

# DECENTRALIZING DRONE REGULATIONS IN LOW-ALTITUDE AIRSPACE

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# DECENTRALIZING DRONE REGULATIONS IN LOW-ALTITUDE AIRSPACE

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**Abstract:** States have long held authority over low-altitude airspace. Nonetheless, with the rise of commercial drones over the past decade, the FAA has extended its near exclusive authority over aircraft in navigable airspace, generally airspace above 500 feet, to low-altitude airspace. Several members of Congress have proposed affirming the state's authority over low-altitude airspace, most recently Senator Mike Lee with the Drone Integration and Zoning Act of 2019. Under the FAA's regime, dominant players have secured valuable authorizations for beyond visual line of sight operations and package delivery services, yet small businesses have struggled to obtain authorization for lucrative market applications. Additionally, the FAA has compromised domestic drone businesses' ability to compete globally with foreign drone businesses that operate in countries with permissive regulations for commercial drones, such as France and New Zealand. States should affirm their authority over drone operations in low-altitude airspace to accelerate competition in the drone industry and to tailor drone regulation to local preferences for privacy, property rights, and civil liberties concerns. By reapportioning this authority to the states, the FAA can focus its limited resources on national systems, such as the drone air traffic management system, manufacturing and performance standards, and the future of interstate drone traffic.

## INTRODUCTION

The proliferation of commercial drones in our airspace has required governments to dynamically develop regulations that balance the risks and benefits that drones offer.<sup>1</sup> Drones can deliver critical goods to previously hard-to-reach areas, monitor crops and infrastructure at a fraction of the cost of general aviation aircraft, and detect environmental risks in real-time.<sup>2</sup> On the other hand, drones present considerable risks.<sup>3</sup> There are innumerable safety concerns, from collision with passenger aircraft to injuring individuals, as well as serious concerns for privacy, property

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<sup>1</sup> THERESE JONES, RAND CORP., INTERNATIONAL COMMERCIAL DRONE REGULATION AND DRONE DELIVERY SERVICES 1 (2017), [https://www.rand.org/content/dam/rand/pubs/research\\_reports/RR1700/RR1718z3/RAND\\_RR1718z3.pdf](https://www.rand.org/content/dam/rand/pubs/research_reports/RR1700/RR1718z3/RAND_RR1718z3.pdf).

<sup>2</sup> Tom Standage, *Taking Flight*, ECONOMIST: TECH. Q.,

[https://www.economist.com/node/21722993/sites/all/modules/custom/ec\\_essay](https://www.economist.com/node/21722993/sites/all/modules/custom/ec_essay) (last visited Feb 27, 2020).

<sup>3</sup> Joshua Kohler, *The Sky is the Limit: FAA Regulations and the Future of Drones*, 15 COLO. TECH. L.J. 151, 171 (2016).

rights, and civil liberties.<sup>4</sup> Consequently, creating a regulatory framework that maximizes the benefits and minimizes the harms is no easy task.<sup>5</sup>

In the United States, it is hard to imagine the Federal Aviation Administration (FAA) not controlling drone regulations.<sup>6</sup> The FAA and its predecessors have regulated aircraft and most of the United States' airspace since 1926, and thus, it was not surprising when, in 2012, Congress asked the FAA to safely and efficiently integrate drones into the airspace.<sup>7</sup> What may be surprising is that the federal government does not own all U.S. airspace; rather, low-altitude airspace where drones fly belongs largely to state governments.<sup>8</sup> The federal government owns what has historically been called the navigable airspace and today is referred to as the national airspace system (NAS), which is the airspace that is above approximately 500 feet above ground level (AGL) in uncongested areas and 1000 feet AGL in congested areas.<sup>9</sup> Given the conflicting claims over low-altitude airspace, several views have emerged about who should regulate drones and how they should be regulated.<sup>10</sup>

Broadly speaking, there are two camps.<sup>11</sup> The first camp, led by the FAA and dominant players in the drone industry, defends the current centralized regulatory regime.<sup>12</sup> Proponents argue that a uniform set of national regulations is the only way to safely and efficiently integrate drones into a complex airspace.<sup>13</sup> This camp fears that a "patchwork quilt" of regulations from local and state governments would compromise safety and impede innovation.<sup>14</sup> Nonetheless, since 2012, the

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<sup>4</sup> *Id.*

<sup>5</sup> See Jones, *supra* note 1, at 2–3 (discussing the various approaches that countries have taken to regulate drones, ranging from outright bans to wait-and-see laissez-faire approaches).

<sup>6</sup> See *A Brief History of the FAA*, FED. AVIATION ADMIN., U.S. DEP'T OF TRANSP., [https://www.faa.gov/about/history/brief\\_history/](https://www.faa.gov/about/history/brief_history/) (last modified Jan. 4, 2017) (summarizing the FAA's development of airspace regulations over the last fifty years).

<sup>7</sup> FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, §§ 331–336, 126 Stat. 11, 72–78 (codified as amended in scattered sections of 49 U.S.C.); §§ 332–334, 336, 49 U.S.C § 40101 (2012) (repealed 2018). The Air Commerce Act of 1926 established the Aeronautics Branch of the Department of Commerce. *A Brief History of the FAA*, *supra* note 6. In 1934, the Aeronautics Branch was renamed the Bureau of Air Commerce. *Id.* The Civil Aeronautics Act of 1938 established the independent Civil Aeronautics Authority, which was then replaced in 1958 by the Federal Aviation Agency. *Id.* In 1966, the Federal Aviation Agency was moved under the Department of Transportation and renamed the Federal Aviation Administration. *Id.*

<sup>8</sup> See Stephen J. Migala, *UAS: Understanding the Airspace of States*, 82 J. AIR LAW COMM. 3, 3 (2017) (stating that the FAA's drone regulations have overreached into airspace that was historically controlled by the states).

<sup>9</sup> *Id.* at 45–46; 14 C.F.R. § 91.119(a)–(c) (2020).

<sup>10</sup> See FED. AVIATION ADMIN., STATE AND LOCAL REGULATION OF UNMANNED AIRCRAFT SYSTEMS (UAS) FACT SHEET 1–3 (2015), [https://www.faa.gov/uas/resources/policy\\_library/media/UAS\\_Fact\\_Sheet\\_Final.pdf](https://www.faa.gov/uas/resources/policy_library/media/UAS_Fact_Sheet_Final.pdf) [hereinafter FAA FACT SHEET 2015] (stating the FAA's perspective that the federal government should have authority over drone operations in low-altitude airspace); JASON SNEAD & JOHN-MICHAEL SEIBLER, COOPERATIVE FEDERALISM AND LOW-ALTITUDE DRONE OPERATIONS 1 (2017), <https://www.heritage.org/sites/default/files/2017-12/LM-222.pdf> (arguing in favor of decentralized regulation of low-altitude airspace by state and local governments).

<sup>11</sup> SNEAD & SEIBLER, *supra* note 10, at 1–2, 7 (discussing views of centralized versus decentralized drone regulations).

<sup>12</sup> See FAA FACT SHEET 2015, *supra* note 10, at 2–3 (expressing the FAA's concern for a patchwork quilt of regulations that would compromise the safety and efficiency of the airspace); AMANDA ESSEX, NAT'L CONFERENCE OF STATE LEG. (NCSL), TAKING OFF: STATE UNMANNED AIRCRAFT SYSTEMS POLICIES 14 (2016), <http://www.ncsl.org/research/transportation/taking-off-state-unmanned-aircraft-systems-policies.aspx> (noting that of the twenty steering committee members for the NCSL partnership on UAS policies, Alphabet and Amazon represented five members; and stating industry concern of patchwork quick regulations); Cecilia Kang, *Drone Lobbying Heats Up on Capitol Hill*, N.Y. TIMES: BITS (Jan. 24, 2016), <http://bits.blogs.nytimes.com/2016/01/24/drone-lobbying-turns-to-capitol-hill/> (reporting Amazon and Alphabet's lobbying efforts to shape the FAA's drone regulations).

<sup>13</sup> FAA FACT SHEET 2015, *supra* note 10, at 2.

<sup>14</sup> *Id.*

FAA's handling of drone regulations has demonstrated severe shortcomings.<sup>15</sup> As a consequence, the United States is lagging behind other countries for drone integration, resulting in U.S. drone businesses traveling abroad to develop their technologies.<sup>16</sup> By its own admission, the FAA lacks the resources to implement its plans.<sup>17</sup> An overwhelmed and under-resourced FAA has resulted in long delays for authorization for drone businesses.<sup>18</sup> To achieve milestones for drone integration with its limited budget, the FAA has relied on public-private partnerships that have favored a small set of states and a few companies with deep pockets, such as Amazon, Alphabet (the parent company of Google), UPS, and Uber.<sup>19</sup> Consequently, the FAA has picked winners for some of the most lucrative segments of the drone market, namely beyond visual line of sight (BVLOS) operations, ranging from long-distance package delivery to large-scale agricultural surveying.<sup>20</sup> Lastly, the effects of drone operations are felt at the local level, yet drone regulations currently reflect only the FAA's own priorities and preferences.<sup>21</sup> Troublingly, the FAA has also struggled to enforce its regulations at the local level given its sparsity of resources.<sup>22</sup>

The second camp argues for a decentralized regulatory regime that acknowledges states' authority over low-altitude airspace and believes that reasserting state authority will promote competition among the states and in the drone industry.<sup>23</sup> Since 2017, federal legislators have proposed various bills to address the lack of state and local government involvement in drone regulation.<sup>24</sup> The Drone

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<sup>15</sup> See, e.g., U.S. GOV'T ACCOUNTABILITY OFFICE, UNMANNED AIRCRAFT SYSTEMS: FAA COULD BETTER LEVERAGE TEST SITE PROGRAM TO ADVANCE DRONE INTEGRATION 23–24 (2020), <https://www.gao.gov/assets/710/703726.pdf> [hereinafter GAO DRONE INTEGRATION REPORT] (raising the issue of lengthy and complex authorization process from the FAA for drone operations).

<sup>16</sup> See Kohler, *supra* note 3, at 167–69 (explaining how New Zealand and France have developed business-friendly drone regulations without comprising safety and efficiency; also noting that U.S.-based Flirtey traveled to New Zealand to test its drones).

<sup>17</sup> DRONE ADVISORY COMMITTEE, FED. AVIATION ADMIN., DRONE INTEGRATION FUNDING FINAL REPORT 3–4 (2018),

[https://www.faa.gov/uas/programs\\_partnerships/drone\\_advisory\\_committee/rca\\_dac/media/dac\\_tg3\\_funding\\_report\\_final\\_7-21-17.pdf](https://www.faa.gov/uas/programs_partnerships/drone_advisory_committee/rca_dac/media/dac_tg3_funding_report_final_7-21-17.pdf) [hereinafter RTCA REPORT] (according to the Drone Advisory Committee, created by the FAA, the FAA lacks adequate funding to implement its drone integration strategy).

<sup>18</sup> GAO DRONE INTEGRATION REPORT, *supra* note 15, at 23–24.

<sup>19</sup> RTCA REPORT, *supra* note 17, at 21 (stating the benefits of using industry partnerships to reduce governmental costs); Zacc Dukowitz, *A Look at the 10 UAS Integration Pilot Program Winners—Who They Are and What They Plan to Do*, UAV COACH (May 17, 2018), <https://uavcoach.com/uas-ipp-winners/> (reporting that Alphabet, Intel, Apple, FedEx, Microsoft, AT&T were among the big winners for the UAS Integration Pilot Program, a major initiative by the FAA to advance drone integration).

<sup>20</sup> See Haye Kesteloo, *UAS IPP: Amazon, DJI Are Out. Airbus, Alphabet (Google), Apple, AT&T, Microsoft, FedEx, Uber and Others Are In*, DRONEDJ (May 10, 2018), <https://dronedj.com/2018/05/10/uas-ipp-amazon-dji-are-out-airbus-alphabet-google-apple-att-microsoft-fedex-uber-and-others-are-in/> (announcing the winners of the FAA's Integration Pilot Program that selected Airbus, Alphabet, Apple, AT&T, Microsoft, FedEx, and Uber, and left out Amazon and DJI for testing experimental applications such as beyond visual line of sight flights); Sally French, *The Fight That's Roiling the Drone Industry: Small Businesses See an "Ol' Boys Club" Forming*, THE DRONE GIRL (Nov. 11, 2017), <http://thedronegirl.com/2017/11/11/fight-thats-roiling-drone-industry-small-businesses-see-ol-boys-club-forming/> (highlighting the FAA's reliance on public-private partnerships with dominant industry players).

<sup>21</sup> Troy A. Rule, *Drone Zoning*, 95 N.C. L. REV. 133, 135–36 (2016).

<sup>22</sup> SNEAD & SEIBLER, *supra* note 10, at 6.

<sup>23</sup> *Id.* at 1; Brent Skorup & Connor Haaland, *To Kickstart Drone Deliveries, Give Cities and States Regulatory Flexibility*, MERCATUS CTR. (Oct. 22, 2019), <https://www.mercatus.org/bridge/commentary/kickstart-drone-deliveries-give-cities-and-states-regulatory-flexibility>.

<sup>24</sup> See Drone Federalism Act of 2017, S.1272, 115th Cong. (2017) (proposing that states are delegated greater authority over drone regulations); Drone Innovation Act of 2017, H.R. 2930, 115th Cong. (2017) (proposing to expand state and local authority over drones).

Integration and Zoning Act (DIZA), the most recent version, was proposed in October 2019.<sup>25</sup> This camp is more loosely organized, supported by small businesses that were not selected for the FAA’s pilot programs and have faced long delays for authorization that impede testing and development of their technology, as well as state legislators seeking to grow a local drone industry.<sup>26</sup>

This Article argues that a “patchwork quilt” of local and state government regulations for low-altitude airspace would neither compromise safety nor hamper drone innovation.<sup>27</sup> Rather, decentralizing drone regulations would reduce the burden on the FAA, enabling it to focus on areas best suited to federal oversight such as drone operations in navigable airspace and air traffic management systems.<sup>28</sup> Equally, if not more importantly, transferring authority to state and local governments would counter the market distortions created by the FAA, resulting in a more level playing field for drone businesses to utilize low-altitude airspace.<sup>29</sup> Lastly, decentralization would leverage states as “laboratories of democracy” to take local preferences into account and dynamically experiment with regulations for this new technology.<sup>30</sup>

Part I of this Article provides background on the commercial drone market, and the current landscape of drone regulations at the federal, state, and local level.<sup>31</sup> Part II analyzes the legal challenges and policy issues of centralized drone regulation.<sup>32</sup> Finally, Part III argues that state and local governments should regulate drones in low-altitude airspace, and that this is practical through existing state aviation offices.<sup>33</sup>

## I. THE FAA’S DISTORTION OF THE U.S. COMMERCIAL DRONE MARKET

Over the past few years, commercial and personal use of drones has surged.<sup>34</sup> In response, governments have sought to secure the economic benefits of drone operation without compromising the safety and efficiency of their airspace.<sup>35</sup> The most lucrative commercial drone applications generally require beyond visual line of sight (BVLOS) operations, which are riskier than the standard visual line of sight (VLOS) operations.<sup>36</sup> Such BVLOS applications include agricultural monitoring, construction surveying, and infrastructure inspection, all of which are

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<sup>25</sup> Drone Integration and Zoning Act of 2019, S. 2607, 116th Cong. (2019).

<sup>26</sup> See French, *supra* note 20 (discussing favoritism for dominant players in the drone industry); Skorup & Haaland, *supra* note 23 (discussing various state and local government initiatives to promote local drone industries).

