to assess his land acre by acre.<sup>132</sup> His ten-pound fixed-wing imaging drone saved him from \$9,000 Cessna rentals and the three-week delays in photo deliveries that followed.<sup>133</sup>

East Asian rice cultivation validates the Midwesterner’s faith in drones as a farmer’s friend. In Japan, over two thousand drones provided the crop spraying for thirty percent of all rice fields in 2010, a safer and cheaper alternative to manned helicopters.<sup>134</sup> The

---

<sup>128</sup> See generally Robert Blair, THE UNMANNED FARMER, <http://theunmannedfarmer.blogspot.com/> (last visited Feb. 27, 2014) (discussing Blair’s leadership positions, such as serving as the Nez Perce County Farm Bureau President and as a member of the Governor’s Regional Advisory Committee).

<sup>129</sup> Miranda Green, *Unmanned Drones May Have Their Greatest Impact on Agriculture*, DAILY BEAST (Mar. 26, 2013), <http://www.thedailybeast.com/articles/2013/03/26/unmanned-drones-may-have-their-greatest-impact-on-agriculture.html> (reporting that Robert Blair knowingly flies his drone “in spite of U.S. regulations” and blogs for the FAA to end their ban and allow agricultural drone use). However, Blair’s own ingenuity in building his own drone likely makes it legal, despite his row with the FAA and its commercial drone prohibition. See USA TODAY, *supra* note 127.

<sup>130</sup> Blair, *supra* note 128.

<sup>131</sup> See Alexis Madigral, *Self-Steered Tractors and UAVs: Future Farming Is (Finally) Now*, WIRED (Oct. 19, 2009, 1:47 PM), <http://www.wired.com/wiredscience/2009/10/precisionfarming/> (reporting on how the images and data from drones flying over fields “can be converted into data that can be used in water, fertilizer and pesticide decision-making.”).

<sup>132</sup> See Shachtman, *supra* note 116 (summarizing Blair’s use across his hardscrabble farm).

<sup>133</sup> *Id.*

<sup>134</sup> Spencer Ackerman, *Drone Boosters Say Farmers, Not Cops, Are the Biggest U.S. Robot Market*, WIRED (Feb. 5, 2013, 3:05 PM), <http://www.wired.com/dangerroom/2013/02/drone-farm/> (“Yamaha introduced its RMAX unmanned helicopter for crop-spraying in 1990. By 2010, the drone ‘copter and its robotic competitors—some 2,300 of them—sprayed 30 percent of Japanese

growth and success of crop-dusting drones in Japan has, consequently, caught the eye and the enthusiasm of many U.S. farmers and agricultural researchers. University of California-Davis academics have seen promising results from their cooperation with Yamaha engineers, whose drones dominate the Japanese crop-dusting market, in testing drone dusters on Golden State vineyards.<sup>135</sup> But Japan is not alone in its adoption of commercial drone technologies. Farmers in Brazil and Argentina have also begun using drones to map and monitor “corn, soybean, wheat, sugarcane and rice.”<sup>136</sup> Peruvian drones assist with agriculture and archaeology,<sup>137</sup> and British drones analyze pesticide and fertilizer in pastoral England.<sup>138</sup>

Agricultural drones offer farmers two things: overhead analysis and precision application. The former is generally a new tool for farmers to leverage with the help of researchers such as those at the University of California, Davis, and thus does not displace any

---

rice fields with pesticides, according to a recent Yamaha presentation. The Japanese farm hectares sprayed by manned helicopters dropped from 1,328 in 1995 to 57 in 2011, as unmanned helicopter spray rose to 1,000 hectares that year.”)

<sup>135</sup> Katie Spence, *Northrop Grumman Wants to Sell Unmanned Drones to Farmers?*, THE MOTLEY FOOL (Dec. 8, 2013), <http://www.fool.com/investing/general/2013/12/08/northrop-grumman-wants-to-sell-unmanned-drones-to.aspx> (describing this success at the Oakville Experimental Vineyard).

<sup>136</sup> Caleb Garling, *Drone, Drone on the Range*, MODERN FARMER (July 8, 2013), <http://modernfarmer.com/2013/07/drones-drones-on-the-range/> (“For instance, they can use the chlorophyll index to analyze nitrogen changes to the overall terrain, which then informs the way they’ll fertilize plants down the line. And rice needs a specific amount of water so the images dictate where to irrigate and where the crop grows best. Lastly, they use the images to simply gauge what crop yields will be before harvesting.”).

