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**DRONE USE IN AERIAL PESTICIDE APPLICATION FACES  
OUTDATED REGULATORY HURDLES**

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I. INTRODUCTION

The use of unmanned aerial systems<sup>1</sup> (“UASs” or “drones”) in commercial activity has become exponentially popular in recent years.<sup>2</sup> One relatively new use for UASs is in pest control—eliminating both agricultural pests and disease vectors—through aerial pesticide application. Compared to a traditional fixed wing aircraft, a UAS can fly lower, is significantly smaller, and can hover in place for extended periods of time, all of which enhance the precision, speed,

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1. Note that the “system” includes not only the actual unmanned aircraft itself, but also the remote-control unit and any other associated hardware and software which ultimately operate the aircraft. Note also that UAS encompasses all unmanned aerial systems whereas sUAS applies only to a UAS under 55 lbs. of total weight.

2. See, e.g., *E-commerce Giant Amazon Seeks FAA Nod For Testing Drones*, SEATTLE BULLETIN (July 12, 2014), <http://www.seattlebulletin.com/news/223727243/e-commerce-giant-amazon-seeks-faa-nod-for-testing-drones>.

and safety of pesticide application.<sup>3</sup> In fact, estimates suggest that pesticide application by a UAS could be up to five times faster than traditional fixed-wing aircraft.<sup>4</sup> Some aircraft have already been developed to apply pesticides via UAS and are currently undergoing testing in the United States.<sup>5</sup> However, the regulatory landscape facing these novel uses for UASs serves as a significant barrier to entry.

In, 2016, the Federal Aviation Administration (“FAA”) promulgated extensive rules regulating the use of small UASs (“sUASs”), UASs under 55 lbs.<sup>6</sup> These regulations, codified at 14 C.F.R. § 107 (“Section 107” or “Part 107”), streamline the process for certifying sUASs for flight and only regulate commercial sUAS use.<sup>7</sup> One benefit is that a sUAS pilot, unlike traditional aircraft or UASs over 55 lbs., need only receive a “remote pilot” certification, which has substantially fewer requirements than a traditional pilot certification.<sup>8</sup> The Section 107 rules include limitations, among others, on operational hours<sup>9</sup> and require registration for sUASs.<sup>10</sup> Some, but not all, of these limitations may be waived by the FAA Administrator.<sup>11</sup> Despite the advent of novel uses of UASs, the regulations surrounding aerial pesticide application have not yet been updated to accommodate the specific benefits and limitations of UAS use. As a result, a patchwork of

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3. For a thorough overview of the various benefits to UAS use in agriculture, see Andy Lin, *Agricultural Sector Poised To Soar With Drone Integration, But Federal Regulation May Ground The Industry Before It Can Take Off*, 48 TEX. TECH. L. REV. 975, 978–80 (2016); see also Kelsey Atherton, *This Drone Sprays Pesticides Around Crops*, POPULAR SCI. (June 23, 2016), <https://www.popsoci.com/agri-drone-is-precision-pesticide-machine>; 5 *Ways Drones Could Change the Way America Eats*, PBS NEWSHOUR, <http://www.pbs.org/newshour/rundown/5-ways-unmanned-drones-change-american-food-supply/> (last accessed September 24, 2017).

4. See Michael Mazur, *Six Ways Drones Are Revolutionizing Agriculture*, MIT TECH. REV. (July 20, 2016), <https://www.technologyreview.com/s/601935/six-ways-drones-are-revolutionizing-agriculture/>.

5. See Evan Ackerman, *Yamaha Demos Agricultural RoboCopter, But Humans Can't Unleash It Yet*, IEEE SPECTRUM (Oct. 16, 2014), <http://spectrum.ieee.org/automaton/robotics/drones/yamaha-demos-agricultural-robocopter>. Note that this particular craft has been in-use since 1991 in Japan and has recently been approved for limited use in the U.S.

6. 14 C.F.R. § 107 (2016).

7. The FAA provides several examples to differentiate between commercial and personal use. Personal use is for “educational or recreational flying only” and commercial/business use includes “providing aerial surveying or photography services” and “doing roof inspections or real estate photography.” *Unmanned Aircraft Systems – Getting Started*, FED. AVIATION ADMIN., [https://www.faa.gov/uas/getting\\_started/](https://www.faa.gov/uas/getting_started/) (last accessed June 28, 2017).