<sup>27</sup> See discussion *infra* Part III.C.

<sup>28</sup> See discussion *infra* Part III.A.

<sup>29</sup> See discussion *infra* Part II.A.

<sup>30</sup> See discussion *infra* Part II.B.

<sup>31</sup> See discussion *infra* Part I.

<sup>32</sup> See discussion *infra* Part II.

<sup>33</sup> See discussion *infra* Part III.

<sup>34</sup> See Standage, *supra* note 2 (showing a rise of commercial drones from 2.2 million in 2015 to 6.6 million in 2020; and personal drones correspondingly from 1.1 million to 4.6 million).

<sup>35</sup> Jones, *supra* note 1, at 1–2 (discussing how governments are developing regulations that balance promoting innovation with maintaining a safe airspace).

<sup>36</sup> See 14 C.F.R. §107 (2020) (limiting operators to operate within visual line of sight unless granted a waiver because BVLOS flights pose a greater risk); *Why 99% of BVLOS Part 107 Waivers Are Rejected*, PRECISIONHAWK (May 15, 2018), <https://www.precisionhawk.com/blog/media/topic/why-99-of-bvlos-part-107-waivers-are-rejected> (explaining the profitability of BVLOS commercial operations).

conducted in low-altitude airspace.<sup>37</sup> The FAA has long had authority over manned aircraft in navigable airspace, but only recently has it extended this authority to low-altitude airspace where drone operations are generally conducted.<sup>38</sup> Although state governments have asserted their police powers to regulate the impact of drones on land use, privacy, and other areas, the actual regulation of drone operation remains largely in the hands of the FAA.<sup>39</sup>

Section A of this Part discusses the commercial drone market in the U.S. and abroad.<sup>40</sup> Section B provides background on the contours of federal and state authority over airspace.<sup>41</sup> Section C reviews the development of drone regulation in the U.S. at the federal level.<sup>42</sup> Lastly, Section D discusses state and local response to the growth of the commercial drone market.<sup>43</sup>

### A. *The Rise of Commercial Drones*

Although the United States has been experimenting with and using drones for almost a century, very few countries embraced the use of drones by civilians until recently.<sup>44</sup> Japan is one notable exception, which has used drones for crop spraying since the 1980s.<sup>45</sup> For much of the world however, the 2010s have fundamentally altered the perception of drones from military weapons to useful business tools.<sup>46</sup> Worldwide from 2015 to 2020, revenue from the drone market rose from approximately \$3 billion to \$11 billion.<sup>47</sup> By 2025, analysts predict the drone market will be worth anywhere from \$43 to \$129 billion, and that much of this growth will be driven by business applications.<sup>48</sup> Business applications include use of drones by farmers for precision agriculture, by construction companies for mapping and surveying, by infrastructure owners for inspection and monitoring, by

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<sup>37</sup> Standage, *supra* note 2.

<sup>38</sup> Migala, *supra* note 8, at 12.

<sup>39</sup> ESSEX, *supra* note 12, at 13.

<sup>40</sup> See discussion *infra* Part I.A.

<sup>41</sup> See discussion *infra* Part I.B.

<sup>42</sup> See discussion *infra* Part I.C.

<sup>43</sup> See discussion *infra* Part I.D.

<sup>44</sup> Troy A. Rule, *Airspace in an Age of Drones*, 95 B.U. L. REV. 155, 159–60 (2015) (“[T]he U.S. military has been building unmanned ‘drone’ aircraft under that name for target practice exercises and other useful functions since at least the 1930s.”); Jones, *supra* note 1, at 1.

<sup>45</sup> Kaitlin D. Sheets, *The Japanese Impact on Global Drone Policy and Law: Why a Laggard United States and Other Nations Should Look to Japan in the Context of Drone Usage*, 25 INDIANA J. GLOBAL LEGAL STUD. 513, 514 (2018).

<sup>46</sup> Standage, *supra* note 2.

<sup>47</sup> *Id.* (noting that these numbers reflect the summation of personal and business drone markets; some analysts distinguish between the personal drone market and the business drone market—between 2015 and 2020 revenue from personal drone market rose from \$1.1 to \$4.6 billion, and for business drones it rose from \$2.2 to \$6.6 billion).

<sup>48</sup> *Commercial Drone Market Worth \$129.2 Billion By 2025*, GRAND VIEW RESEARCH, <https://www.grandviewresearch.com/press-release/commercial-drone-market> (last visited Feb. 27, 2020) (predicting that the commercial drone market will be worth \$129 billion by 2025); *Drone Industry Analysis - Research on the Growth, Size and Future*, COMPTIA, <https://www.comptia.org/content/research/drone-industry-trends-analysis> (last visited Feb. 27, 2020) (predicting commercial drone market will be worth \$43.1 billion in 2024). For comparison, the global lawn mower market is expected to be \$43.7 billion in 2027. See *Lawn Mowers Market Size Worth \$43.7 Billion By 2027*, GRAND VIEW RESEARCH, <https://www.grandviewresearch.com/press-release/global-lawn-mowers-market> (last visited Feb. 27, 2020).

insurance companies for gathering information and making assessments, as well as by logistics companies for package delivery.<sup>49</sup>

Some of the most promising applications in mapping, surveying, inspection, monitoring, as well as package delivery require BVLOS operations.<sup>50</sup> In drone parlance, visual line of sight (VLOS) simply means that the drone operator can see the drone at all times of operation, unaided by other visual observers or other devices.<sup>51</sup> VLOS operations effectively restrict drone flights to no greater than a mile radius around the operator, depending on the terrain, air quality, and time of day.<sup>52</sup> BVLOS operations, on the other hand, provide operators with nearly unlimited opportunities by programming a drone to fly dozens to hundreds of miles away.<sup>53</sup> For example, BNSF Railway Company has tested BVLOS operations to inspect 132 miles of railroad track in New Mexico.<sup>54</sup> A well-known BVLOS application is commercial drone delivery, with applications ranging from critical transport of medical goods to residential delivery of Amazon packages.<sup>55</sup> An additional category, extended visual line of sight (EVLOS) exists between VLOS and BVLOS, which permits an operator to fly a drone beyond visual line of sight so long as there is a visual observer that can report back to the operator.<sup>56</sup>

Unsurprisingly, BVLOS and EVLOS operations (hereafter jointly referred to as “BVLOS”) are heavily restricted because of well-founded concerns, such as collision with other aircraft or unexpected malfunctions that can result in property damage or harm to individuals.<sup>57</sup> In May 2019, for example, a drone developed by

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<sup>49</sup> Darya Shmat, *Taking to the Skies—Using Drones in the Insurance Industry*, CIO (Feb. 1, 2018), <https://www.cio.com/article/3252093/taking-to-the-skies-using-drones-in-the-insurance-industry.html>; Standage, *supra* note 2.

<sup>50</sup> See Robert Graboyes & Brent Skorup, *Medical Drones in the United States and a Survey of Technical and Policy Challenges*, MERCATUS CTR. (Feb. 20, 2020), <https://www.mercatus.org/publications/healthcare/medical-drones-united-states-and-survey-technical-and-policy-challenges> (explaining that BVLOS operations are essential for large-scale applications of drone technology).

<sup>51</sup> FED. AVIATION ADMIN., U.S. DEP’T OF TRANSP., INTEGRATION OF CIVIL UNMANNED AIRCRAFT SYSTEMS (UAS) IN THE NATIONAL AIRSPACE SYSTEM (NAS) ROADMAP 49 (2013), [https://www.faa.gov/uas/resources/policy\\_library/media/uas\\_roadmap\\_2013.pdf](https://www.faa.gov/uas/resources/policy_library/media/uas_roadmap_2013.pdf) [hereinafter FAA UAS ROADMAP 2013] (“Visual Line-of-Sight...means visual contact between a pilot-in-command or a visual observer and a UAS sufficient to maintain safe operational control of the aircraft, know its location, and be able to scan the airspace in which it is operating to see and avoid other air traffic or objects aloft or on the ground.”).

<sup>52</sup> *Is There a Specific Distance Implied When the FAA Says ‘Visual Line-of-Sight’?*, DRONE PILOT GROUND SCH., <https://www.dronepilotgroundschool.com/kb/is-there-a-specific-distance-implied-when-the-faa-says-visual-line-of-sight/> (last visited Feb. 27, 2020); *Beyond Visual Line of Sight Drone Flight*, PRECISIONHAWK, <https://www.precisionhawk.com/beyond-visual-line-of-sight-bvlos-drone-operations> (last visited Mar. 5, 2020) (noting that EVLOS operations commence at approximately 0.75 miles from the operator).

<sup>53</sup> *Beyond Visual Line of Sight Drone Flight*, *supra* note 52.

<sup>54</sup> Vesna Brajkovic, *Railroads Continue to Tap Drone Technology to Inspect Track, Bridges*, PROGRESSIVE RAILROADING (Apr. 2019), <https://www.progressiverailroading.com/mow/article/Railroads-continue-to-tap-drone-technology-to-inspect-track-bridges--57270> (stating that such operations not only provide more efficient inspection, but also are critical in emergency situations when railroad personnel cannot otherwise observe a remote area of track).

<sup>55</sup> Andrew Elefant, *What Can We Learn from Amazon and UPS’ Latest Regulatory Filings with the FAA?*, KITTY HAWK (Sept. 3, 2019), <https://kittyhawk.io/blog/what-can-we-learn-from-amazon-and-ups-latest-regulatory-filings-with-the-faa/>; Miriam McNabb, *How Zipline Became a \$1.2 Billion Drone Company*, DRONELIFE (May 21, 2019), <https://dronelife.com/2019/05/21/how-zipline-became-a-1-2-billion-drone-company/> (stating that Zipline delivers approximately 65% of blood product in Rwanda outside of the Kigali, the capital of Rwanda).

<sup>56</sup> FED. AVIATION ADMIN., U.S. DEP’T OF TRANSP., INTEGRATION OF CIVIL UNMANNED AIRCRAFT SYSTEMS (UAS) IN THE NATIONAL AIRSPACE SYSTEM (NAS) ROADMAP 13 (2d ed. 2018), [https://www.faa.gov/uas/resources/policy\\_library/media/Second\\_Edition\\_Integration\\_of\\_Civil\\_UAS\\_NAS\\_Roadmap\\_July\\_2018.pdf](https://www.faa.gov/uas/resources/policy_library/media/Second_Edition_Integration_of_Civil_UAS_NAS_Roadmap_July_2018.pdf) [hereinafter FAA UAS ROADMAP 2018]; *Beyond Visual Line of Sight Drone Flight*, *supra* note 52.

<sup>57</sup> Kohler, *supra* note 3, at 171.

Matternet, a California-based company, crashed near children in Switzerland during an experimental program for transporting laboratory samples between medical centers.<sup>58</sup> As such, navigating regulatory frameworks, both in the United States and abroad, has been a key factor for companies competing in the BVLOS market space.<sup>59</sup>

In addition to market competition, there has also been significant geographic competition to foster local drone industries, both internationally and domestically.<sup>60</sup> Some countries, such as France and New Zealand, have sought to attract drone companies with permissive drone regulations.<sup>61</sup> In doing so, these countries have become the frontrunners for drone regulations and have reaped the benefits of a growing industry.<sup>62</sup> Analysts estimated that New Zealand gained a benefit of \$190 million per year by permitting BVLOS operations.<sup>63</sup> Other countries, such as the United States, have taken a more cautious approach.<sup>64</sup> Consequently, U.S. companies interested in BVLOS operations have mostly traveled abroad to test their drones while waiting for regulations to evolve domestically.<sup>65</sup>

Within the United States, states have had limited opportunity to independently foster a local drone industry and reap the benefits of job creation and increased tax revenue from an emerging sector.<sup>66</sup> Some states have taken the initiative to foster a local drone industry by enacting policies favorable to drone businesses.<sup>67</sup> Nonetheless, states' efforts are limited so long as the FAA retains expansive control over drone regulations in low-altitude airspace.<sup>68</sup>

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<sup>58</sup> Devin Coldewey, *Drone Crash Near Kids Leads Swiss Post and Matternet to Suspend Autonomous Deliveries*, TECHCRUNCH (July 30, 2019), <https://techcrunch.com/2019/07/30/drone-crash-near-kids-leads-swiss-post-and-matternet-to-suspend-autonomous-deliveries/>.

<sup>59</sup> See Jones, *supra* note 1, at iii (noting that Amazon, Alphabet, UPS, DHL, and Alibaba are competing in the drone delivery space, and face varying international regulations around the world).

<sup>60</sup> *The Future of Drones Depends on Regulation, Not Just Technology*, ECONOMIST: TECH. Q (June 8, 2017), <https://www.economist.com/technology-quarterly/2017/06/08/the-future-of-drones-depends-on-regulation-not-just-technology>; Jones, *supra* note 1, at 1; Andrea Peterson, *States Are Competing to Be the Silicon Valley of Drones*, WASH. POST (Aug. 19, 2013), <https://www.washingtonpost.com/news/the-switch/wp/2013/08/19/states-are-competing-to-be-the-silicon-valley-of-drones/>.

<sup>61</sup> Kohler, *supra* note 3, at 176–77.

<sup>62</sup> See *id.* (illustrating the difficulty of scaling commercial drone operations without BVLOS authorization).

<sup>63</sup> *Id.* at 177.

<sup>64</sup> See Jones, *supra* note 1, at 9 (stating that the United States requires visual line of sight operations, unless waivers are obtained).

<sup>65</sup> Timothy M. Ravich, *Grounding Innovation: How Ex-Ante Prohibitions and Ex-Post Allowances Impede Commercial Drone Use*, 2018 COLUM. BUS. L. REV. 495, 583 (reporting that “DHL, unable to get authorization to test its drone in the United States (carrying medicine), simply arranged to fly in Germany instead. Amazon did the same in Canada, as did Alphabet in Australia.”); Andrew C. Revkin, *In Madagascar Test, Drone Delivers Medicine by Air*, N.Y. TIMES (Nov. 26, 2016), <https://dotearth.blogs.nytimes.com/2016/11/26/in-madagascar-test-drones-deliver-medicine-by-air/> (reporting on drone flights conducted in Madagascar by Vayu, Inc. a Michigan-based company).

<sup>66</sup> See Peterson, *supra* note 60 (“[C]ompetition is fierce because the test sites hold the potential to create thousands of jobs and millions in tax revenue.”).

<sup>67</sup> See generally BRENT SKORUP & CONNOR HAALAND, WHICH STATES ARE PREPARED FOR THE DRONE INDUSTRY? A 50-STATE REPORT CARD (2020), <https://www.mercatus.org/publications/technology-and-innovation/which-states-are-prepared-drone-industry> (discussing states' initiatives to foster a local drone industry).

<sup>68</sup> See FAA FACT SHEET 2015, *supra* note 10, at 2–3 (discussing the FAA's view that federal regulations preempt state and local regulations for drone operations).