<sup>137</sup> See Luis Jaime Cisneros, *Peru’s Drones Used For Agriculture And Archaeology*, HUFFINGTON POST (Aug. 15, 2013, 9:07 AM), [http://www.huffingtonpost.com/2013/08/15/peru-drones\\_n\\_3759298.html](http://www.huffingtonpost.com/2013/08/15/peru-drones_n_3759298.html) (highlighting the diversity of use in Peru with only rudimentary drone technology but a liberating dearth of regulation).

<sup>138</sup> See Jim Reed, *The skies open up for large civilian drones*, BBC (Aug. 29, 2012, 11:03 PM), <http://www.bbc.co.uk/news/technology-19397816> (reporting on this growth in UK as a “quiet revolution”).

current jobs with its adoption by farmers.<sup>139</sup> The latter, a proliferation of agricultural drones for precision application, will increase farmers' efficiencies and yields, and thus lead to lower prices at supermarkets in addition to producing healthier tomatoes and superior wine. It is unlikely to come at the expense of many jobs, because the jobs to be lost are those of crop-dusting pilots, and there not enough crop-duster pilots now to meet demand.<sup>140</sup> Because that demand is large, so is the market and the burden on farmers in what is consequently a sellers' market.<sup>141</sup>

Precision agricultural drones are safer than the traditional alternative. Piloted crop dusters are "notoriously dangerous" because a pilot's unsteady hand must keep the duster only a few yards above rows upon rows of crops while monotonously flying at 150 mph.<sup>142</sup> In addition, the pilot lands and takes off at airports near populated areas.<sup>143</sup> Crop-dusting drones can use their own farms as airports, put no pilot at risk, and use automated systems to keep a steady flight path.<sup>144</sup>

Additionally, drones offer other benefits in addition to cost savings for crop dusting. Academics at the Louisiana State University AgCenter work with surveillance drones equipped with "infrared wave links and electromagnetic reflection" to offer

---

<sup>139</sup> Part V.A surveyed the range of these advantages. While a piloted aircraft could theoretically perform this task, the expense of a piloted aircraft is too great for most farmers, as Robert Blair's experience shows. *See id.*

<sup>140</sup> Johnathan Welsh, *Flying Low Is Flying High As Demand for Crop-Dusters Soars*, WALL ST. J. (Aug. 14, 2009, 11:59 PM), <http://online.wsj.com/news/articles/SB125020758399330769?mg=reno64-wsj&url=http%3A%2F%2Fonline.wsj.com%2Farticle%2F%2FSB125020758399330769.html>.

<sup>141</sup> Jason Koebler, *Drones Will Revolutionize Farming First, Not Delivery*, MOTHERBOARD (Dec. 16, 2013, 11:55 AM), <http://motherboard.vice.com/blog/drones-will-revolutionize-farming-first-not-delivery> ("According to . . . a chemist who licenses crop dusters in Indiana, demand for them in the state has doubled since 2007. In Iowa, agricultural aviation is a \$214 million business annually.").

<sup>142</sup> *Id.* (describing the danger of piloted crop dusters).

<sup>143</sup> *Id.*

<sup>144</sup> *Id.* On an environmental note, it's the ability of drones to fly so low that presents users another benefit. Flying only feet above the crops, drones can environmentally and efficiently spray "pesticides on the plants and not in the ground where it gets to the groundwater." Green, *supra* note 129 (quoting Michael Toscano, CEO of AUVSI).

farmers an asset similar to satellite feeds, allowing analysis of issues as diverse as the nutrient levels of soybean fields to the location of pests and diseases that endanger rice yields.<sup>145</sup> Dairy farmers' potential drone use indicates that the privacy right most likely to be threatened by a surveillance drone is that of a bucolic heifer straying from the herd.