8. See 14 C.F.R. §§ 107.53–107.79; see also *Unmanned Aircraft Systems – Becoming a Pilot*, FED. AVIATION ADMIN., [https://www.faa.gov/uas/getting\\_started/fly\\_for\\_work\\_business/becoming\\_a\\_pilot/](https://www.faa.gov/uas/getting_started/fly_for_work_business/becoming_a_pilot/) (last accessed Nov. 27, 2017).

9. 14 C.F.R. § 107.29 (2016).

10. 14 C.F.R. § 107.13 (2016). UASs in excess of 55 lbs. do not qualify for the § 107 rules and must obtain a Section 333 exemption in order to fly in the national airspace system. See Part III.A. *infra*.

11. See Part III.B. *infra*; see also Part II.B. *infra*.

exemptions,<sup>12</sup> waivers,<sup>13</sup> and label modifications<sup>14</sup> is currently required for a commercial entity to aerially apply pesticides via UAS. The focus of this Note examining UASs in aerial pesticide application is to provide an overview of the regulatory hurdles, to review the two currently approved UASs, and to make recommendations to streamline the permitting process.

## II. CURRENT REGULATIONS FAIL TO REFLECT TECHNOLOGICAL ADVANCEMENTS IN AERIAL PESTICIDE APPLICATION, CREATE BARRIERS TO ENTRY, AND REDUCE COMPETITIVENESS

### *A. FAA pesticide regulations do not reflect the unique nature of UASs*

Many of the FAA regulations on aerial pesticide application have not been updated in almost half a century and fail to accommodate advancements in technology, including UASs. For example, one FAA regulation—which makes it illegal to dispense pesticides from an aircraft contrary to safety instructions—still makes reference to pesticides being registered with the U.S. Department of Agriculture,<sup>15</sup> a role which was transferred to the Environmental Protection Agency (“EPA”) in 1972.<sup>16</sup> Furthermore, while the definition of “aircraft” within 14 C.F.R. § 1.1<sup>17</sup> encompasses UASs,<sup>18</sup> the use of “aircraft” in 14 C.F.R. § 137 clearly does not. Namely, 14 C.F.R. § 137.31 states that “[n]o person may operate an aircraft unless that aircraft—(a) Meets the requirements of § 137.19(d)<sup>19</sup>; and (b) Is equipped with a suitable and properly installed shoulder harness for use by each pilot.” The regulation clearly presupposes that an individual pilot could be physically secured to the aircraft itself, which is inapposite for a UAS. These incongruities may lead to confusion by potential UAS pilots who must determine which rules do and do not apply to their activities.

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12. See Part III.A. *infra*.

13. See Part III.B. *infra*.

14. See *Labelling Requirements*, ENVTL. PROT. AGENCY, <https://www.epa.gov/pesticide-registration/labeling-requirements> (last accessed September 24, 2017); see also 7 U.S.C. § 136(p).

15. 14 C.F.R. § 137.39(a).

16. See Amendments to the Federal Insecticide Fungicide and Rodenticide Act, Pub. L. No. 92-516, 86 Stat. 973 (1972).

17. 14 C.F.R. § 1.1 (1962) contains the definitions section for the entire Title 14 of the Code of Federal Regulations, unless explicitly superseded within a subchapter.

18. “Aircraft means a device that is used or intended to be used for flight in the air.” 14 C.F.R. § 1.1 (1962).

19. The cross-reference to § 137.19(d) states that the aircraft must be “certificated” and “equipped for agricultural operation.” Whether the registration system in place for commercial UASs, and specifically sUASs, actually satisfies this requirement is another open question.

A private agricultural aircraft operator also needs to show a satisfactory knowledge of “maneuvers,” under § 137.19(e)(2), including “flare-outs” and “pullups and turnarounds” which are less relevant to the manner in which a UAS is operated.<sup>20</sup> The section additionally requires that an operator must “hold a current U.S. private, commercial, or airline transport pilot certificate.” This requirement as applied to sUASs in particular is unnecessary as sUASs pose nowhere near the mechanical complexity of helicopters and fixed wing aircraft.<sup>21</sup> Many UASs, in fact, may effectively be controlled autonomously, with pre-programmed mapping software in concert with GPS and additional positional sensors.<sup>22</sup>

*B. Inability to waive hazardous material transport restriction further inhibits use of sUASs in aerial pesticide application*