### B. Sharing the Airspace Among Individuals, States, and the Federal Government

Although the FAA's influence in low-altitude airspace is pervasive today, historically, its authority was limited to navigable airspace.<sup>69</sup> The Supreme Court affirmed individuals' and states' rights to their airspace in the landmark cases of *United States v. Causby* in 1946 and *Braniff Airways Inc., v. Nebraska State Board of Equalization and Assessment* in 1954.<sup>70</sup>

In *Causby*, the Court struggled to strike a balance between protecting the air as a "public highway" and protecting landowners' property rights.<sup>71</sup> The Causby family, who owned a chicken farm in North Carolina, sued the U.S. government for an unconstitutional taking when the government's Army bombers flew at low-altitudes above the Causby's land.<sup>72</sup> Flying as low as sixty-three feet above the barn, the Army bombers' loud noise and glaring lights terrified the chickens, resulting in the death of 150 chickens and the closure of the Causby's farm.<sup>73</sup> Ultimately, the Court asserted that landowners retained property rights to the "immediate reaches" above the land that they used or occupied.<sup>74</sup>

*Causby* also touched on another claim to airspace, that of the states.<sup>75</sup> In analyzing the case, the Court looked to North Carolina law, which like many states' laws, established that the state retained sovereignty over its airspace except where otherwise granted to the federal government.<sup>76</sup> Although the Air Commerce Act of 1926 (the 1926 Act) established that the federal government had sovereignty over navigable airspace, and *Causby* affirmed landowners' airspace rights to "immediate reaches" above their land, rights to low-altitude airspace remained ambiguous.<sup>77</sup> For purposes of this Article, low-altitude airspace is everything between a landowner's "immediate reaches" and the navigable airspace line, which varies depending on a region's geography and terrain.<sup>78</sup> State and local governments' claims to this low-altitude airspace is at the heart of current disputes over the FAA's drone regulations.<sup>79</sup>

Some have incorrectly asserted that 49 U.S.C. § 40103(a), which states in relevant part that "[t]he United States Government has exclusive sovereignty of airspace of the United State" establishes exclusive federal sovereignty over *all*

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<sup>69</sup> Migala, *supra* note 8, at 12.

<sup>70</sup> *Braniff Airways, Inc. v. Nebraska State Bd. of Equalization and Assessment*, 347 U.S. 590, 594–97 (1954); *United States v. Causby*, 328 U.S. 256, 264 (1946).

<sup>71</sup> See *Causby*, 328 U.S. at 261 (discussing the conflicts between the "public highway" for aircraft and landowners' airspace rights).

<sup>72</sup> *Id.* at 258–59.

<sup>73</sup> *Id.*

<sup>74</sup> *Id.* at 264 (stating "if a landowner is to have full enjoyment of the land, he must have exclusive control of the immediate reaches of the enveloping atmosphere" and furthermore that "[t]he landowner owns at least as much of the space above the ground as he can occupy or use in connection with the land").

<sup>75</sup> *Id.* at 266.

<sup>76</sup> *Id.*; N.C. Gen. Stat. §63-11 (2019).

<sup>77</sup> See Air Commerce Act of 1926, Pub. L. No. 69-254, 44 Stat. 568, 568–76 (repealed 1938, 1958) (establishing the navigable airspace for airplane traffic); *Causby*, 328 U.S. at 264–65, 267–68 (affirming landowners' rights to the "immediate reaches" of their airspace).

<sup>78</sup> *Causby*, 328 U.S. at 264.

<sup>79</sup> See, e.g., Drone Integration and Zoning Act of 2019, S. 2607, 116th Cong. (2019) (proposing to increase states' authority over drones in low-altitude airspace).

airspace to the exclusion of state and local governments.<sup>80</sup> In *Braniff Airways*, the Court expressly clarified that § 40103(a) asserted national sovereignty over U.S. airspace but did not exclude states from asserting their authority over their low-altitude airspace.<sup>81</sup> The Court stated that the provision’s force “bottomed on the commerce clause of Congress, not on national ownership of navigable airspace.”<sup>82</sup> Thus, the federal government cannot claim exclusive sovereignty from § 40103(a) to govern the airspace, to the exclusion of the states.<sup>83</sup> Rather, as in most areas of law, states retain their police powers to ensure the safety, health, and welfare of their populations.<sup>84</sup>

The federal government does retain near exclusive authority over manned aircraft in navigable airspace.<sup>85</sup> Drones, however, differ in two important aspects from conventional manned aircraft—drones operate primarily in low-altitude airspace and operate almost exclusively intrastate.<sup>86</sup> Consequently, the FAA’s authority is on shakier grounds for drones than their traditional domain of interstate manned aircraft traffic.<sup>87</sup>

### C. Federal Drone Laws and Regulations

The FAA has regulated drones since the 1980s; however, the rise of commercial drones ushered in a new era for drone regulation beginning with the FAA Modernization and Reform Act of 2012 (FMRA).<sup>88</sup> The FMRA mandated the FAA to integrate drones into the airspace through the establishment of test sites, pilot programs, new licensing regimes for drone pilots, and blanket permissions for a limited set of lower-risk drone operations.<sup>89</sup> Understandably, the FAA’s priorities for integration of drones into the airspace have been safety, efficiency, and national security.<sup>90</sup> Other countries’ civil aviation authorities have balanced these priorities

<sup>80</sup> 49 U.S.C. § 40103(a) (2018) (“The United States Government has exclusive sovereignty of airspace of the United States.”); Migala, *supra* note 8, at 12.

<sup>81</sup> *Braniff Airways*, 347 U.S. at 595–96.

<sup>82</sup> *Id.* at 596–97.

<sup>83</sup> *See id.* (stating that the federal government’s authority over the airspace is limited to their Commerce Clause powers).

<sup>84</sup> *See* FAA FACT SHEET 2015, *supra* note 10, at 3 (stating that “[l]aws traditionally related to state and local police power—including land use, zoning, privacy, trespass, and law enforcement operations—generally are not subject to federal regulation.”). *See generally* Migala, *supra* note 8 (providing a comprehensive overview of the development of §40103(a) and the resulting misinterpretation from overly simplified codification). Two points are worth emphasizing. First, the original version of today’s § 40103(a) arose from the United States’ participation in international conventions regarding aviation laws. Migala, *supra* note 8, at 16–20. And second, before the 1926 Act and long afterwards, states enacted their own aviation laws, largely based on the Uniform State Laws of Aeronautics. *Id.* at 32.

<sup>85</sup> *See* *Northwest Airlines v. Minnesota*, 322 U.S. 292, 303 (1944) (Jackson, J., concurring) (“Planes do not wander about the sky like vagrant clouds. They move only by federal permission, subject to federal inspection, in the hands of federally certified personnel and under an intricate system of federal command.”).

<sup>86</sup> *See* Rule, *supra* note 21, at 155–56 (stating that drones operate predominantly within the borders of a single state).

<sup>87</sup> Rule, *supra* note 44, at 198.

<sup>88</sup> FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, §§ 331–336, 126 Stat. 11, 72–78 (codified as amended in scattered sections of 49 U.S.C.); Kohler, *supra* note 3, at 156–57.

<sup>89</sup> *See generally* FAA Modernization and Reform Act §§ 331, 335, 49 U.S.C. § 44802 (2018); §§ 332–334, 336, 49 U.S.C. § 40101 (2012) (repealed 2018) (establishing a modern framework for drone integration into the national airspace).

<sup>90</sup> FAA UAS ROADMAP 2013, *supra* note 51, at 11–12.

with a desire to promote the growth of domestic drone businesses.<sup>91</sup> For example, France has achieved a comparable safety outcome to the United States but has still managed to encourage drone businesses to experiment with BVLOS operations.<sup>92</sup> The FAA's narrow focus has resulted in restrictions and bottlenecks that have hampered U.S. drone companies' research and efforts.<sup>93</sup> Moreover, the FAA's efforts to accelerate drone integration and experimentation have been limited to a select set of states and companies.<sup>94</sup>

## 1. Evolution of the FAA's Regulatory Framework for Commercial Drones

The evolution of the FAA's commercial drone regulation can be broken down into three phases: prior to the FMRA, Section 333 exemptions under the FMRA, and Part 107 regulations.<sup>95</sup> Prior to the dramatic rise of commercial drones, the FAA required civil operators to apply for special airworthiness certificates in the experimental category under 49 U.S.C. § 44704(d)(1).<sup>96</sup> Although this system worked for a small number of operators, by 2012, Congress recognized that existing FAA regulations bottlenecked the commercial drone market and passed the FMRA.<sup>97</sup> First, the FMRA mandated the FAA to immediately review and grant, if appropriate, Section 333 exemptions to accelerate the integration of drones into the airspace.<sup>98</sup> Second, the FMRA required the FAA to pass a final rule for small unmanned aircraft systems by September 30, 2015.<sup>99</sup> The FAA fell behind schedule for passing this final rule, ultimately promulgating 14 CFR § 107 on June 28, 2016, commonly referred to as Part 107.<sup>100</sup> Part 107 regulations remain in effect today and will be the focus of this discussion.<sup>101</sup>

Although the Section 333 exemptions were a significant step forward in 2012, commercial drone operators anxiously waited for the FAA to issue its final rules for small unmanned aerial systems (UAS) pursuant to FMRA Section 332(b).<sup>102</sup> The final rules, generally referred to as Part 107 regulations, were met with mixed reactions from commercial drone operators.<sup>103</sup> Some were pleased the

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<sup>91</sup> See Kohler, *supra* note 3, at 177 (explaining that France has achieved a similar safety record to the United States and has permitted commercial drone operators to test riskier operations, such as night-time flights and BVLOS).

<sup>92</sup> *Id.* (noting that safety outcomes include interference with manned aircraft, and damage to persons or property).

<sup>93</sup> See *Why 99% of BVLOS Part 107 Waivers Are Rejected*, *supra* note 36 (reporting that 99% of BVLOS waivers are rejected, indicating a very limited opportunity to experiment with riskier operations).

<sup>94</sup> See *id.* (reporting that 99% of BVLOS waivers are rejected, indicating a very limited opportunity to test BVLOS operations for organizations that were not selected to participate in the IPP); Dukowitz, *supra* note 19 (illustrating how the FAA has permitted large industry participants, such as UPS and Alphabet, to experiment with BVLOS through the FAA's UAS Integration Pilot Program (IPP)).

<sup>95</sup> See generally Kohler, *supra* note 3, at 155–60 (providing the evolution of the FAA's regulatory framework for drones).

<sup>96</sup> 49 U.S.C. § 44704(d)(1) (2018); Ravich, *supra* note 65, at 555–57 (noting that commercial operators could alternatively partner with a public entity and obtain a Certificate of Waiver or Authorization (COA)).

<sup>97</sup> FAA Modernization and Reform Act §§ 331, 335, 49 U.S.C. § 44802; §§ 332–334, 336, 49 U.S.C. § 40101 (2012) (repealed 2018); Kohler, *supra* note 3, at 157.

<sup>98</sup> See FAA Modernization and Reform Act § 333, 49 U.S.C. § 40101 (2012) (repealed 2018) (directing the FAA to promulgate regulations to safely integrate drones into the national airspace).

<sup>99</sup> *Id.* § 332(a)(3), 49 U.S.C. § 40101 (2012) (repealed 2018).

<sup>100</sup> Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. 42,603 (June 28, 2016) (codified at 14 C.F.R. § 107 (2020)).

<sup>101</sup> *Id.*

<sup>102</sup> Ravich, *supra* note 65, at 558–61.

<sup>103</sup> Kelsey D. Atherton, *What Does the Drone Industry Think of the FAA's New Rules?*, POPULAR SCI. (Feb. 19, 2015), <https://www.popsci.com/what-does-drone-industry-think-faas-new-rules/>.

rules provided more certainty; others were disappointed the uniform rules did not account for a diverse set of local operating conditions.<sup>104</sup> For example, those in the precision agriculture industry had hoped for more lenient BVLOS operations in rural areas given the significantly lower risks of harming individuals or property than urban areas with high population densities.<sup>105</sup>

Despite its shortcomings, Part 107 was transformative for drone businesses operating in the U.S when it went into effect on August 29, 2016.<sup>106</sup> Like Section 333, Part 107 transitioned the FAA from focusing on certifying the airworthiness of drones to permitting limited types of drone operations.<sup>107</sup> This transition was critical for accelerating drone innovation because it removed the bottleneck of the FAA approving each new experimental aircraft.<sup>108</sup> Part 107 established a system where the FAA blanketly permitted a limited set of drone operations.<sup>109</sup> Specifically, under Part 107, a certified drone operator could now operate a small UAS within visual line of sight (VLOS) during daylight hours in Class G uncontrolled airspace below 400 feet AGL.<sup>110</sup>

Additionally, Part 107 effectively created a much greater pool of certified drone operators because it no longer limited drone operation to individuals who had earned traditional pilot licenses.<sup>111</sup> This in turn made it significantly easier and cheaper for businesses to hire drone operators, whether to fly commercial off-the-shelf drones for surveying or to test their own aircraft.<sup>112</sup> Under Part 107, a commercial drone operator is only required to obtain a Remote Pilot Certificate by registering with the FAA and passing an Aeronautical Knowledge Test.<sup>113</sup> This new certification process balanced the FAA's mission to maintain a safe airspace with the demand for decreasing barriers to drone integration.<sup>114</sup>

For those who wanted to operate outside of Part 107, the FAA created a waiver system.<sup>115</sup> Under the waiver system, the FAA granted authorization on a case-by-case basis for various types of riskier operations, such as flying at night, over people, or BVLOS.<sup>116</sup> The day that Part 107 went into effect, the FAA issued

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<sup>104</sup> *Id.*

<sup>105</sup> *Id.*

<sup>106</sup> Kohler, *supra* note 3, at 153, 160.

<sup>107</sup> ANNA MASUTTI & FILIPPO TOMASELLO, INTERNATIONAL REGULATION OF NON-MILITARY DRONES 18, 72 (2018).

<sup>108</sup> *See id.* at 72 (stating that the FAA granted over 5,500 exemptions between the FMRA enactment and September 2016).

<sup>109</sup> *See* 14 C.F.R. §§ 107.29, 107.31 (2020) (permitting operation within visual line of sight during the day-time, among other restrictions).

<sup>110</sup> FAA UAS ROADMAP 2018, *supra* note 56, at 10 (illustrating that a Class G airspace is an uncontrolled airspace that does not require approval from Air Traffic Management (ATM), whereas Class B, C, D and E are controlled airspaces that require approval from ATM); Ravich, *supra* note 65, at 561.

<sup>111</sup> FAA UAS ROADMAP 2018, *supra* note 56, at 10.

<sup>112</sup> *See id.* (stating the lower requirements to become a UAS pilot after Part 107 was promulgated).

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

<sup>114</sup> *Id.*

<sup>115</sup> *Part 107 Waivers*, FED. AVIATION ADMIN., U.S. DEP'T OF TRANSP., [https://www.faa.gov/uas/commercial\\_operators/part\\_107\\_waivers/](https://www.faa.gov/uas/commercial_operators/part_107_waivers/) (last modified Aug. 1, 2019); Diego Barrera, *Tips for Applying for a Part 107 Waiver*, SKYWARD (Oct. 14, 2019), <https://skyward.io/tips-for-applying-for-part-107-waiver/>.