B. *The International Competition that the United States is Losing*

If the proliferation of drones in global farming does not strike home the point that the United States is falling behind, perhaps a tale of Hollywood drones can better capture the imagination of policymakers in a more Americana fashion. The aptly named company Flying-Cam began offering drone technology to Hollywood as far back as the 1980s as a safe and cost-effective means to capture shots for which piloted helicopters would otherwise be necessary.<sup>146</sup> Flying-Cam's founder earned an Oscar for his work in 1995, and Flying-Cam's credits include popular blockbusters such as the *Harry Potter* and *Mission Impossible* franchises.<sup>147</sup> But, Flying-Cam's services in the United States ended in 2011 when the FAA informed the company that, pursuant to the quiet policy clarification in 2007, its continued operation violated the law.<sup>148</sup> Consequently, Flying-Cam laid off U.S. workers and shifted future business, such as the filming of a *Transformers* sequel and a Sony PlayStation advertisement, to

---

<sup>145</sup> Renita D. Young, *LSU AgCenter testing use of drones in agriculture*, TIMES PICAYUNE (Jan. 9, 2014, 3:56 PM), [http://www.nola.com/business/baton-rouge/index.ssf/2014/01/lsu\\_agcenter\\_testing\\_use\\_of\\_dr.html](http://www.nola.com/business/baton-rouge/index.ssf/2014/01/lsu_agcenter_testing_use_of_dr.html) (adding that drones offer efficiencies for cheaper seed production and more environmental chemical usage).

<sup>146</sup> See Newman, *supra* note 61.

<sup>147</sup> *Id.* (describing the company's successes).

<sup>148</sup> *Id.* ("But in 2011 Flying-Cam's U.S. business was effectively grounded when the FAA notified the film industry that flying unmanned aerial systems (UAS) for commercial use was illegal until regulations were finalized. . . . Since many companies were unaware of the change, the FAA began to tell industry officials that the use of drones was not yet legal as it became aware they were using them. Virtually overnight, Flying-Cam and other companies in the same business were grounded in the U.S.").

Hong Kong and European countries with more permissive rules for drones.<sup>149</sup>

As with many promising sources of tax revenue and jobs, international competition in the emerging drone industry operates within a context of international competition *for* the industry itself. The United States, hampered by its drone ambivalence, arguably does not even place in the current race to develop commercial drones.<sup>150</sup> Zookal, an Australian company with roots in online book sales, will begin drone book delivery to residents of Sydney in March of 2014.<sup>151</sup> Australia's permissive airspace regulations allow Zookal to proactively negotiate to wrap other ventures into its prospective ambitions.<sup>152</sup>

Australia's fiercest competition for commercial drone development in the growing global industry will likely be China.<sup>153</sup> In contrast to Amazon, China's delivery giant, SF Express, launched no media campaign before developing a commercial drone program; it chose instead to simply start test flights with

---

<sup>149</sup> Newman, *supra* note 61 ("Flying-Cam laid off more than 30 workers and other companies doing the same type of work have gone bust. Flying-Cam is picking up more overseas business, meanwhile, largely because regulators in countries such as England, France and China have developed new rules that allow and even encourage the commercial use of drones. Flying-Cam recently shot aerial scenes for the forthcoming films 'Transformers: Age of Extinction' in Hong Kong and 'Smurfs II' in Paris, for instance. And the production for a Sony PlayStation advertisement was recently moved from L.A. to Budapest so the director could include such aerial shots.").

<sup>150</sup> See Gwynn Guilford, *Australia and China are way ahead of Amazon in the commercial drone race*, QUARTZ (Dec. 2, 2013), <http://qz.com/152788/australia-and-china-are-way-ahead-of-amazon-in-the-commercial-drone-race/>.

<sup>151</sup> *Id.* Zookal has already applied to fly pursuant to Australia's established regulatory framework. *Id.*

<sup>152</sup> *Id.* ("Australia's looser regulations could help make it a commercial drone pioneer. 'As one of the few countries in the world to allow commercial drone activities, Australia is uniquely placed to create a new drone industry and shape the development of regulations in this space,' Zookal CEO Ahmed Haider told The Verge. The company's joint-venture partner . . . is now signing up other businesses for drone deliveries . . .").