While some restrictions on sUASs may be waived, not all—including those critical to pesticide application—can be. For example, sUASs are forbidden from carrying “hazardous materials,” which includes certain pesticide active ingredients such as allethrin, carbamate, and organophosphorous.<sup>23</sup> With such prohibitions, one notable loss is the application of naled, an organophosphate. Naled is one of the most common aeri ally applied pesticides, used primarily for the control of mosquito populations.<sup>24</sup> Naled’s use has been on the rise as a response to recent Zika virus outbreaks in the southern United States.<sup>25</sup> As an organophosphate, naled-based pesticides would be banned from transport by a sUAS unless a specific, time-consuming exemption were granted.<sup>26</sup> An ability to waive the ban on sUAS hazardous material transport would permit the use of chemicals like naled

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20. See Yamaha Motor Corporation, Docket No. FAA-2014-0397, Exemption No. 11448 (FAA Dec. 21 2015), at 17 (noting that “the skills described in these paragraphs . . . are not compatible or applicable to the operation of [a UAS] . . .”).

21. Elizabeth Maartens, *Drone vs. Helicopter, What is the Difference?*, <https://www.ezvid.com/drone-vs-helicopter-what-is-the-difference> (last accessed September 24, 2017) (comparing the fixed pitch of quadcopters with the adjustable pitch of helicopters).

22. See, e.g., *How GPS Drone Navigation Works*, DRONEOMEGA.COM, <http://www.droneomega.com/gps-drone-navigation-works/> (last accessed September 24, 2017).

23. There are 76 chemicals on the hazardous materials table at 49 C.F.R. § 172.191 listed as pesticides, though many of these represent different forms and states of the same chemical. A catch-all for other relevant pesticides posing an inhalation hazard is also present on the table under “Pesticide, liquid, toxic, not otherwise specified.”

24. See *Naled For Mosquito Control*, ENVTL. PROT. AGENCY, <https://www.epa.gov/mosquitocontrol/naled-mosquito-control>##1 (last accessed June 30, 2017).

25. See, e.g., Julie Steenhuysen, *Florida To Begin Aerial Spraying Of Pesticides To Control Zika*, REUTERS (Aug. 2, 2016), <http://www.reuters.com/article/us-health-zika-insecticide-idUSKCN10E06Q>.

26. See Part III.B. *infra*.

in the fight against Zika and other mosquito-borne diseases in addition to traditional agricultural pest control.

*C. EPA pesticide regulations require modification in light of new sUAS uses*

Among the requirements of a pesticide label are those which dictate the directions of use.<sup>27</sup> In the case of pesticides which may be applied aerially, this includes whether a pesticide may only be applied by a helicopter/rotocopter, fixed-wing aircraft, or both. Often this limitation is to minimize the risk of pesticides drifting to non-target areas, potentially poisoning non-resistant neighboring crops or agricultural workers. Drift can be caused by pesticides being released at improper altitudes, at inappropriate ambient temperatures, or with incorrect droplet sizes.<sup>28</sup> EPA mandates specific applicator boom length and nozzle size to mitigate drift of certain pesticides.<sup>29</sup> The fact that a sUAS can operate significantly closer to crops without causing damage, due in part to the lower thrust exerted by a sUAS relative to larger manned aircraft, reduces the concern for drift, and renders the safety concerns of current pesticide label restrictions less relevant.<sup>30</sup> These benefits may also result in sUASs supplanting uses that have traditionally required hand-application for certain pesticides, reaping farmworker safety benefits currently addressed by the Worker Protection Standards.<sup>31</sup>

*D. International adoption of UASs leaves the United States less competitive.*

Other countries, including Japan and China, have been at the forefront for the use of UASs in pesticide application, leaving the United States lagging behind. For example, the Yamaha RMAX, discussed below under *Section 333 Exemptions*, has been in operation in Japan for over 20 years, while it has only recently been approved for limited use in the United States.<sup>32</sup> In 2015, China issued its first major regulations surrounding UAS use and in these regulations created a dedicat-

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27. See Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) § 2(q)(1)(F); 40 C.F.R. § 156.10(a)(1)(viii).

28. See, e.g., Vista® Ultra (Fluroxypyr 1-methylheptyl ester), EPA Registration No. 62719-586 (“fixed wing aircraft require additional drift mitigation measures”) and Garlon® XRT (Triclopyr, methyl ester), EPA Registration No. 62719-553 (limiting aerial application to helicopters only).