<sup>116</sup> *Part 107 Waivers*, *supra* note 115 (explaining waivers for § 107.29 for Daylight Operations and § 107.31 for Visual Line of Sight Aircraft Operation).

seventy-five waivers and, as of this writing, has granted over 4,300 waivers.<sup>117</sup> This, however, is a small fraction of total waiver applications.<sup>118</sup> In 2018, for example, the FAA approved just 16% of 11,345 waiver applications.<sup>119</sup> Furthermore, 99% of waivers for BVLOS have been denied.<sup>120</sup> Additionally the waiver process requires at least ninety days and can take significantly longer for more complex operations.<sup>121</sup> For example, the FAA took three years to approve a BVLOS waiver at one of its approved UAS Test Sites.<sup>122</sup> When reviewing the FAA's UAS Test Site Program, the Government Accountability Office expressed concern that the FAA has had trouble keeping up with the volume of Part 107 waiver applications.<sup>123</sup>

Despite the shortcomings of Part 107, the FAA has continued its efforts to integrate drones into the national airspace, largely by focusing on pilot projects in a few select states and industry participants.<sup>124</sup>

## 2. To Accelerate Drone Integration, the FAA Created Programs to Test Technology in Certain States with a Few Select Companies

To offset the restrictive regulatory framework for commercial drones, the FAA implemented UAS test sites and several pilot programs to facilitate controlled experiments for riskier drone operations, such as night-time and BVLOS operations.<sup>125</sup> It is critical to note the FAA granted these opportunities to a few select states and industry participants, restricting the vast majority of states and businesses to Part 107 regulations and its cumbersome waiver system.<sup>126</sup> States' ability to attract drone companies has largely depended on being selected for the FAA's two test programs: the UAS Test Site Program and the UAS Integration Pilot Program

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<sup>117</sup> *Part 107 Waivers Issued*, FED. AVIATION ADMIN., U.S. DEP'T OF TRANSP.,

[https://www.faa.gov/uas/commercial\\_operators/part\\_107\\_waivers/](https://www.faa.gov/uas/commercial_operators/part_107_waivers/) (last modified Sept. 3, 2020).

<sup>118</sup> Nick Zazulia, *FAA: Why Most Drone Rule Waiver Applications Crash and Burn*, AVIATION TODAY (Aug. 7, 2018), <https://www.aviationtoday.com/2018/08/07/faa-drone-rule-waiver-applications-crash-burn/>.

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

<sup>120</sup> *Why 99% of BVLOS Part 107 Waivers Are Rejected*, *supra* note 36.

<sup>121</sup> GAO DRONE INTEGRATION REPORT, *supra* note 15, at 24.

<sup>122</sup> *Id.* at 24.

<sup>123</sup> *Id.* at 23–24.

<sup>124</sup> *See, e.g., UAS Integration Pilot Program*, FED. AVIATION ADMIN., U.S. DEP'T OF TRANSP.,

[https://www.faa.gov/uas/programs\\_partnerships/integration\\_pilot\\_program/](https://www.faa.gov/uas/programs_partnerships/integration_pilot_program/) (last modified Dec. 10, 2019)

(explaining the FAA's major initiative for drone integration); Dukowitz, *supra* note 19 (reporting that Alphabet, Intel, Apple, FedEx, Microsoft, AT&T were among the big winners for the UAS Integration Pilot Program, a major initiative by the FAA to advance drone integration).

<sup>125</sup> FAA Modernization and Reform Act § 332(c) (repealed 2018) (requiring the FAA to establish at least six test sites to accelerate drone integration in the national airspace system); *Fact Sheet – The UAS Integration Pilot Program*, FED. AVIATION ADMIN., U.S. DEP'T OF TRANSP. (Mar. 31, 2020), [https://www.faa.gov/news/fact\\_sheets/news\\_story.cfm?newsId=23574](https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=23574) [hereinafter *UAS IPP Fact Sheet*].

Contract towers are air traffic control towers that are staffed by employees of private companies rather than by FAA employees. LAANC provides air traffic professionals with visibility into where and when authorized drones are flying near airports and helps ensure that everyone can safely operate within the airspace. The expansion to more than 100 contract towers means the FAA has further increased drone pilots' access to controlled airspace safely and efficiently.

*LAANC More Access to Airspace to Fly Drones*, FED. AVIATION ADMIN., U.S. DEP'T OF TRANSP., [https://www.faa.gov/news/updates/?newsId=93789&omniRss=news\\_updatesAoc&cid=101\\_N\\_U](https://www.faa.gov/news/updates/?newsId=93789&omniRss=news_updatesAoc&cid=101_N_U) (last visited Feb. 15, 2020).

<sup>126</sup> *See, e.g.,* Dukowitz, *supra* note 19 (reporting Alphabet, Apple among the winners for the IPP); Zazulia, *supra* note 118.

(IPP), launched in 2013 and 2017 respectively.<sup>127</sup> Similarly, companies' ability to test advanced drone operation has depended on securing BVLOS waivers or participating in the IPP.<sup>128</sup>

Pursuant to the FMRA Section 332(c), the FAA selected six locations to serve as UAS Test Sites for riskier drone operation, such as Detect and Avoid (DAA) systems and BVLOS flights.<sup>129</sup> States competed fiercely, with twenty-four states vying for the seven spots.<sup>130</sup> The winners included Alaska, Nevada, New Mexico, New York, North Dakota, Texas, and Virginia.<sup>131</sup> These UAS Test Sites have remained a central part of the FAA's strategy for integrating drones into the airspace, but have come at the cost of concentrating opportunities in a small number of states.<sup>132</sup>

The IPP, which launched in 2017 by President Trump's executive order, was met with great excitement in the drone industry.<sup>133</sup> The order directed the FAA to partner with state, local, and tribal governments together with private-sector entities to accelerate the approval of operations that fell beyond Part 107, including BVLOS operations.<sup>134</sup> The impetus for the IPP program was the recognition of the drone industry's potential to contribute to the efficiency and productivity of the market, as well as create "tens of thousands of new American jobs."<sup>135</sup> The FAA received about 149 applications for the IPP, predominately from public-private partnerships, such as Amazon's partnership with the state of New York.<sup>136</sup> Ultimately, many applicants were disappointed as only ten were selected to participate in the IPP.<sup>137</sup> Of these ten winners, four were in the same states that had previously secured UAS Test Sites: Alaska, Nevada, North Dakota, and Virginia.<sup>138</sup> Virginia's selection as both a UAS Test Site and an IPP participant through its partnership with Wing (an Alphabet subsidiary) has positioned it as a leader in the domestic drone market.<sup>139</sup> Another IPP winner, North Carolina, which partnered with UPS

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<sup>127</sup> FAA Reauthorization Act of 2018 § 351, 49 U.S.C. § 44802 (2018) (mandating the UAS Integration Pilot program); see Peterson, *supra* note 60 (noting that twenty-four states competed for the six spots as a UAS Site); Dukowitz, *supra* note 19 (reporting on the winners for the IPP program).

<sup>128</sup> Dukowitz, *supra* note 19 (discussing several IPP participants that plan to test BVLOS operations); *Part 107 Waivers Issued*, *supra* note 117.

<sup>129</sup> FAA Modernization and Reform Act § 332(c), 49 U.S.C. § 40101 (2012) (repealed 2018); *UAS Test Site Program*, FED. AVIATION ADMIN., U.S. DEPT OF TRANSP., [https://www.faa.gov/uas/programs\\_partnerships/test\\_sites](https://www.faa.gov/uas/programs_partnerships/test_sites) (last modified May 6, 2020) (noting that Detect and Avoid (DAA) systems provide drones with the capability to autonomously detect and avoid obstacles in the airspace).

<sup>130</sup> Peterson, *supra* note 60; *UAS Test Site Program*, *supra* note 129 (noting that the FAA expanded the program from six to seven sites).

<sup>131</sup> *UAS Test Site Program*, *supra* note 129.

<sup>132</sup> See *id.* (illustrating that UAS test sites were unique areas to experiment with riskier drone operations, such as BVLOS, Detect and Avoid (DAA) systems, and multiple UAS systems operating simultaneously by a single operator).

<sup>133</sup> Memorandum on Unmanned Aircraft Systems Integration Pilot Program, DAILY COMP. PRES. DOC. 2017 DCPD No. 00786 (Oct. 31, 2017) (stating other goals of "identifying ways to balance local and national interests related to drone integration; improving communications with local, state and tribal jurisdictions; and addressing security and privacy risks"); FAA Reauthorization Act of 2018 § 351, 49 U.S.C. § 44802 (2018) (codifying the UAS Integration Pilot Program).

<sup>134</sup> Memorandum on Unmanned Aircraft Systems Integration Pilot Program, *supra* note 133.

<sup>135</sup> *Id.*

<sup>136</sup> *UAS IPP Fact Sheet*, *supra* note 125; Dukowitz, *supra* note 19.

<sup>137</sup> Dukowitz, *supra* note 19.

<sup>138</sup> *Id.*; *UAS Test Site Program*, *supra* note 129.

<sup>139</sup> See Kyle Wiggers, *Wing Launches Drone Delivery in Christiansburg, Virginia*, VENTUREBEAT (Oct. 18, 2019), <https://venturebeat.com/2019/10/18/wing-launches-drone-delivery-in-christiansburg-virginia/> (reporting that Virginia was the first state to have drone delivery for its residents).

and drone manufacturer Matternet, has become another market leader.<sup>140</sup> It was a surprise at the time that Amazon and its partner state New York, which had been a UAS Test Site, were not selected.<sup>141</sup> Some speculated that politics influenced the decision.<sup>142</sup> Many businesses seeking to test their BVLOS operations were also among the many denied applications for the IPP.<sup>143</sup>

Participation in the IPP provided an accelerated path for Alphabet and UPS to secure authorization for drone package delivery in 2019 under 14 C.F.R. § 135 Air Carrier and Operator Certification, generally referred to as Part 135.<sup>144</sup> Part 135 was designed for manned aircraft, and as such the FAA adapted it to drones by granting exemptions for rules that are inapplicable to drone operations.<sup>145</sup> On the other hand, Amazon's Part 135 application was approved nearly a year after Alphabet and UPS' applications, despite extensive flight testing in the United States and abroad.<sup>146</sup>

As a natural evolution from Part 135 certification, the FAA announced a Notice of Proposed Rulemaking for Type Certification of UAS in February 2020 under 14 C.F.R. § 21.17(b).<sup>147</sup> Once enacted, Part 135 operators would be required to certify their drones under § 21.17(b), although this is likely a few years away.<sup>148</sup> The move towards type certification would bring the FAA full circle back to airworthiness certification.<sup>149</sup> For companies like UPS that want to operate across the nation, type certification has significant advantages over Part 135 and BVLOS waivers that are generally tied to a geographic region.<sup>150</sup> Nevertheless, the FAA's progression towards nationwide authorization raises significant issues regarding the federal and state governments' jurisdiction over low-altitude airspace.<sup>151</sup>

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<sup>140</sup> See Andrew J. Hawkins, *UPS Will Use Drones to Deliver Medical Supplies in North Carolina*, VERGE (Mar. 26, 2019), <https://www.theverge.com/2019/3/26/18282291/ups-drone-delivery-hospital-nc-matternet> (reporting on the activities of UPS and Matternet in North Carolina to deliver medical supplies by drone as part of their participation in the FAA's Integration Pilot Program).

<sup>141</sup> Kesteloo, *supra* note 20.

<sup>142</sup> *Id.* (“President Trump’s strained relationship with Jeff Bezos, The Washington Post and Amazon may have played a role in the company having been denied the opportunity to start testing.”).

<sup>143</sup> See Dukowitz, *supra* note 19 (reporting that major industry players such as UPS, Intel, and Wing were selected for the IPP program).

<sup>144</sup> See *Package Delivery by Drone (Part 135)*, FED. AVIATION ADMIN., U.S. DEP’T OF TRANSP., [https://www.faa.gov/uas/advanced\\_operations/package\\_delivery\\_drone/](https://www.faa.gov/uas/advanced_operations/package_delivery_drone/) (last modified May 12, 2020) [hereinafter *Package Delivery by Drone*] (stating that UPS and Wing (Alphabet’s subsidiary) received Part 135 certificates for drone deliveries).

<sup>145</sup> *Id.* (noting the exclusion of the “requirement to carry the flight manuals on board the aircraft”).

<sup>146</sup> Concepción de León, *Drone Delivery? Amazon Moves Closer with F.A.A. Approval*, N.Y. TIMES (Aug. 31, 2020), <https://www.nytimes.com/2020/08/31/business/amazon-drone-delivery.html>; Brian Garrett-Glaser, *Amazon Seeks FAA Approval for Prime Air Drone Delivery*, AVIATION TODAY (Aug. 9, 2019), <https://www.aviationtoday.com/2019/08/09/following-wing-ups-amazon-seeks-approval-prime-air-drone-delivery/>

(stating that Amazon has conducted “more [than] 10,000 real-word [sic] tests of its concept of operations . . .”).

<sup>147</sup> Type of Certification of Unmanned Aircraft Systems, 85 Fed. Reg. 5905 (Feb. 3, 2020) (codified at 14 C.F.R. § 21.17(b) (2020)).

<sup>148</sup> *Id.* (noting that § 21.17(b) was designed for manned aircraft, namely for certification of atypical aircraft such as gliders and airships). As proposed, the FAA would adapt § 21.17(b) to approve certain types of drones as a “special class” of aircraft, and subsequently permit this class to operate nationally in the controlled airspace). *Id.*

<sup>149</sup> See MASUTTI & TOMASELLO, *supra* note 107, at 18–19 (describing the differences between aircraft-centric and operation-centric regulatory approaches).

<sup>150</sup> See Brian Garrett-Glaser, *FAA Releases Policy Proposal for Type Certifying Drones*, AVIATION TODAY, (Feb. 5, 2020), <https://www.aviationtoday.com/2020/02/05/faa-releases-policy-proposal-type-certifying-drones/> (stating that type certification is critical for scaling drone delivery services).

<sup>151</sup> See SNEAD & SEIBLER, *supra* note 10, at 1 (“Drones will operate extensively in this low-altitude airspace where state and local interests like trespass, nuisance, property damage, personal injury and land use predominate”).

### D. State and Local Response to the Growth of the Commercial Drone Market

Although states have largely accepted that the FAA has authority over aircraft navigable airspace, it is still up for debate how involved state and local governments should be in regulating aircraft in low-altitude airspace.<sup>152</sup> Prior to the introduction of drones, the state's role was largely limited to harmonizing state laws with the FAA's regulations, such as altering zoning laws for areas surrounding airports.<sup>153</sup> Each state has an aviation office, such as Alabama's Department of Transportation's Aeronautics Bureau and Virginia's Department of Aviation.<sup>154</sup> Thus far, state aviation offices have had limited involvement with drones, though some have taken proactive steps to promote drone integration into their airspace.<sup>155</sup> For example, at the direction of Governor Whitmer, the Michigan Department of Transportation's Aeronautic Commission set up a UAS Task Force.<sup>156</sup>

Nonetheless, state and local governments have an important role to play so that drone regulations reflect local preferences, rather than the uniform imposition of the FAA's preferences.<sup>157</sup> Following is a discussion of the restricting and enabling laws that states and localities have implemented and an overview of the current debate over how much authority the FAA should have in historically state-owned low-altitude airspace.<sup>158</sup>

#### 1. Restricting and Enabling Drone Laws in States and Municipalities

As of 2018, forty-one states have enacted legislation addressing drones.<sup>159</sup> State legislatures have considered various measures to restrict some drone operations and others to enable and foster a local drone industry.<sup>160</sup> On one hand, states and local governments concerned with privacy, safety, and civil liberties have limited the flight of drones in certain areas, such as municipal parks, as well as for certain activities, such as hunting game.<sup>161</sup> Additionally, states have considered whether and how law enforcement and other state agencies should utilize drones, implicating potential Fourth Amendment concerns for illegal search and seizures.<sup>162</sup> It is worth noting that much of the negative news about drones results from

<sup>152</sup> See Drone Integration and Zoning Act of 2019, S. 2607, 116th Cong. (2019) (proposing that state, local, and tribal governments assume greater authority over drones operating in low-altitude airspace).

<sup>153</sup> See, e.g., *Airspace & Zoning*, OFF. OF AERONAUTICS, MICHIGAN DEP'T OF TRANSP., [https://www.michigan.gov/aero/0,4533,7-352-79155\\_79164---,00.html](https://www.michigan.gov/aero/0,4533,7-352-79155_79164---,00.html) (last visited June 14, 2020) (stating that Michigan Aeronautics (Michigan's state aviation office) "provides safe and reasonable methods to assure proper protection and zoning for the areas surrounding areas in Michigan . . .").