<sup>153</sup> *Id.* ("Breathing down Zookal's neck is Shunfeng Express, one of China's biggest parcel delivery services, which began testing drone delivery back in September.").

permission from Dongguang city officials and have spotters in social media reveal the company's fait accompli.<sup>154</sup> Moreover, SF Express faces competition *within* China from other eager commercial drone developers.<sup>155</sup> China faces an increasingly prosperous population with a preference for the goods of e-commerce that overwhelms the nation's infrastructure in both urban and rural areas, a fact that has not gone unnoticed by Chinese officials and investors who naturally see drones as part of the solution.<sup>156</sup>

## VI. EMBRACING AND LEGALIZING COMMERCIAL DRONES

American citizens, lawmakers, and regulators should embrace commercial drones. Our laws should integrate their use into our lives as much as laws have accepted the airplane, the Internet, and the internal combustion engine. Skepticism of technology seemingly straight from the pages of science fiction is misguided. The potential benefits from integrating commercial drones could boast of range of benefits for society.<sup>157</sup> Skeptics continue to conflate commercial drones with unrelated military strikes and law enforcement investigations rather than with the wheels of commerce, the pistons of industry, and the seeds of agriculture.<sup>158</sup>

---

<sup>154</sup> Gwynn Guilford, *China could become the first country to legalize parcel delivery by drone*, QUARTZ (Sept. 3, 2013), <http://qz.com/120654/china-could-become-the-first-country-to-legalize-parcel-delivery-by-drone> (explaining how a local resident, and a user of the Chinese social media site Sina Weibo, spotted the test flight, and also noting the local police response that, "except during certain sensitive times, commercial operators who receive permission from the civil aviation regulator and air traffic control are allowed to fly drones").

<sup>155</sup> *Id.* (using as an example a "pie in the sky" cake company in Shanghai).

<sup>156</sup> *Id.* ("Drone delivery undoubtedly has a certain appeal to the Chinese authorities, who are increasingly struggling to control both traffic and pollution in China's major cities. On top of that, e-commerce is growing much faster than delivery infrastructure in rural and mountainous parts of China, such that logistics systems are emerging as a big area of investment . . . . In fact, a consortium . . . took a 25% stake in SF Express in late August.").

<sup>157</sup> *See supra* Part V.

<sup>158</sup> *See supra* Part IV.

A. *The Business of America IS Business: Choosing Prosperity Over Paranoia and Litigation*

After *Causby* cemented the commercial purpose of the Air Commerce Act of 1926, the federal government has ruled the skies as a “public highway.”<sup>159</sup> For piloted aircraft, the general national interest in the prosperity of aviation soars above factional, antiquated claims.<sup>160</sup> With commercial *pilotless* aircraft, the legal narrative is going in reverse, prioritizing the latter over the former. This reversal comes despite how the very technology of even urban drones—likely to be rotary wing—impose little chance of incidental trespass violations. But due to FAA’s failure to take quick initiative, states are beginning to lead the way, but many of their legislative enactments relate drones to intrusions of privacy rather than a new era of commerce.

Apparently taken by Justice Brandeis’ federalist idea of using the various state governments as “laboratories of democracy,”<sup>161</sup> Yale Law School’s Margot E. Kaminski argues that state-by-state experimentation in private drone legislation can find the optimal legal framework for privately operated drones. She “argues that preemption of state drone regulation would be a mistake.”<sup>162</sup> However, the idea of punting the legal framework of commercial drones to the states poses serious drawbacks for the integration and cultivation of commercial drones.

---

<sup>159</sup> See *supra* Part III.A.

<sup>160</sup> See *supra* Part III.A.

<sup>161</sup> The “laboratories of democracy” idea emerged from *New State Ice Co. v. Liebmann*, 285 U.S. 262, 311 (1932) (Brandeis, J., dissenting) (“Denial of the right to experiment may be fraught with serious consequences to the nation. It is one of the happy incidents of the federal system that a single courageous state may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country.”). For a contemporary review of the concept, see Brian Galle & Joseph Leahy, *Laboratories of Democracy? Policy Innovation in Decentralized Governments*, 58 EMORY L.J. 1333 (2009).

<sup>162</sup> See generally Margot E. Kaminski, *Drone Federalism: Civilian Drones and the Things They Carry*, 4 CAL. L. REV. CIRCUIT 57, 67 (2013) (arguing in favor of the experimentation of state-by-state laws on civilian drones).