29. See, e.g., Vista® Ultra (restricting boom length to 90% of the total diameter of the rotor and nozzle direction to no more than 45° downward).

30. See Lin, *supra* note 3, at 980.

31. See generally 40 C.F.R. § 170.

32. See Ackerman, *supra*, note 5.

ed category for “Plant Protection UAS.”<sup>33</sup> This category includes UASs up to 5,700 kg but limits flight to 15 meters above the surface.<sup>34</sup> UASs in this category must, however, have an “electric fence” installed that reports every second that the UAS is within a key area, which includes “military sites, nuclear plants, [and] administrative centers.”<sup>35</sup> Many UASs are already in operation for aerial pesticide application in China and new models are currently being developed for the market.<sup>36</sup> Importantly, the lack of integration of UASs into domestic industry, including in the agriculture sector, is estimated to cost at least \$10 billion annually in unrealized productivity and full integration has projected benefits of up to \$86 billion by 2025.<sup>37</sup> Rapid adoption internationally of UASs, along with the cost and production efficiencies that accompany their use, ultimately puts the United States at a competitive disadvantage.

*E. FAA is receptive to modifying regulations to accommodate UAS innovations*

On October 25th, 2017, the United States Department of Transportation (“USDOT”) announced it was launching a new initiative called the “Innovative Drone Integration Program.”<sup>38</sup> This program’s purpose is to:

help the USDOT and FAA develop a regulatory framework that will allow more complex low-altitude operations; identify ways to balance local and national interests; improve communications with local, state and tribal jurisdictions; address security and privacy risks; and *accelerate the approval of op-*

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33. See *Regulation of Drones: People’s Republic of China*, LIBR. CONG., <https://www.loc.gov/law/help/regulation-of-drones/china.php> (last updated July 22, 2016).

34. *Id.*

35. *Id.*

36. See Julien Girault, *China Drone King Turns To Farming*, PHYS.ORG (June 25, 2017), <https://phys.org/news/2017-06-china-drone-king-farming.html>. See also Newley Purnell, *Chinese Drone Maker Plows Into Agriculture*, WALL ST. J. (Nov. 26, 2015), <https://www.wsj.com/articles/chinese-drone-maker-plows-into-agriculture-1448573490>; Sijia Jiang, *Drones For Agricultural Use Taking Off In China*, S. CHINA MORNING POST (July 25, 2016), <http://www.scmp.com/business/companies/article/1994543/drones-agricultural-use-taking-china>.

37. See Darryl Jenkins & Bijan Vasigh, *The Economic Impact of Unmanned Aircraft Ssystems Integration in the United States*, ASS’N. FOR UNMANNED VEHICLE SYS. INT’L (Mar. 2013), at 2, [https://higherlogicdownload.s3.amazonaws.com/AUVSI/958c920a-7f9b-4ad2-9807-f9a4e95d1ef1/UploadedImages/New\\_Economic%20Report%202013%20Full.pdf](https://higherlogicdownload.s3.amazonaws.com/AUVSI/958c920a-7f9b-4ad2-9807-f9a4e95d1ef1/UploadedImages/New_Economic%20Report%202013%20Full.pdf).

38. *President Donald Trump and Secretary Elaine L. Chao Announce Innovative Drone Integration Pilot Program*, U.S. DEPT. OF TRANSP. (Oct. 25, 2017), <https://www.transportation.gov/UAS-integration-pilot-program>.

*erations that currently require special authorizations.*<sup>39</sup>

The FAA subsequently published additional details of the program in the Federal Register on November 8th, 2017.<sup>40</sup> One specific type of proposal the FAA was interested in receiving was “[a]n agricultural State and several of its municipalities desiring to explore with stakeholders how UAS could be used to assist farmers in reducing costs.”<sup>41</sup> A program which coordinates with the State agency who has authority, delegated by EPA,<sup>42</sup> to regulate pesticides in combination with pesticide applicators, UAS operators, and farmers would be a perfect proposal for this initiative. The current process for regulatory relief, which could be simplified, is detailed next.