<sup>154</sup> *State Aviation Offices*, AOPA, <https://www.aopa.org/advocacy/state-advocacy/state-aviation-offices> (last visited Feb. 28, 2020).

<sup>155</sup> See generally SKORUP & HAALAND, *supra* note 67.

<sup>156</sup> MICH. COMP. LAWS § 259.331 (2020).

<sup>157</sup> Rule, *supra* note 21, at 133.

<sup>158</sup> See *infra* notes 159–194 and accompanying text.

<sup>159</sup> *Current Unmanned Aircraft State Law Landscape*, NAT'L. CONF. STATE LEGIS., Sept. 10, 2018, <http://www.ncsl.org/research/transportation/current-unmanned-aircraft-state-law-landscape.aspx>.

<sup>160</sup> See *id.* (providing an overview of various new state laws, including "North Dakota SCR 4014 support[ing] the development of the UAS industry in the state . . ." and "Montana HB 644 prohibit[ing] using UAS to interfere with wildfire suppression efforts").

<sup>161</sup> *Current Unmanned Aircraft State Law Landscape*, *supra* note 159; see, e.g. *Michigan Coalition of Drone Operators v. Genesee County Parks Commission*, Docket No. 19-113058 C2 (Mich. Cir. Ct. Feb 10, 2020) (showing a municipal government's attempt to limit drone operations in local parks).

<sup>162</sup> ESSEX, *supra* note 12, at 14.

recreational rather than commercial use of drones, including amateur drone operators invading private property and interfering with airplanes and wildfire response teams.<sup>163</sup> This Article focuses primarily on commercial drone operations, which require a certified drone pilot and generally have higher standards of operation and safety.<sup>164</sup>

On the other hand, some states have eagerly taken measures to foster local drone industry.<sup>165</sup> As discussed above, over twenty-four states applied for the UAS Test Site Program, and 149 public entities applied for the IPP indicating these states and localities have embraced the new drone industry.<sup>166</sup> For example, as of February 2020, North Dakota planned to invest \$33 million in its drone industry, with the goal of being the leading state for drone research, development, and commercialization.<sup>167</sup> Similarly, Utah and Texas have partnered with the FAA and NASA for their Urban Air Mobility (UAM) program, with the goal to capture part of an expected \$3 trillion market by 2040 for drones and air taxis.<sup>168</sup>

States are simultaneously restricting drone activities that are harmful to their citizens and working to foster a local drone industry as a source for jobs and revenue.<sup>169</sup> Given the complex policy issues and unique preferences across the country, some have questioned whether the FAA's uniform national regulations are the best response to this novel technology.<sup>170</sup>

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<sup>163</sup> See Ravich, *supra* note 65, at 567–69 (stating that “the FAA has reported issuing slightly less than two dozen civil penalties to drone operators, with fines generally ranging between \$400 and \$5500 (with one outlier at \$1.9 million). . . though no one seems to have been fined for flying a drone commercially”); Chris Matyszczyk, *Judge Rules Man Had Right to Shoot Down Drone over His House*, CNET (Oct. 28, 2015), <https://www.cnet.com/news/judge-rules-man-had-right-to-shoot-down-drone-over-his-house/> (reporting that amateur drones have invaded private property, and interfered with airplanes and wildfire response).

<sup>164</sup> See Ravich, *supra* note 65, at 567–69 (stating that the FAA has issued civil penalties only to recreational drone operators, and that commercial drone operators have not received such fines).

<sup>165</sup> See, e.g., N.D. CENT. CODE § 54-60-29 (2020) (demonstrating North Dakota's commitment to developing the infrastructure for BVLOS operations in the state); *North Dakota Invests \$33 Million in UAS Infrastructure to Support Statewide Beyond Visual Line of Sight Operations*, N.D. ST. GOV't (May 1, 2019), <https://www.nd.gov/news/north-dakota-invests-33-million-uas-infrastructure-support-statewide-beyond-visual-line-sight> (announcing a \$33 million investment in BVLOS operations in North Dakota).

<sup>166</sup> *UAS IPP Fact Sheet*, *supra* note 125; Peterson, *supra* note 60.

<sup>167</sup> *North Dakota Invests \$33 Million in UAS Infrastructure to Support Statewide Beyond Visual Line of Sight Operations*, *supra* note 165.

<sup>168</sup> Muriel Xochimiltl, *Flying Cars: A Jetsonian Reality Coming to Utah*, UTAHPOLICY.COM (Feb. 25, 2019), <https://utahpolicy.com/index.php/features/today-at-utah-policy/19551-flying-cars-a-jetsonian-reality-coming-to-utah>.

Large companies and small start-ups are vying for a piece of the UAM market that analysts predict will grow to nearly \$3 trillion by 2040. Amazon's Prime Air, Uber Air, CityAirbus and Boeing's NeXt are all examples of large companies developing UAM products. Smaller companies like Utah-based start-up, ElectraFly, are vying to be part of this future transportation system as well.

*Id.*; see *NASA Chooses Texas A&M University-Corpus Christi for Urban UTM Test Programme*, UNMANNED AIRSPACE (Feb. 20, 2019), <https://www.unmannedairspace.info/uncategorized/nasa-chooses-texas-am-university-corpus-christi-for-urban-utm-test-programme/> (discussing NASA's partnership with Texas A&M University).

<sup>169</sup> See ESSEX, *supra* note 12, at 13 (explaining that state and local governments can require “police to obtain a warrant prior to using a UAS for surveillance” and prohibit “attaching firearms or similar weapons to UAS”); Peterson, *supra* note 60 (discussing competition among states to secure an FAA UAS test site to foster a local drone industry).

<sup>170</sup> See *generally* Rule, *supra* note 21.

## 2. The Debate Over Regulation of Drones in Low-Altitude Airspace

What role state and local governments should play in regulating drones remains an unanswered question.<sup>171</sup> Although the FAA has tried to assert its authority over drones regardless of where they fly, Congress has not yet provided a clear statement giving the FAA authority over drones in low-altitude airspace.<sup>172</sup> Congress has had multiple opportunities to define this line between federal and state control over low-altitude airspace, yet chose not to in the FMRA, the FAA Extension, Safety, and Security Act of 2016 (2016 Act) nor the FAA Reauthorization Act of 2018 (2018 Act).<sup>173</sup> Given this lack of clarity from Congress, the FAA has tried to assert its authority through indirect means.<sup>174</sup>

In 2015, prior to the release of Part 107, the FAA tried to preemptively draw the contours of federal, state, and local regulation of drones by releasing a fact sheet.<sup>175</sup> In the fact sheet, the FAA implied it would have field preemption over the areas of drone operation and safety.<sup>176</sup> Furthermore, it stated that state and local governments should limit their laws to traditional police powers, namely those concerning “land use, zoning, privacy, trespass, and law enforcement operations.”<sup>177</sup> Additionally, in Part 107, the FAA did not assert its authority to preempt state laws.<sup>178</sup> The FAA stated that a preemption provision was not included because “those issues necessitate a case specific analysis that is not appropriate in a rule of general applicability,” and “[s]tate law and other legal protections for individual privacy may provide recourse for a person whose privacy may be affected . . . .”<sup>179</sup>

In both the 2016 Act and 2018 Act, Congress chose not to preempt state laws regarding drone operation.<sup>180</sup> In the 2016 Act, Congress excluded the Senate bill’s provision for preempting state laws for drone operation.<sup>181</sup> Furthermore, in Section 373 of the 2018 Act, Congress mandated the Comptroller General to

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<sup>171</sup> See Drone Integration and Zoning Act of 2019, S. 2607, 116th Cong. (2019) (proposing that state, tribal, and local governments have greater authority over drone operation in low-altitude airspace).

<sup>172</sup> See FAA FACT SHEET 2015, *supra* note 10, at 1 (arguing that state and local regulations must be consistent with the FAA’s regulations); *Clear Statement Rules, Federalism, and Congressional Regulation of States*, 107 HARV. L. REV. 1959, 1959 (1994) (contending that clear statement rules require “express indications of congressional intent to effect certain specific legislative goals”).

<sup>173</sup> See FAA Reauthorization Act of 2018, Pub. L. No. 115-254, §§ 341–384, 132 Stat 3186, 3284–3320 (including § 373, which mandates a study to explore boundaries of federal, state, tribal, and local government authority over low-altitude airspace). *But cf.* FAA Extension, Safety, and Security Act of 2016 Pub. L. No. 114-190, § 2203–2213, 130 Stat. 615, 629–638 (lacking a provision for federal preemption of state, tribal, and local drone regulations).

<sup>174</sup> See FAA FACT SHEET 2015, *supra* note 10, at 1–2 (attempting to clarify the boundaries between federal, state, and local authority over low-altitude airspace).

<sup>175</sup> See *generally id.* (stating the FAA’s viewpoint that federal regulations preempt state and local regulations for drone operations).

<sup>176</sup> *Id.* at 2–3.

<sup>177</sup> *Id.* at 3 (asserting that the FAA has authority over operational UAS restrictions and on mandating equipment or training for UAS related to aviation safety).

<sup>178</sup> Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. 42,064, 42,194 (June 28, 2016) (codified at 14 C.F.R. § 107).

<sup>179</sup> *Id.* at 42,064.

<sup>180</sup> FAA Reauthorization Act of 2018 §§ 341–384, 49 U.S.C. §§ 44801–44810 (2018); FAA Extension, Safety, and Security Act of 2016 §§ 2201–2213, 49 U.S.C. §§ 44802 (2018).

<sup>181</sup> FAA Reauthorization Act of 2016, S. 2658, 114th Cong. (2016) (proposing § 214, which sought to “broadly preempt both states and cities from enacting laws related to the design, manufacture, testing, licensing, registration, certification, operation, or maintenance of UAS, including airspace, altitude, flight paths, equipment or technology requirements, purpose of operations, and pilot, operator, and observer qualifications, training, and certification”); FAA Extension, Safety, and Security Act of 2016 §§ 2201–2213, 49 U.S.C. §§ 44802 (2018) (lacking § 2142 preemption provision from the Senate version of the 2016 Act).

conduct a study on the boundary of federal, state, and local authority over low-altitude airspace.<sup>182</sup> Consequently, with respect to regulation of drones in low-altitude airspace, there is little that the FAA can point to that would convince a court that Congress intended for the FAA's regulations to preempt state and local law.<sup>183</sup>

Thus far, courts have not had an opportunity to address federal preemption of state drone regulations; however, courts have addressed preemption of local drone ordinances, both at the state and federal level.<sup>184</sup> To limit varying regulations within a state, seventeen states prevent local governments from enacting ordinances that conflict with state drone regulations, including Michigan.<sup>185</sup> In 2020, in *Michigan Coalition of Drone Operators v. Genesee County Parks Commission*, a Michigan Circuit Court held that Genesee County violated Michigan law when it banned drones from operating in its municipal parks.<sup>186</sup> At the federal level, in 2017, in *Singer v. City of Newton*, the United States District Court for the District of Massachusetts declined to apply field preemption.<sup>187</sup> Instead, the court determined that the city's ordinances for drone registration and its operation restrictions conflicted with the FAA's regulations and were thus preempted.<sup>188</sup> It remains unknown what would happen if a state were to pass drone regulations for low-altitude airspace that conflicted with the FAA's regulations.<sup>189</sup>

Starting in 2017, some Congress members expressed concern about the FAA dominating drone regulation, particularly in low-altitude airspace, by proposing the Drone Innovation Act and the Drone Federalism Act, bills from the House and Senate, respectively.<sup>190</sup> Neither of these bills were successful, and the matter was reintroduced in October 2019 by Senator Mike Lee of Utah as the Drone Integration and Zoning Act (DIZA).<sup>191</sup> Although the 2017 bills and the 2019 bill differ in the details, the overarching purpose is to enable states to take a greater role in drone regulation in low-altitude airspace, specifically the airspace below 200 feet

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<sup>182</sup> FAA Reauthorization Act of 2018 §§ 341–384, 49 U.S.C. §§ 44801–44810 (2018) (including Section 373 to “conduct a study on the relative roles of the Federal Government, State, local and Tribal governments in the regulation and oversight of low-altitude operations of unmanned aircraft systems in the national airspace”). Notably, Congress’ instructions for the report direct the Comptroller to review “[t]he degree of regulatory consistency required...for the safe and financially viable growth and development of the unmanned aircraft industry” and “[t]he interests of Federal, State, local, and Tribal governments...and the authorities of those governments to protect such interests.” *Id.*

<sup>183</sup> See FAA Reauthorization Act of 2018 §§ 341–384, 49 U.S.C. §§ 44801–44810 (including § 373 to explore the relative roles of the federal, state, local, and tribal governments in low-altitude airspace). *But cf.* FAA Extension, Safety, and Security Act of 2016 §§ 2201–2213, 49 U.S.C. §§ 44802 (2018) (noting the absence of a preemption provision).

<sup>184</sup> See e.g., *Singer v. City of Newton*, 284 F. Supp. 3d 125, 129 (D. Mass. 2017) (discussing federal preemption of local drone regulations); *Judge Rules in Favor of Drones Taking Flight in Michigan Public Parks*, INTERDRONE (Feb. 13, 2020), <https://www.interdrone.com/news/judge-rules-in-favor-of-drones-taking-flight-in-michigan-public-parks/> (discussing *Michigan Coalition of Drone Operators*, Docket No. 19-113058 C2 (Mich. Cir. Ct.) (Feb. 10, 2020), which addressed state preemption of local drone regulations).

<sup>185</sup> *Judge Rules in Favor of Drones Taking Flight in Michigan Public Parks*, *supra* note 184.

<sup>186</sup> *Id.*; *Michigan Coalition of Drone Operators*, Docket No. 19-113058.

<sup>187</sup> *Judge Rules in Favor of Drones Taking Flight in Michigan Public Parks*, *supra* note 184; *Michigan Coalition of Drone Operators*, Docket No. 19-113058.

<sup>188</sup> *Singer*, 284 F. Supp. 3d 125 at 130–33 (noting that that the City of Newton's requirement for all owners to register their pilotless aircraft conflicted with the FAA's mandatory registration requirements for drones).

<sup>189</sup> See FAA FACT SHEET 2015, *supra* note 10, at 2–3 (showing that the FAA tried to proactively establish that federal regulation would preempt local and state regulations for drone operations).

<sup>190</sup> Drone Federalism Act, S.1272, 115th Cong. (2017); Drone Innovation Act, H.R. 2930, 115th Cong. (2017).

<sup>191</sup> Drone Integration and Zoning Act of 2019, S. 2607, 116th Cong. (2019).