First, the vacuum of the FAA's lethargy in creating a distinctly *commercial* legal framework, such as with piloting certification, aircraft standards, and communication protocols, upsets the uniformity of airspace regulations across the nation. This vacuum leaves states to legislate from their respective priority of privacy protection rather than promotion of interstate commerce. The Texas law discussed in Part IV shows how legitimate drone surveillance concerns are morphing to lawmaking by States on all drones writ large.<sup>163</sup>

Second, Kaminiski fails to appreciate that if states create piecemeal legal frameworks across the United States, these varied frameworks will focus on privacy fears, which are largely inapplicable to commercial drones, rather than promoting the safe traffic of commerce. In contrast, if the FAA legalizes commercial drones, at least in narrow capacities such as agriculture, before states outlaw mostly generally harmless aircraft the presence and production of the drones themselves will frame the discussion of future legislation. Citizens and legislators will be more amenable to commercial drones once they see them over cornfields, appreciate the footage they provide a news channel before an impending storm, and help locate a child after an Amber Alert.<sup>164</sup>

Finally, unless the FAA adopts Kaminiski's federalist viewpoint, a potential contest of laws among the states and the FAA could retard rather than facilitate stable growth. For example, businesses with an interest in commercial drone employment could find it legally risky to operate in the United States and move—or

---

<sup>163</sup> See *supra* notes 103 & 104 and accompanying text.

<sup>164</sup> Ben Popper, *Drones over us soil: the calm before the swarm*, THE VERGE (Mar. 19, 2013, 1:00 PM), <http://www.theverge.com/2013/3/19/4120548/calm-before-the-swarm-domestic-drones-are-here> ("In the mind of folks like Chris Anderson, the key is changing public perception, showing drones in some positive function at home that's unrelated to warfare or surveillance. 'Agriculture is the most likely,' says Anderson. 'You drive down the road with farms on either side and you see the drones surveying the crops or spraying, you're like 'oh, that's a drone,' and you start to associate it with farming rather than military use, and that's how we change the narrative.'").

keep—their business abroad.<sup>165</sup> The FAA’s actions on commercial drones have already invited a strong legal challenge. The agency may not exhibit an eagerness to fulfill the FMRA’s promise in creating a workable, competitive legal framework for drones, but the FAA *is* active in enforcing its 2007 decree grounding commercial drones until it develops said framework. Premised on its 2007 memorandum, the FAA sent at least seventeen private operators cease-and-desist letters, terminating the operators’ flights with the threat of federal penalties.<sup>166</sup>

This dragnet may be unlawful. Before a federal regulation from an agency can become enforceable, the agency must first submit the regulation to a comment period.<sup>167</sup> This drawn-out process on instituting a binding, enforceable regulation could further delay the FAA’s forthcoming commercial drone legal framework. However, the requirement of a comment period gave frustrated drone enthusiasts a legal premise to attack the ban itself: the FAA cannot enforce the 2007 decree because the FAA never submitted it for proper public review.<sup>168</sup> Under this premise, a drone operator who had been subject to the FAA’s legal missives—and fined \$10,000—has taken the FAA to court.<sup>169</sup>

---

<sup>165</sup> See the discussion of Flying-Cam, *supra* Part V.B, for an example of company that may not risk a return.

<sup>166</sup> Patrick McKay, *FOIA Response Reveals FAA Routinely Misrepresents the Law Regarding Unmanned Aircraft*, DIY DRONES (Feb. 4, 2014) <http://diydrone.com/m/blogpost?id=705844%3ABlogPost%3A1551726>. The FOIA response is available at the link as an attachment at the bottom of this web article, and is on file with the author. The recipients of these letters include the journalism schools discussed *supra* Part V.A.

<sup>167</sup> See Administrative Procedures Act, 5 U.S.C. § 553 (2012) (outlining the requirements of notice to proposed rule-making for federal agencies).

<sup>168</sup> Resp’t Mot. to Dismiss, *Huerta v. Pirker*, NTSB, Docket No. CP-217 (July 18, 2013), *available at* <http://blogs.scientificamerican.com/observations/files/2013/11/MotionToDismiss.pdf> (arguing that the FAA’s 2007 ban is invalid because both § 533 and the FAA’s own regulations require notice and comment before an regulation can bind the public).

<sup>169</sup> Kenneth Anderson, *Readings: FAA v. Pirker (Domestic Drone Flights)*, LAWFARE BLOG (Oct. 16, 2013, 7:00 AM), [www.lawfareblog.com/2013/10/readings-administrator-of-the-faa-v-pirker-re-drone-flights/#.UwWA1\\_IdUt1](http://www.lawfareblog.com/2013/10/readings-administrator-of-the-faa-v-pirker-re-drone-flights/#.UwWA1_IdUt1) (explaining how Pirker, who operated a drone to take promotional aerial photos for a public relations firm, is fighting the FAA 2007 order).