AGL.<sup>192</sup> Interestingly, DIZA, if enacted, would also enable states to set up intrastate drone delivery programs, providing an alternative to Part 135 certification.<sup>193</sup> DIZA, as of this writing, is under committee review, and the issues it addresses remain contentious.<sup>194</sup>

## II. CONSEQUENCES OF CENTRALIZED DRONE REGULATION

Legally, the Federal Aviation Administration's (FAA) authority over drones in low-altitude airspace is on shaky ground.<sup>195</sup> The FAA's drone regulation could be challenged under the Commerce Clause, given that the federal government is regulating an inherently *intrastate* activity in the traditional state domain of low-altitude airspace.<sup>196</sup> Alternatively, states could challenge the FAA's drone regulations under the clear statement rule, which requires Congress to expressly state its intention to upset the traditional balance of power between federal and state governments.<sup>197</sup>

Nonetheless, given the steady trend of the federal government expanding its reach into state and local concerns, the most compelling reasons against the FAA's centralized drone regulations are policy concerns.<sup>198</sup> First, the FAA's regulatory approach has favored dominant players domestically and hindered many U.S. drone companies from competing internationally.<sup>199</sup> Second, the FAA has handpicked a few states to develop regional drone industries and has nationally imposed a uniform framework, failing to take local preferences into consideration despite the fact that drone operation in low-altitude airspace is an inherently local activity.<sup>200</sup>

Section A of this Part discusses how the FAA's approach has compromised the success of U.S. drone business and distorted market competition.<sup>201</sup> Section B discusses the elevation of a few states' drone industries and the lost opportunity to tailor drone regulations to fit local preferences and conditions.<sup>202</sup>

### A. The FAA's Distortion of Market Competition

Although market competition is highly valued in the United States, federal administrative agencies have justified curtailing competition to achieve their

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<sup>192</sup> *Id.*; The Drone Federalism Act, S.1272, 115th Cong. (2017); Drone Innovation Act, H.R. 2930, 115th Cong. (2017).

<sup>193</sup> Drone Integration and Zoning Act of 2019, S. 2607, 116th Cong. (2019).

<sup>194</sup> S.2607—*Drone Integration and Zoning Act of 2019*, CONGRESS.GOV, <https://www.congress.gov/bill/116th-congress/senate-bill/2607> (last visited Mar. 5, 2020); SNEAD & SEIBLER, *supra* note 10, at 1 (advocating for greater state and local authority over drone operations in low-altitude airspace).

<sup>195</sup> See Migala, *supra* note 8, at 3 (explaining that the federal government's authority is limited to the navigable airspace).

<sup>196</sup> U.S. Const. art. I, § 8, cl. 3; see *id.* at 3 (stating that drones fly predominately in low-altitude airspace that was traditionally under the state's authority).

<sup>197</sup> *Clear Statement Rules, Federalism, and Congressional Regulation of States*, *supra* note 172.

<sup>198</sup> See Thomas W. Merrill, *Rescuing Federalism After Raich: The Case for Clear Statement Rules*, 9 LEWIS & CLARK L. REV. 823, 826 (2005) (discussing the state of federalism after *Gonzales v. Raich*, 517 U.S. 44 (1996)).

<sup>199</sup> See discussion *infra* Part II.A.

<sup>200</sup> See discussion *infra* Part II.B.

<sup>201</sup> See discussion *infra* Part II.A.

<sup>202</sup> See discussion *infra* Part II.B.

priorities.<sup>203</sup> For example, the Federal Communications Commission (FCC) long believed that the telecommunications market was a natural monopoly.<sup>204</sup> The FAA, for most of its history, has regulated a highly concentrated market of aircraft manufacturers and airlines.<sup>205</sup> As such, it is not surprising that the FAA implemented programs and regulations in which it could closely oversee a few large players while restricting other market participants to low-risk activities.<sup>206</sup> This preference has favored a small set of states and a few dominant players in the drone industry.<sup>207</sup> Arguably, dominant players gained this favorable treatment through special interest lobbying and legislative capture; however, another part of the story is that the FAA and dominant players shared a common goal of uniform regulations across the nation rather than the feared “patchwork quilt” of local and state regulations.<sup>208</sup> Additionally, public choice theory would propose that dominant players’ concentrated special interests have prevailed because of the difficulty of mobilizing the diffuse interests of small and medium-sized drone businesses.<sup>209</sup>

The FAA has doubly obstructed most drone businesses, first by establishing a restrictive regulatory regime with slow approval processes under Part 107 and then by selecting deep-pocketed companies for programs designed to test riskier operations, such as the UAS Integration Pilot Program (IPP).<sup>210</sup> Most businesses have largely been excluded from this valuable opportunity to test riskier operations, particularly BVLOS.<sup>211</sup> Globally, this has put U.S. drone businesses at a disadvantage compared to businesses in other countries that have created permissive regulatory frameworks for commercial drone operations, such as Iceland, France, New Zealand, and Australia.<sup>212</sup> Furthermore in the United States, dominant players, such as Amazon, Alphabet, UPS, and DJI have consistently had a seat at the table through their participation on the FAA’s Drone Advisory Committee, granting them not only early knowledge of changes to regulations but also the ability to influence regulations to suit their interests.<sup>213</sup>

<sup>203</sup> See Adam D. Thierer, *Unnatural Monopoly: Critical Moments in the Development of the Bell System Monopoly*, 14 CATO J. 267, 267–68 (1994) (stating the government’s role in creating a monopoly in the telecommunications market).

<sup>204</sup> *Id.* at 279 (describing the FCC’s view of Bell Systems as “the implementor of its agenda”).

<sup>205</sup> THOMAS PHILIPPON, *THE GREAT REVERSAL: HOW AMERICA GAVE UP ON FREE MARKETS* 35–37 (2019).

<sup>206</sup> See 14 C.F.R. § 107 (requiring businesses to obtain waivers for riskier drone operations); Dukowitz, *supra* note 19 (reporting on the winners of the IPP).

<sup>207</sup> Dukowitz, *supra* note 19; *UAS Test Site Program*, *supra* note 129.

<sup>208</sup> Rule, *supra* note 21, at 151, 158.

<sup>209</sup> *Id.* at 199 (noting that under public choice theory the diffuse, decentralized interests of states and local governments will be outmatched by “powerful corporations with highly concentrated benefits at stake, such as Amazon and Alphabet . . .”).

<sup>210</sup> See 14 C.F.R. § 107 (requiring businesses to obtain waivers for riskier drone operations); Dukowitz, *supra* note 19.

<sup>211</sup> See *UAS IPP Fact Sheet*, *supra* note 125 (stating that ten participants were selected out of 149 applicants).

<sup>212</sup> See Jones, *supra* note 1, at 1 (describing how commercial drone regulations vary across countries based priorities of promoting industry and ensuring safe airspaces).

<sup>213</sup> See DRONE ADVISORY COMMITTEE, U.S. DEP’T OF TRANSP., DAC MEMBER (PUBLIC) INFORMATION FOR THE OCTOBER 17, 2019 DAC MEETING 6–7 (2019), [https://www.faa.gov/uas/programs\\_partnerships/drone\\_advisory\\_committee/media/eBook\\_10-17-2019\\_DAC\\_Meeting.pdf](https://www.faa.gov/uas/programs_partnerships/drone_advisory_committee/media/eBook_10-17-2019_DAC_Meeting.pdf) [hereinafter FAA DRONE ADVISORY COMMITTEE REPORT] (listing the members of the Drone Advisory Committee, including Amazon, Alphabet, DJI, and UPS among others).

The FAA's Part 107 systems have been characterized by low approval numbers and long delays.<sup>214</sup> For example, in 2018, just 16% of approximately 11,000 waivers were approved by the FAA.<sup>215</sup> Moreover, waivers in some cases have taken up to three years to be granted.<sup>216</sup> BVLOS waivers are considered the holy grail of waivers because they are challenging to obtain, and they enable businesses to pursue the most lucrative market activities, such as drone delivery and large-scale surveying and monitoring.<sup>217</sup> For BVLOS, the FAA has rejected 99% of waiver requests, resulting in only 54 approvals granted since 2016.<sup>218</sup> Thus, the demand for BVLOS authorization has far exceeded the supply that the FAA has been willing to grant.<sup>219</sup> Proponents of restrictive BVLOS operations may argue that restrictions are necessary to maintain a safe airspace; however, evidence from several other countries indicate otherwise.<sup>220</sup> For example, France has been far more permissive of BVLOS operations and has similar safety outcomes to the United States.<sup>221</sup>

With extremely limited opportunity to test BVLOS operations, businesses were hopeful when the Trump administration announced the UAS Integration Pilot Program (IPP).<sup>222</sup> The IPP, however, generated much excitement but little value for most businesses.<sup>223</sup> Rather the IPP winners were largely household names—Uber, Alphabet, Intel, Apple, UPS, FedEx, Microsoft, AT&T, and Airbus—and a couple of venture-backed drone companies—AirMap and PrecisionHawk.<sup>224</sup> In addition to excluding most drone businesses, the IPP surprisingly excluded Amazon and DJI, a Chinese company.<sup>225</sup> Many suspected politics may have factored into the decision.<sup>226</sup> Consequently, under the IPP, the most dominant players were given an extraordinary advantage to test BVLOS and other operations disallowed under Part 107.<sup>227</sup> In the meantime, most businesses continued to endure delays and low approval rates under the FAA's waiver system.<sup>228</sup> In 2019, the benefit from participating in the IPP was made clear when the FAA granted the Part 135 authorization for package delivery to UPS and Alphabet.<sup>229</sup>

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<sup>214</sup> GAO DRONE INTEGRATION REPORT, *supra* note 15, at 23–24; *Why 99% of BVLOS Part 107 Waivers Are Rejected*, *supra* note 36.

<sup>215</sup> Zazulia, *supra* note 118.

<sup>216</sup> GAO DRONE INTEGRATION REPORT, *supra* note 15, at 23–24.

<sup>217</sup> *Why 99% of BVLOS Part 107 Waivers Are Rejected*, *supra* note 36.

<sup>218</sup> *Id.*; *Part 107 Waivers Issued*, *supra* note 117.

<sup>219</sup> See *Why 99% of BVLOS Part 107 Waivers Are Rejected*, *supra* note 36 (stating that the FAA has rejected 99% of BVLOS waiver applications).

<sup>220</sup> Kohler, *supra* note 3, at 170–71 (stating that France has less restrictive regulations for commercial drones and similar safety records); Sheets, *supra* note 45, at 513 (noting Japan's pioneering work of drone regulations and enabling nature for commercial drones).

<sup>221</sup> Kohler, *supra* note 3, at 170–71.

<sup>222</sup> See *UAS IPP Fact Sheet*, *supra* note 125 (stating that ten participants were selected out of 149 applicants).

<sup>223</sup> See Dukowitz, *supra* note 19 (reporting that the winners of the IPP were large multinationals and venture-backed companies).

<sup>224</sup> *Id.*

<sup>225</sup> *Id.*

<sup>226</sup> Kesteloo, *supra* note 20.

<sup>227</sup> See 14 C.F.R. § 107 (requiring businesses to obtain waivers for riskier drone operations); Dukowitz, *supra* note 19 (reporting the winners of the IPP).

<sup>228</sup> Zazulia, *supra* note 118; GAO DRONE INTEGRATION REPORT, *supra* note 15.

<sup>229</sup> *Package Delivery by Drone*, *supra* note 144.

Consequently, dominant players are poised to control the domestic market for commercial applications requiring BVLOS operations.<sup>230</sup> Recognizing this uphill battle, some drone businesses have abandoned opportunities in the U.S. and looked abroad to grow their businesses, ceding yet more domestic market share to dominant players.<sup>231</sup> Other drone companies, such as SkySpecs, which provides wind turbine inspection services, have focused on operations that fit within the Part 107 framework.<sup>232</sup> Although the FAA is not solely responsible for the existing breakdown of the BVLOS market, it played a considerable role in tilting the field towards companies that had the resources to navigate and influence a complex regulatory framework.<sup>233</sup>

### *B. The FAA's Distortion of Regional Competition and Subjugation of Local Preferences*

States and localities compete with one another to attract promising industries, generate jobs, and secure government funding.<sup>234</sup> This competition among states is a standard part of our system of federalism.<sup>235</sup> State competition for the drone industry was apparent early on, with twenty-four states competing for just seven spots in the FAA's UAS Test Site Program in 2013.<sup>236</sup> Given that states have lacked the authority to govern low-altitude airspace, their ability to attract the drone industry has largely depended on whether they were selected for one of the FAA's programs, including the UAS Test Sites, IPP, and the Unmanned Traffic Management Pilot Program (UPP).<sup>237</sup> Despite widespread desire by states to foster a local drone industry, the FAA has favored a small set of states.<sup>238</sup>

Through the FMRA, Congress directed the FAA to select at least six test sites to test drone operations.<sup>239</sup> Although this mandate was a positive step for integrating drones into the airspace, it ultimately led to the FAA concentrating

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<sup>230</sup> See *id.* (stating that UPS and Wing have been granted Part 135 certificates for package delivery); *Part 107 Waivers Issued*, *supra* note 117 (showing that as of June 11, 2020, the FAA had granted only 54 waivers for BVLOS operations).

<sup>231</sup> See, e.g., Revkin, *supra* note 65 (reporting that Michigan-based Vayu, Inc. traveled to Madagascar to deploy its technology).

<sup>232</sup> See, e.g., ORSTED & SKYSPECS, THE FUTURE IS HERE: AUTOMATED DRONE ROBOTS INSPECT MASSIVE 80M WIND TURBINE BLADES (2018), [https://skyspecs.com/wp-content/uploads/2018/10/skyspecs\\_orsted\\_AUG2018.pdf](https://skyspecs.com/wp-content/uploads/2018/10/skyspecs_orsted_AUG2018.pdf) (discussing SkySpec's use of drone for automated wind turbine inspection, conducted within the Part 107 framework).

<sup>233</sup> Dukowitz, *supra* note 19; see French, *supra* note 20 (discussing the common problem of the FAA handpicking companies to participate in its pilot programs).

<sup>234</sup> See Peterson, *supra* note 60 (reporting on states competing over FAA UAS Test Sites because of the attendant economic benefits); Henry N. Butler & Jonathan R. Macey, *Externalities and the Matching Principle: The Case for Reallocating Environmental Regulatory Authority*, 14 YALE L. & POL'Y REV. 23, 33–34 (1996) (discussing state competition to attract industry).

<sup>235</sup> Butler & Macey, *supra* note 234, at 33–34.

<sup>236</sup> Peterson, *supra* note 60.

<sup>237</sup> See *id.* (reporting that a fraction of the states that applied were selected to be a UAS Test Site); Kesteloo, *supra* note 20 (noting that New York was not selected to participate in the IPP, potentially due to political reasons); FED. AVIATION ADMIN. & NAT'L AERONAUTICS AND SPACE ADMIN., UPP SUMMARY REPORT i (2019), [https://www.faa.gov/uas/research\\_development/traffic\\_management/utm\\_pilot\\_program/media/UPP\\_Technical\\_Summary\\_Report\\_Final.pdf](https://www.faa.gov/uas/research_development/traffic_management/utm_pilot_program/media/UPP_Technical_Summary_Report_Final.pdf) [hereinafter UPP SUMMARY REPORT].

<sup>238</sup> See *UAS Test Site Program*, *supra* note 129 (listing the states selected for the UAS Test Site Program); Dukowitz, *supra* note 19 (showing that four of the ten states selected to participate in IPP were the same that were selected originally as a UAS Test Site by the FAA years prior).

<sup>239</sup> FAA Modernization and Reform Act § 332(c), 49 U.S.C § 40101 (2012) (repealed 2018).

opportunities in a small set of states.<sup>240</sup> The six states chosen in 2013 as UAS Test Sites were Alaska, Nevada, New Mexico, New York, North Dakota, Virginia, and Texas.<sup>241</sup> In 2017, the FAA again had to select sites to experiment with riskier drone operations, this time for the IPP.<sup>242</sup> Although the FAA received 149 applications, it ultimately selected just ten applicants.<sup>243</sup> Of these ten, four of the applicants were the same states that were already selected as a UAS test site—Alaska, Nevada, North Dakota, and Virginia.<sup>244</sup> By the time the FAA launched the UPP, it was not surprising that the three selected participants—Nevada, North Dakota, and Virginia—were states that had been UAS Test Sites and IPP participants.<sup>245</sup>

Although it is easy to blame the FAA for concentrating resources in these three states, the FAA has a limited budget and it was likely more efficient to build these programs at existing facilities in these states.<sup>246</sup> Given its budgetary constraints, it is highly unlikely that the FAA will have the resources necessary to fully implement its plans.<sup>247</sup> Thus, the FAA will likely continue to rely on public-private partnerships that tend to exclude the vast majority of states and businesses.<sup>248</sup> This favoritism is not appropriate nor optimal for development of the commercial drone industry.<sup>249</sup>

### III. DECENTRALIZE DRONE REGULATIONS IN LOW-ALTITUDE AIRSPACE

A paradigm shift for drone regulation in the United States is necessary, not only for domestic drone companies to compete globally, but also to compete fairly within our borders.<sup>250</sup> This shift would take advantage of our unique system of federalism by allowing the FAA to focus on shared national objectives and enabling states to compete as “[l]aboratories of [d]emocracy.”<sup>251</sup> Several bills have proposed this shift, most recently the Drone Integration and Zoning Act (DIZA) in 2019.<sup>252</sup>

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<sup>240</sup> See *UAS Test Site Program*, *supra* note 129 (listing the states that were initially selected to be UAS Test Sites).

<sup>241</sup> *Id.*

<sup>242</sup> *UAS IPP Fact Sheet*, *supra* note 125.

<sup>243</sup> *Id.*

<sup>244</sup> Dukowitz, *supra* note 19.

<sup>245</sup> UPP SUMMARY REPORT, *supra* note 237, at i.

<sup>246</sup> See RTCA REPORT, *supra* note 17, at 3–4 (noting that the FAA’s funding is inadequate to implement its drone initiatives).

<sup>247</sup> See *id.* (“90 percent of the FAA [is] funded through manned aviation taxes and fees, yet the FAA is increasing emphasis on drone integration projects.”).

<sup>248</sup> See *id.* at 21 (recommending that the FAA should continue to use public-private partnerships to reduce how much the agency spends on drone integration). *But see* French, *supra* note 20 (expressing concern about the FAA’s reliance on public-private partnerships that favor a few select players).

<sup>249</sup> See French, *supra* note 20 (stating that the FAA’s handpicked companies have an exclusive opportunity to innovate through participation in the FAA’s pilot programs).

<sup>250</sup> See Kohler, *supra* note 3, at 151, 166 (proposing modifications to the FAA’s regulatory framework for drones to make the domestic commercial drone industry more globally competitive); Ravich, *supra* note 65, at 495–96 (proposing that federal regulators should consider “permissionless innovation” rather than “*ex-ante* prohibitions and *ex-post* allowances” for drone regulations).

<sup>251</sup> Rule, *supra* note 21, at 163–68 (stating that federal regulators would be best suited to regulate “uniform design and performance standards,” “federal drone registration and tracking systems,” and “restrictions that protect federal assets and interests”); Laura K. Donohue, *A Tale of Two Sovereigns: Federal and State Use and Regulation of Unmanned Aircraft Systems*, in HANDBOOK OF UNMANNED AERIAL VEHICLES (Kimon P. Valavanis & George J. Vachtsevanos eds., Springer Int’l Publ’g 2d ed. forthcoming) (discussing the importance of states acting as “laboratories of democracy” to promote innovation in the drone industry).

<sup>252</sup> See generally Drone Integration and Zoning Act of 2019, S. 2607, 116th Cong. (2019) (proposing that state, local, and tribal governments are given greater authority over regulation of drones in low-altitude airspace).

Specifically, DIZA proposes that the federal government oversee drone operations in airspace above 200 feet AGL, and that state, local, and tribal governments have authority in airspace below 200 feet AGL.<sup>253</sup> Additionally, DIZA proposes that intrastate drone delivery services should be solely under state authorization, providing an alternative path to the FAA's Part 135 authorization for drone delivery services.<sup>254</sup>

This Part explores what DIZA could look like in practice, as well as the consequences of implementing a decentralized drone regulation framework for low-altitude airspace.<sup>255</sup> Section A outlines the FAA's new role under this framework.<sup>256</sup> Section B discusses the state's new role and the spectrum of regulations that could emerge.<sup>257</sup> Lastly, Section C argues that the benefits far outweigh the risks for decentralizing drone regulation.<sup>258</sup>

### *A. The FAA's Role in a Decentralized Framework*

In a decentralized framework, the FAA would need to shift from being a central planner of national airspace to a facilitator of states' initiatives under a system of cooperative federalism.<sup>259</sup> Under DIZA's framework, the FAA would maintain authority over navigable airspace, as well as airspace between 200 and 400 feet AGL for designated drone operations, and the airspace below 200 feet AGL would be governed by state, local, and tribal governments.<sup>260</sup> Setting aside the airspace between 200 and 400 feet AGL as federally-regulated airspace creates an ample buffer zone between manned and unmanned aircraft and provides a future "highway" for interstate drone traffic.<sup>261</sup> The question then remains as to what the FAA's role should be in regulating drones in low-altitude airspace.<sup>262</sup> Cooperative federalism provides an answer to this question.<sup>263</sup>

Cooperative federalism is a system under which "various levels of government ha[ve] overlapping interests and shared functions," and laws can be coordinated at each level to take advantage of institutional advantages.<sup>264</sup> There is a shared national interest in maintaining a safe airspace, specifically by reducing risks of collisions between unmanned and manned aircraft and reducing risks to homeland security through unlawful operators with bad intentions.<sup>265</sup> To achieve this interest,

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<sup>253</sup> *Id.* § 3, 4 (proposing new boundaries for state and federal jurisdiction over the airspace).

<sup>254</sup> *Id.* § 7.

<sup>255</sup> See discussion *infra* Part III.

<sup>256</sup> See discussion *infra* Part III.A.

<sup>257</sup> See discussion *infra* Part III.B.

<sup>258</sup> See discussion *infra* Part III.C.

<sup>259</sup> See Rule, *supra* note 21, at 161–84 (proposing areas of regulation that would be best suited for federal, state, and municipal governments).

<sup>260</sup> Drone Integration and Zoning Act of 2019, S. 2607, 116th Cong. (2019).

<sup>261</sup> See Daniel Thompson, *Rethinking the Highway: Integrating Delivery Drones into Airspace Above Highways*, 95 IND. L.J. SUPP. 8, 8 (2020) (discussing how manned and unmanned aircraft will share the airspace).

<sup>262</sup> See Rule, *supra* note 21, at 163–68 (discussing areas of regulations that would be best allocated to the federal government).

<sup>263</sup> Press Release, Sen. Lee Introduces Drone Integration and Zoning Act (Oct. 16, 2019),

<https://www.lee.senate.gov/public/index.cfm/press-releases?ID=B12FA932-FF40-4862-ACDB-A4210CF5D716> [hereinafter *DIZA Press Release*].

<sup>264</sup> See Edward A. Purcell Jr., *Evolving Understandings of American Federalism: Some Shifting Parameters*, N.Y.L. SCH. L. REV. 625, 685 (2006).

<sup>265</sup> Rule, *supra* note 21, at 135–36.

the FAA should leverage its ability to create uniform national systems for air traffic management and drone registration, as well as uniform standards for drone manufacturing and performance.<sup>266</sup>

First, the FAA has extensive experience in creating and maintaining the air traffic management system for manned aircraft (ATM).<sup>267</sup> This experience should be leveraged for a national UAS traffic management system (UTM) that syncs with the existing ATM.<sup>268</sup> Additionally, drone registration and Remote ID are key parts of the UTM that should be overseen by the FAA.<sup>269</sup> These systems are essential for reducing the risk of collisions and protecting homeland security and are best implemented at the federal level to ensure uniformity across states.<sup>270</sup> Allocating this responsibility to the FAA will enable states to focus on substantive regulations of their low-altitude airspace, rather than the costly and inefficient development of fifty separate UAS traffic management and registration systems.<sup>271</sup> The FAA should nevertheless coordinate with state governments to ensure that implementation of UTM and Remote ID does not hinder development of their low-altitude airspace.<sup>272</sup> For example, operators in rural states have expressed concern that the lack of internet connectivity makes the currently proposed Remote ID system untenable for agricultural and other remote applications.<sup>273</sup>

Second, drone operators and the population at large will benefit from a national standard for drone manufacturing and performance, with carveouts for state authorization of experimental aircraft in designated zones.<sup>274</sup> For businesses, like UPS, which operate nationally, uniform standards will greatly ease implementation of an interstate drone network.<sup>275</sup> Nevertheless, such uniform standards should not impede innovation at the state-level.<sup>276</sup> The past decade has demonstrated that the FAA has limited bandwidth to foster innovation, leaving it to rely largely on public-private partnerships with dominant players such as UPS, Amazon, and Alphabet.<sup>277</sup> To enable local drone businesses, states should retain the flexibility to authorize operation of experimental drones in their low-altitude airspace regardless of whether such drones meet the national manufacturing and performance standards.<sup>278</sup>

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<sup>266</sup> *Id.*

<sup>267</sup> *Unmanned Aircraft System Traffic Management (UTM)*, FED. AVIATION ADMIN., DEP'T OF TRANSP., [https://www.faa.gov/uas/research\\_development/traffic\\_management/](https://www.faa.gov/uas/research_development/traffic_management/) (last visited Feb. 28, 2020).

<sup>268</sup> *Id.*

<sup>269</sup> *UAS Remote Identification*, FED. AVIATION ADMIN., DEP'T OF TRANSP., [https://www.faa.gov/uas/research\\_development/remote\\_id/](https://www.faa.gov/uas/research_development/remote_id/) (last visited Mar. 30, 2020) (defining Remote ID as “the ability of a UAS in flight to provide identification information that can be received by other parties”).

<sup>270</sup> See Rule, *supra* note 21, at 166–67 (discussing the need for law enforcement to track drones in the airspace).

<sup>271</sup> See *id.* (arguing that the FAA is well-positioned to lead on developing and maintain a national UTM).

<sup>272</sup> See Drone Integration and Zoning Act of 2019, S. 2607, 116th Cong. § 9 (2019) (stating that the federal government should coordinate with state, local, and tribal governments for the UTM).

<sup>273</sup> Miriam McNabb, *17 Days Left to Comment on Remote ID for Drones: What the Comments Look Like So Far*, DRONELIFE (Feb. 14, 2020), <https://dronelife.com/2020/02/14/17-days-left-to-comment-on-remote-id-for-drones-what-the-comments-look-like-so-far/>.

<sup>274</sup> See Rule, *supra* note 21, at 163 (proposing that the federal government should define uniform manufacturing and performance standards for drones).

<sup>275</sup> Garrett-Glaser, *supra* note 146 (discussing the FAA’s recent proposal for type certification to establish uniform manufacturing and performance standards).

<sup>276</sup> See Ravich, *supra* note 65, at 496 (discussing how the FAA’s current regulatory scheme for drones limits innovation).

<sup>277</sup> RTCA REPORT, *supra* note 17; Dukowitz, *supra* note 19.

<sup>278</sup> See Ravich, *supra* note 65 (discussing how the FAA’s regulations for drones limit innovation).

By limiting the FAA's role in governing drones in low-altitude airspace, the FAA can focus its resources on governing drones between 200 to 400 feet AGL, developing national uniform systems for the UTM, overseeing drone registration, as well as managing drone manufacturing and performance standards.<sup>279</sup> Furthermore, this limitation will provide states with the freedom to develop drone regulations in their low-altitude airspaces that reflect local preferences.<sup>280</sup>

### *B. The State's Role in a Decentralized Framework*

In a decentralized framework, states would regulate drone operations in low-altitude airspace based on local preferences and conditions.<sup>281</sup> Some limited carveouts for the FAA would include airspace immediately surrounding areas of national interest, such as national parks.<sup>282</sup> The majority of states have aviation offices housed within their departments of transportation that would be well positioned to implement such regulations.<sup>283</sup> Several states, such as Michigan, have already leveraged their aviation offices by creating a UAS task force.<sup>284</sup> Additionally, to facilitate drone integration into low-altitude airspace, the majority of states would need to review and update their airspace lease laws, air rights laws for landowners, and aviation easement laws, which are discussed further below.<sup>285</sup>

Inevitably, decentralizing authority would result in a spectrum of regulatory frameworks, from states that seek to encourage and enable commercial drone operations to other states that prefer to restrict drone operations in their airspace.<sup>286</sup> Unlike uniform federal regulations, states are better positioned to work with local governments to adapt regulations to fit local preferences and conditions.<sup>287</sup> Professor Rule, for example, has proposed the use of zoning laws to spatially and temporally restrict the operation of drones.<sup>288</sup> Zoning laws would provide a ready-made framework for developing appropriate drone regulations based on property types and attendant risk levels.<sup>289</sup> For example, North Dakota may enact liberal regulations in rural sparsely-populated areas of the state that are predominately used for agriculture or oil and mining operations but stricter regulations for residential and commercial areas of densely-populated cities.<sup>290</sup>

Under a decentralized system, drone companies would request authorization from a state's aviation office rather than the FAA for riskier low-altitude

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<sup>279</sup> See Rule, *supra* note 21, at 163–67 (outlining the federal government's role in establishing uniform standards, drone tracking, and registration).

<sup>280</sup> *Id.* at 168.

<sup>281</sup> *DIZA Press Release*, *supra* note 263.

<sup>282</sup> Rule, *supra* note 21, at 167.

<sup>283</sup> See *State Aviation Offices*, *supra* note 154 (listing each state's aviation office).

<sup>284</sup> See, e.g., MICH. COMP. LAWS § 259.331 (2020) (demonstrating Michigan's commitment to preparing the airspace for drones); see also SKORUP AND HAALAND, *supra* note 67, at 6–7 (discussing the importance of states developing a task force or statewide committee for successful drone integration).

<sup>285</sup> SKORUP & HAALAND, *supra* note 67, at 4–7.

<sup>286</sup> FAA FACT SHEET 2015, *supra* note 10, at 2–3.

<sup>287</sup> Rule, *supra* note 21, at 133 (discussing the importance of involving municipal governments when developing drone regulations).

<sup>288</sup> *Id.* at 183–84.

<sup>289</sup> *Id.*

<sup>290</sup> See *id.* at 190, 197 (discussing various drone regulatory frameworks based on zoning classifications).

airspace operations, such as BVLOS or nighttime flights.<sup>291</sup> When evaluating such applications, state aviation offices would be better positioned than the FAA to determine the localized level of risk posed by the operation.<sup>292</sup> By allocating this authority to state governments, or by delegating it to local governments, Congress would provide a means for drone regulations to reflect local preferences and risk tolerances rather than the uniform preferences of the FAA.<sup>293</sup> In states that opt for a permissive regulatory framework, local drone businesses would have greater opportunity to develop their technologies without requiring FAA authorization for BVLOS and other riskier operations.<sup>294</sup>

To facilitate drone integration into low-altitude airspace, the majority of states would also need to review and update their airspace lease laws, air rights laws for landowners, and avigation easement laws.<sup>295</sup> First, airspace lease laws permit state and local authorities to lease airspace above public property, including state and local roads.<sup>296</sup> By leasing such airspace, state and local governments could develop “drone highways” above public roads in their low-altitude airspace to avoid unnecessary drone traffic over personal property.<sup>297</sup> Currently, twenty-one states have passed regulation granting themselves authority to lease airspace above public roads—eight states have authority to lease airspace above state and local roads, and thirteen states over either state or local roads but not both.<sup>298</sup>

Second, and related, air rights laws establish the property rights of landowners to the airspace in their “immediate reaches.”<sup>299</sup> The “immediate reaches” remains an incredibly vague allocation of airspace rights, and states are best positioned to clarify these rights to create legal certainty for drone operators and landowners.<sup>300</sup> Approximately half of the states clearly vest air rights with landowners.<sup>301</sup>

Lastly, states should demarcate avigation easements that permit drone operations at such altitudes that they do not interfere or disturb landowners below.<sup>302</sup> By designating avigation easements, drones could operate above a certain altitude regardless of whether the operation is within a “drone highway.”<sup>303</sup> This would be particularly important for activities that require limited operation on private property, such as environmental monitoring and surveying.<sup>304</sup> Currently, about half of states have avigation easement laws.<sup>305</sup>

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<sup>291</sup> See SKORUP & HAALAND, *supra* note 67, at 6–7 (explaining the use of statewide committees or task forces within states’ departments of transportation to implement drone regulations).