If the plaintiff succeeds, the sudden unenforceability of the FAA's ban will bring unwelcome consequences. First, it will allow enthusiasts to take to the skies subject to regulation only by states. This flood of activity may, consequently, cause the fifty states to overreact and pass fifty sub-FAA regulations. These state regulations may produce more legal chaos when the FAA (or Congress) finally escapes its own bureaucratized inertia (or legislative gridlock) and lays down clear but conflicting federal rules. While the FAA will have no one to blame but their own heavy-handed bureaucrats, this chaotic governance of commercial drones will not facilitate a strong legal framework for commercial drone flight in the United States.

The competition to reap the benefits of embracing drones has gone global.<sup>170</sup> Falling behind competitive nations that lack America's hesitancy about commercial drone legalization comes at a cost for the United States. In 2013, economic analysts forecasted the annual sales of drones worldwide will "likely to double over the next decade from \$5.2bn to \$11.6bn by 2023."<sup>171</sup> While that figure includes producing commercial and non-commercial drones, analysts project that the receipts for that growth to be in drone-friendly European and Asian nations where "drones are becoming increasingly accepted into private commercial applications and where the industry and regulatory environments appear ready to foster widespread use."<sup>172</sup> In contrast, the potential for market growth in the United States is now "under threat" due to the actions of state governments.<sup>173</sup>

---

<sup>170</sup> See *supra* Part V.B.

<sup>171</sup> Geoff Dyer, *Drone Market Under Fire As It Tries To Take Off*, FINANCIAL TIMES (Oct. 9, 2013), <http://www.ft.com/cms/s/0/8a2ea13e-3034-11e3-80a4-00144feab7de.html>. The figures come from the Teal Group Corporation, which sells aerospace and defense market analysis to industry firms. See *Teal Group Predicts Worldwide UAV Market Will Total \$89 Billion in Its 2013 UAV Market Profile and Forecast*, TEAL GROUP CORP. (last visited Mar. 3, 2014), <http://tealgroup.com/index.php/about-teal-group-corporation/press-releases/94-2013-uav-press-release>.

<sup>172</sup> Cloar, *supra* note 86.

<sup>173</sup> Dyer, *supra* note 171 (quoting Greg McNeal, a law professor at Pepperdine University, that the industry is, if anything, "in denial" and not taking the general public's "vein of paranoia" seriously enough, as some of the legislative

Michael Toscano, president and CEO of the Association for Unmanned Vehicle Systems International (“AUVSI”) emphasizes this economic value in terms many Americans—and their elected policy-makers—should clearly understand: jobs.<sup>174</sup> AUVSI’s analysis predicts legalization of commercial drones could lead to over 103,000 U.S. jobs in the first decade after the FAA allows drones to fly through domestic airspace.<sup>175</sup> As a result, by refusing to act quickly on commercial drone legalization and regulation, the FAA stifles potential areas of economic growth of which other countries are already taking advantage.

B. *Swords into Plowshares, Predator Drones into Crop-Dusters*

America, a nation struggling to reboot its manufacturing sector,<sup>176</sup> is home to the businesses best positioned to take the lead in the twenty-first century industry of robotics engineering. The top firms with a first-mover advantage in drone manufacturing are U.S. firms with proficiencies garnered from years of building drones for the U.S. military. These firms include some of the usual suspects of aerospace manufacturers, namely Boeing, Lockheed

---

initiatives “could kill off the potential use of drones” and thus the domestic drone market).

<sup>174</sup> Jaikumar Vijayan, *FAA road map sees challenges in allowing drones over U.S. airspace*, COMPUTERWORLD (Nov. 8, 2013, 6:34 AM), <http://www.computerworld.com/s/article/9243902/>. For the report itself, see *The Economic Impact Of Unmanned Aircraft Systems Integration In The United States*, ASS’N FOR UNMANNED VEHICLE SYSTEMS INT’L (2013), available at <http://www.auvsi.org/econreport> [hereinafter AUVSI, *Impact*].

<sup>175</sup> AUVSI, *Impact*, *supra* note 174, at 2–4 (arriving at that figure by a state-by-state analysis that concludes that “states with an already thriving aerospace industry are projected to reap the most economic gain”).

<sup>176</sup> See, e.g., Eamonn Fingleton, *Reports Of America’s Manufacturing Renaissance Are Just A Cruel Political Hoax*, FORBES (Nov. 3, 2013, 12:07 PM), <http://www.forbes.com/sites/eamonnfingleton/2013/11/03/reports-of-americas-manufacturing-renaissance-are-just-a-cruel-hoax/>; Christopher Matthews, *Can Robots Bring Manufacturing Jobs Back to the U.S.?*, TIME (Sept. 27, 2012), <http://business.time.com/2012/09/27/can-robots-bring-back-manufacturing-jobs-to-the-u-s/>.

Martin, and Northrup Grumman.<sup>177</sup> Other firms include some specialist manufacturers, namely General Atomics, famous for the Predator drone, and AeroVironment, a producer of smaller spy drones for the Defense Department.<sup>178</sup> With the federal budget sequester impairing the Pentagon's procurement, these manufacturing firms can look to shuffle production lines and re-task U.S. employees towards a new demand for their product: commercial drones. Yet, the ability to exploit America's technological and established manufacturing head start will not last forever. As other nations speed along in their own development, the failure to deregulate and open the skies risks the United States falling behind global competitors.<sup>179</sup>

Despite the public's association of domestic drones with law enforcement, drone industry experts express skepticism that drone demand in the public safety sector can offer significant demand for drone manufacturing.<sup>180</sup> In contrast, American farmers could replace American soldiers as the heavy buyers of a domestically manufactured product.<sup>181</sup> If commercial drones had a green light to fly, precision agriculture could command eighty percent of the commercial drone market.<sup>182</sup> Thus the irony of the FAA's lassitude is that agriculture, the area that most needs FAA permission for drones, is the area that least needs regulation because rural use implicates few safety or surveillance concerns. Precision farming

---

<sup>177</sup> Jillian Berman, *12 Companies Cashing In On Drones*, HUFFINGTON POST, (Mar. 11, 2013, 4:53 PM), [http://www.huffingtonpost.com/2013/03/11/companies-making-drones\\_n\\_2849569.html](http://www.huffingtonpost.com/2013/03/11/companies-making-drones_n_2849569.html).

<sup>178</sup> *Id.*

<sup>179</sup> Green, *supra* note 129.

<sup>180</sup> AUVSI, *Impact*, *supra* note 174, at 6 ("We found that almost all respondents considered agriculture to be far and above the largest market given that the public safety market is limited by the number of first-response teams.").

<sup>181</sup> Green, *supra* note 129 ("We are ahead and damn well should be given how much more we spend on the military than every other nation in the world. The U.S. is still the leader of drone technology and production, but it may not be forever . . . There is a rule in technology and war: there is no such thing as a permanent first mover advantage. There are 87 countries that have military robotics programs.") (quoting Peter Singer, director of the Center for 21st Century Security and Intelligence).

<sup>182</sup> *Id.*

will also find overseas buyers, because other nations already boast far more permissive drone laws and a ready demand for their use.<sup>183</sup>

## VII. CONCLUSION

The FAA should stop dragging its heels. Even if the agency is waiting to perfect collision avoidance technology before permitting more commercial drones in populated areas,<sup>184</sup> that logic does not counter pleas to authorize drones in unpopulated areas, particularly over farmers' fields. If the FAA created a simple categorical exception for low-altitude flights over agricultural lands and other unpopulated spaces, such as near offshore oilrigs, that exception would cover a majority of the near-term market potential for, and benefits from, commercial drones. The FAA can issue commercial certificates for these ready-to-go uses now, but declines to do so.<sup>185</sup>

The United States is needlessly playing catch-up. The FAA's speed in rulemaking is inexcusable given the agency is not inventing the proverbial regulatory wheel. If international competition can take advantage of the technological drone concepts the U.S. government largely pioneered,<sup>186</sup> no convincing reason exists—besides hubris—for the U.S. government not to learn from the legal frameworks that allow commercial drones to fly safely abroad.

---

<sup>183</sup> See *supra* Part V.B.