<sup>292</sup> See *id.* (emphasizing the importance of local knowledge for tailoring drone regulations).

<sup>293</sup> See Butler & Macey, *supra* note 234, at 31 (arguing that environmental regulations should be developed at the state-level rather than the federal-level because the effects are localized largely to the state; and that states should have the opportunity to balance the risk and benefits of varying levels of environmental regulations).

<sup>294</sup> See DIZA Press Release, *supra* note 263 (proposing that state governments govern drones in low-altitude airspace to “allow this innovative industry to thrive,” among other reasons).

<sup>295</sup> SKORUP & HAALAND, *supra* note 67, at 4–7.

<sup>296</sup> *Id.* at 5.

<sup>297</sup> *Id.*

<sup>298</sup> *Id.*

<sup>299</sup> *Id.* at 5–6.

<sup>300</sup> *Id.*

<sup>301</sup> *Id.*

<sup>302</sup> *Id.* at 6.

<sup>303</sup> *Id.*

<sup>304</sup> *Id.*

<sup>305</sup> *Id.*

States would undeniably need to expend considerable resources on developing laws for low-altitude airspace and equipping aviation offices with the necessary knowledge and personnel; however, this cost is well worth the resulting benefits of fairer competition in the drone market and tailored regulations that match local preferences.<sup>306</sup> Moreover, as with many other areas of law, states can reduce this burden by modeling their laws after states that share similar preferences and conditions.<sup>307</sup>

### C. Benefits Outweigh the Risks for Decentralizing Drone Regulations

The oft-cited concern for states regulating their low-altitude airspace is that it would jeopardize drone safety and efficiency by establishing a “patchwork quilt” of state and local regulations.<sup>308</sup> The conventional wisdom is that a national regulatory system, similar to what exists for manned aircraft in the navigable airspace, is necessary for unmanned aircraft.<sup>309</sup> Operation of unmanned aircraft, however, is distinguished from manned aircraft in two important ways.<sup>310</sup> First, drone operations are, for now, predominately *intrastate*.<sup>311</sup> On the other hand, manned aircraft operations, are predominately interstate, ferrying passengers and cargo across state lines.<sup>312</sup> Second, drones operate in low-altitude airspace that has historically been in the domain of the states.<sup>313</sup> Low-altitude operations affect the welfare and safety of states’ populations, and thus, fall naturally within the states’ traditional police powers.<sup>314</sup> If Congress wants to reallocate authority over low-altitude airspace from the states to the FAA, then it should do so explicitly.<sup>315</sup> Thus far, Congress has not asserted a desire to do so.<sup>316</sup> Instead, Congress is merely exploring the boundaries between federal, state, and local governance of low-altitude airspace.<sup>317</sup>

As discussed above, cooperative federalism would address many of the concerns for a “patchwork quilt” of drone regulations.<sup>318</sup> Drone companies would operate in a uniform air traffic management system, under a national registration system, and with uniform manufacturing and performance standards.<sup>319</sup> Moreover, state aviation offices have long interfaced with the FAA for takeoff and landing areas, and would be capable of implementing statewide regulations to ensure the

<sup>306</sup> *Id.* at 2.

<sup>307</sup> MERCATUS CTR., RESEARCH SUMMARY: JUMP-STARTING THE DRONE INDUSTRY: WHICH STATES ARE READY TO FLY? 2 (2020).

<sup>308</sup> FAA FACT SHEET 2015, *supra* note 10, at 2; SNEAD & SEIBLER, *supra* note 10.

<sup>309</sup> See FAA FACT SHEET 2015, *supra* note 10, at 1–2 (requiring that state and local drone regulations be consistent with the federal regulatory framework).

<sup>310</sup> Rule, *supra* note 21, at 155–56; Migala, *supra* note 8, at 3.

<sup>311</sup> Rule, *supra* note 21, at 155–56.

<sup>312</sup> See Air Commerce Act of 1926, Pub. L. No. 69-254, 44 Stat. 568 (repealed 1938, 1958) (discussing the interstate nature of airplane traffic).

<sup>313</sup> Migala, *supra* note 8, at 3.

<sup>314</sup> Drone Integration and Zoning Act of 2019, S. 2607, 116th Cong. § 4 (2019).

<sup>315</sup> See FAA Reauthorization Act of 2018 §§ 341–384, 49 U.S.C. §§ 44801–44810 (2018) (including § 373 requesting the Comptroller General to research the boundaries between federal, state, and local jurisdiction over low-altitude airspace).

<sup>316</sup> *Id.*

<sup>317</sup> See *id.* (directing the Comptroller General to “conduct a study on the relative roles of the Federal Government, State, local and Tribal governments in the regulation and oversight of low-altitude operation”).

<sup>318</sup> SNEAD & SEIBLER, *supra* note 10, at 1; *supra* notes 260–263 and accompanying text.

<sup>319</sup> See Rule, *supra* note 21, at 163–67.

safety of low-altitude airspace.<sup>320</sup> Thus, the only “patchwork” regulation of real concern are those pertaining to interstate drone operations in low-altitude airspace.<sup>321</sup> DIZA addresses this concern by stipulating that state, tribal, and local governments would refrain from promulgating regulations that restrict the ascent or descent of drones between low-altitude airspace and navigable airspace.<sup>322</sup> This type of regulation poses a risk to dominant players such as Amazon, UPS, and Alphabet that are pursuing national drone delivery systems.<sup>323</sup> Under the current centralized system, such dominant players only need to secure the FAA’s authorization to access the airspace, whereas a decentralized system would require both the FAA’s authorization and an additional fifty authorizations to nationally access low-altitude airspace.<sup>324</sup> Moreover, the FAA has already authorized such dominant players for riskier operations, such as BVLOS and Part 135 certifications, providing them with a competitive moat as other companies struggle to obtain authorization from the FAA.<sup>325</sup> This efficient centralized solution for the dominant players has come at the severe cost of distorting market competition and subjugating local preferences.<sup>326</sup>

Decentralization of drone regulation in low-altitude airspace is critical to ameliorate the harms of the current regulatory system.<sup>327</sup> First, states will be able to function as “laboratories of democracy” and more dynamically adapt regulations to this rapidly developing technology.<sup>328</sup> The FAA has clearly demonstrated it does not have the capacity to evaluate and authorize novel drone applications from the hundreds of domestic drone companies.<sup>329</sup> States, on the other hand, can decide whether supporting a local drone industry is a priority for their state and if it is, they can enact regulations that more rapidly enable technological development and innovation.<sup>330</sup> Utilizing state aviation offices to evaluate and authorize intrastate drone operations could play an important role in reducing the current bottleneck for

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<sup>320</sup> See SKORUP & HAALAND, *supra* note 67, at 6 (discussing the role of statewide committees and task forces within state departments of transportation for drone regulations); *State Aviation Offices*, *supra* note 154 (listing the state aviation offices).

<sup>321</sup> See Thompson, *supra* note 261, at 10 (noting the challenges of harmonizing federal, state, and local regulations over drones operating interstate).

<sup>322</sup> Drone Integration and Zoning Act of 2019, S. 2607, 116th Cong. § 6 (2019).

<sup>323</sup> Rule, *supra* note 21, at 171.

<sup>324</sup> *Id.*

<sup>325</sup> *Package Delivery by Drone*, *supra* note 144 (summarizing Part 135 certifications for UPS and Alphabet); *Part 107 Waivers Issued*, *supra* note 117 (showing that BVLOS waivers approved for a very limited number of commercial operators including UPS and Alphabet).

<sup>326</sup> See Rule, *supra* note 21, at 171.

[L]arge corporations such as Amazon and Alphabet . . . could likewise benefit if federal laws broadly preempted municipal authority to regulate drone activities in that space, allowing companies with federal drone use authorizations to ignore most state and local drone use restrictions. Expanding drone delivery throughout the country could be less complicated and expensive for these companies if the FAA were to establish sole control over low-altitude airspace and leave minimal room for aerial trespass claims or state or local drone use restrictions.

*Id.* (citations omitted); *supra* notes 193–246 and accompanying text.

<sup>327</sup> *Supra* notes 196–250 and accompanying text.

<sup>328</sup> See Donohue, *supra* note 251, at 49 (“Protected from federal overreach, and more directly answerable to the people, states can take steps to encourage new ideas and technologies, giving citizens greater freedom and states a competitive advantage over other regions.”).

<sup>329</sup> See RTCA REPORT, *supra* note 17, at 3–4 (stating that the FAA’s budget for their drone integration initiatives is inadequate and unsustainable because it relies predominately on collection of “manned aviation taxes and fees.”); French, *supra* note 20 (objecting to the FAA’s overreliance on public-private partnerships).

<sup>330</sup> Donohue, *supra* note 251, at 49.

approving BVLOS, night-time, and other riskier operations.<sup>331</sup> Moreover, states can enact regulations that reflect their local preferences for privacy and property interests, as well as local conditions such as terrain and population density.<sup>332</sup>

Second, transferring authority over low-altitude airspace away from the FAA will reduce the legislative capture of the FAA by dominant players in the drone industry.<sup>333</sup> Not only have dominant players benefitted the most from the FAA's programs, but they have also been able to influence regulations through participation on the advisory committees.<sup>334</sup> As discussed above, the FAA is accustomed to dealing with a few large companies, which may work for the manned aircraft industry, but is neither appropriate nor optimal for the nascent drone industry.<sup>335</sup>

Lastly, the FAA has itself acknowledged that it is overwhelmed and under-resourced.<sup>336</sup> The natural consequence of an overburdened and understandably cautious agency is to uniformly restrict and delay authorization for riskier drone operations, and rely on exclusive public-private partnerships for experimental drone integration.<sup>337</sup> This response not only harms individual drone companies, but hinders the development of a globally competitive U.S. drone industry.<sup>338</sup> Other countries' civil aviation authorities have succeeded in not only integrating but encouraging drones in their airspace.<sup>339</sup> Continuing business as usual will stifle innovation and competition in a market that is predicated to grow to \$1.5 trillion by 2040 as air taxis enter the market.<sup>340</sup> Reallocating authority to the states over low-altitude airspace would not only reduce the burden on the FAA for authorizing drone operations, but more importantly, it would enable states to lift restrictions that are currently hindering technology development and innovation in the drone industry.<sup>341</sup>

## CONCLUSION

Drone operations in low-altitude airspace should be governed by states to democratize competition and tailor regulations to local preferences. States'

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<sup>331</sup> See SKORUP & HAALAND, *supra* note 67, at 6–7 (discussing the importance of statewide committees and taskforces within state departments of transportation for defining state-level drone regulations); *State Aviation Offices*, *supra* note 154 (listing state aviation offices).

<sup>332</sup> Rule, *supra* note 21, at 133 (stating that state and local governments are best positioned to tailor drone regulations to local conditions); Butler & Macey, *supra* note 234, at 31 (arguing that states should have the authority for regulating issues that are local to their state, such as environmental contamination).

<sup>333</sup> Rule, *supra* note 21, at 199.

<sup>334</sup> See FAA DRONE ADVISORY COMMITTEE REPORT, *supra* note 213, at 6 (listing the members of the Drone Advisory Committee, including Amazon, Alphabet, DJI, and UPS among others).

<sup>335</sup> *Supra* notes 204–210 and accompanying text.

<sup>336</sup> RTCA REPORT, *supra* note 17, at 3–4.

<sup>337</sup> See GAO DRONE INTEGRATION REPORT, *supra* note 15, at 23–24 (discussing the complex and lengthy process for obtaining authorization to operate outside of the Part 107 framework); French, *supra* note 20 (discussing the FAA's overreliance on public-private partnerships with a limited set of large corporations).

<sup>338</sup> See Kohler, *supra* note 3, at 176–77 (comparing the FAA's drone regulations to France and New Zealand, and finding that the FAA's BVLOS restrictions have hindered commercial drone operators in the United States).

<sup>339</sup> *Id.*

<sup>340</sup> See Are Flying Cars Preparing for Takeoff?, MORGAN STANLEY (Jan. 23, 2019), <https://www.morganstanley.com/ideas/autonomous-aircraft> (stating that “autonomous urban aircraft...could create a \$1.5 trillion market by 2040.”).

<sup>341</sup> See generally Drone Integration and Zoning Act of 2019, S. 2607, 116th Cong. (2019) (proposing that state, local, and tribal governments have the primary authority to regulate drones in low-altitude airspace); Donohue, *supra* note 251, at 49 (stating the importance of state sovereignty for enabling innovation in the United States' drone industry).

authority over low-altitude airspace is consistent with federal and state law concerning state sovereignty over airspace not allocated to the federal government as well as standard principles of federalism. States have long held authority over their low-altitude airspaces, and the rise of the drone industry should not shrink this area of traditional state concern.

The commercial drone industry has grown dramatically over the past decade, both in the United States and abroad. The pace of growth in each country has largely been defined by regulations. In the U.S., the FAA's slow and cautious response has hindered the drone sector's growth, particularly by limiting beyond visual line of sight (BVLOS) and package delivery authorizations. Such authorizations are necessary for lucrative market applications, such as agricultural monitoring, linear asset inspection, and drone delivery services. Dominant players, such as UPS and Alphabet, have been able to secure these valuable authorizations, but most drone businesses remain relegated to limited operations within visual line of sight.

Additionally, the proliferation of drones has created privacy, property, and civil liberty concerns that would be best addressed at the state and local level. The FAA is not mandated to consider the inevitable privacy, property, or civil liberty concerns that result from drones operating in low-altitude airspace. States, on the other hand, have long considered such issues under their traditional police powers. Moreover, the uniform preference of the FAA should not be imposed on states with diverse sets of priorities.

Several Congressmembers have proposed affirming states' power over their low-altitude airspace, most recently Senator Mike Lee with the Drone Integration and Zoning Act of 2019 (DIZA). Under DIZA, states would have authority over drone operations in the airspace below 200 feet, as well as over intrastate drone delivery services. The airspace between 200 and 400 feet would be under the FAA's jurisdiction, providing an area for the future of interstate drone traffic.

Decentralizing drone regulations in low-altitude airspace would more appropriately apportion responsibilities between the federal and state governments. The FAA, which has admitted it is underfunded and overwhelmed, could focus its resources on developing national systems, such as the air traffic management system for drones, as well as manufacturing and performance standards. States, on the other hand, could tailor drone regulations to fit local priorities and preferences. Additionally, this reapportionment would provide an opportunity for states to correct market distortions created by the FAA. Specifically, states could enable local drone businesses to test their technologies and implement commercial solutions at the state level. Enabling local drone businesses would not only foster competition in the domestic drone industry, but also create a pathway for U.S. companies to lead the global drone sector.

**Recommended Citation:** Julie Bateman, *Decentralizing Drone Regulations in Low-Altitude Airspace*, B.C. INTELL. PROP. & TECH. F. (Sept. 17, 2020), <http://bciprf.org/2020/09/decentralizing-drone-regulations/>.