<sup>184</sup> Kelsey D. Atherton, *This Is The FAA's Plan For Drone-Friendly Skies*, POPULAR SCIENCE (Nov. 8, 2013, 3:00 PM), <http://www.popsci.com/article/technology/faas-plan-drone-friendly-skies> ("For the FAA, an agency born out of a mid-air collision, the scariest part of drones is the chance of them crashing. . . . In theory, there's a technological solution: sense-and-avoid algorithms. . . . This technology, allowing flying machines to detect and fly around other flying machines when communication with people and computers on the ground is lost, is at best only available in the mid-term, likely between 2016 and 2020, according to the FAA. . . . Until this technology is ready, expect the FAA to be extra cautious about drone applications, especially in busy skies.").

<sup>185</sup> See *supra* notes 79 & 80 and accompanying text.

<sup>186</sup> See *supra* Part II on the technological development of drones by the U.S. military.

Australia, a common law country, is a prime target for legal plagiarism. The country's FAA counterpart, the Civil Aviation Safety Authority ("CASA"), sets a four hundred foot ceiling for drones to operate over unpopulated areas, but permits commercial drones exceptions outside that permissive zone.<sup>187</sup> CASA certifies drone operators for the requisite aviation knowledge and drone proficiency.<sup>188</sup> Under this framework, commercial drones have flourished,<sup>189</sup> with the only significant privacy concerns arising from *recreational* drones<sup>190</sup>—the only drone type legal under current FAA rules.<sup>191</sup> CASA established their drone laws in 2002.<sup>192</sup>

Supporting commercial drone legalization is not akin to supporting drone anarchy. Commercial drones need the liberty to fly, but lawlessness in a crowded airspace would be no more liberating for drone operators than it would be for piloted aircraft. For urban uses, such as Amazon's delivery systems, our own legal framework already offers civil remedies for tort violations. If a commercial drone violates someone's privacy, the victim can sue the operator on the same grounds used to sue a peeping neighbor misusing a telescope. But if the drone flies in the "immediate reaches of the enveloping atmosphere" without troubling any "use and enjoyment" of a landowner's property,<sup>193</sup> there should be no

---

<sup>187</sup> CIVIL AVIATION SAFETY REGULATIONS (1998), ADVISORY CIRCULAR 101-1(0), Section 13, Appendix 3 (July 2002), CIVIL AVIATION SAFETY AUTHORITY (Australia), *available at* [http://www.casa.gov.au/wcmswrt/\\_assets/main/rules/1998casr/101/101c01.pdf](http://www.casa.gov.au/wcmswrt/_assets/main/rules/1998casr/101/101c01.pdf).

<sup>188</sup> *Id.*

<sup>189</sup> *See supra* Part V.B.

<sup>190</sup> Caroline Zielinski & Rachel Wells, *Spying eyes or a bit of fun, drones fly off the shelves*, THE SYDNEY MORNING HERALD (Feb. 17, 2013), <http://www.smh.com.au/technology/technology-news/spying-eyes-or-a-bit-of-fun-drones-fly-off-the-shelves-20130216-2ek6s.html> (discussing the privacy issues posed by smaller, hobbyist drones).

<sup>191</sup> *See* FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 336(a)(1)–(5), 126 Stat. 11 (2012) (grandfathering the original, permissive rules for recreational aircraft).

<sup>192</sup> *See* CIVIL AVIATION SAFETY REGULATIONS, *supra* note 187.

<sup>193</sup> *See supra* Part III.A; *see also* RESTATEMENT (SECOND) OF TORTS § 159, *supra* notes 45–47, 49–50.

more of a legal premise for a trespass claim than there is now for a piloted aircraft. The laws can work the same.

Commercial drone proponents generally favor regulations that will govern the safe operation of drones while taking privacy concerns into account.<sup>194</sup> But traffic laws are a far cry from banning the automobile: “The FAA should require you to pass a test and maintain a license to fly one of these things, just like a car or a plane. But the stuff that’s going on in these cities and states that are banning drones... well, they are going to be cutting themselves off from technology that could save lives and move them into a new economic age.”<sup>195</sup>

---

<sup>194</sup> See Popper, *supra* note 164 (noting support for sensible regulation among commercial drone proponents).

<sup>195</sup> *Id.* (quoting Gene Robinson, founder of RP SearchServices).