### III. UASs MAY BE USED FOR AERIAL PESTICIDE APPLICATION THROUGH A BURDENSOME EXEMPTION AND WAIVER PROCESS

There are currently three exemption and waiver processes that a UAS operator would need to navigate to aurally dispense pesticides, depending on the type of UAS used. For UASs over 55 lbs., a Section 333 Exemption is required. This application is more open-ended, has fewer limitations, but is more expensive and takes longer to obtain. For sUASs, a Part 107 waiver may be used. These waivers are cheaper and faster to obtain, but are more limited in the restrictions that may be waived. Finally, Part 11 Exemptions permit relief from a vast array of FAA regulations; however, this process requires full notice and comment for each applicant and requires navigating significantly more regulations. An overview of each of these three processes follows next along with an example of a UAS aerial pesticide applicator that has successfully navigated these regulatory hurdles.

#### *A. Section 333 Exemptions for non-sUASs*

In order for any aircraft to operate in the United States, it must be certified for airworthiness by the FAA. Prior to the promulgation of Section 107 to regulate sUASs, most commercial UASs were operating under what are called Section 333 exemptions. Section 333 of the FAA Modernization and Reform Act of 2012 allowed the Secretary of Transportation to determine, on a case by case basis, that a

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39. *Id.* (emphasis added).

40. *See* 82 Fed. Reg. 51903.

41. *Id.* at 51904.

42. *See* FIFRA, *supra* note 25 at §§ 26–27 (detailing how states may be delegated primary enforcement of the law).

certain “[UAS] may operate safely” in the national airspace system.<sup>43</sup> For most commercial sUASs, Section 107 has supplanted their prior Section 333 exemptions.<sup>44</sup> Because Section 107 bans the transport of certain pesticides as hazardous materials, the Section 333 Exemption process, which is still active, may be an avenue to bypass the current restrictions which face UAS aerial pesticide application. It is important to note that the Section 333 Exemption only certifies the UAS itself, while the pilot must also be fully trained and certified by the FAA as with any other traditional aircraft.

Approximately 40,000 Section 333 Exemptions have been requested,<sup>45</sup> of which approximately 5,500 have been thus far approved<sup>46</sup> leading to a current approval rate of less than 14%. In addition, the cost of obtaining a basic Section 333 exemption can be up to \$1,500 and take up to four months for the FAA to review.<sup>47</sup>

Recently, Yamaha received a Section 333 Exemption to use its UAS, the RMAX, in aerial pesticide application.<sup>48</sup> Because the RMAX weighs in excess of 55 lbs., it is ineligible for the Section 107 sUAS rules. The RMAX possesses two 8 liter tanks, with a practical payload of up to 16 kg (~35 lbs.).<sup>49</sup> According to Yamaha, the RMAX currently treats 2.4 million acres of farmland annually in Japan.<sup>50</sup> In granting the Section 333 Exemption, the FAA looked beyond the plain text of certain provisions in § 137, noting that “[t]hese requirements are intended to ensure the safety of the onboard pilot during manned agricultural aircraft operations and thus, relief from §§ 137.31(b) and 137.42 [both shoulder harness requirements] does not adversely impact safety.”<sup>51</sup> After obtaining the exemption, the

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43. The Secretary would also be required to “establish requirements for the safe operation” of such aircraft when granting the exemption. See FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, 126 Stat. 11. § 333.

44. Section 333 exemptions, however, can be broader in what use of a UAS is permitted as compared to 14 C.F.R. § 107. For example, Section 107 forbids the carriage of hazardous materials by a sUAS whereas prior to Section 107, no such restrictions existed unless specified as a condition of the exemption.

45. See Regulations.gov, search term “333,” filtered by “notice,” “nonrulemaking,” and “FAA.”

46. See *Authorizations Granted via Section 333 Exemption*, FED. AVIATION ADMIN., [https://www.faa.gov/uas/beyond\\_the\\_basics/section\\_333/333\\_authorizations/](https://www.faa.gov/uas/beyond_the_basics/section_333/333_authorizations/) (last accessed Nov. 24, 2017).

47. See, e.g., Jeffrey Antonelli, *Most Section 333s Just \$1,500*, DRONE LAWS (Jan. 06, 2016), <http://dronelawsblog.com/2016-most-section-333s-just-1500/>.

48. See *Precision Agriculture: Frequently Asked Question*, YAMAHA MOTOR SPORTS, <https://www.yamahamotorsports.com/motorsports/pages/precision-agriculture-faq> (last accessed June 30, 2017). See also Yamaha Exemption No. 11448, *supra* note 20.

49. See *Precision Agriculture: RMAX*, YAMAHA MOTOR SPORTS, <https://www.yamahamotorsports.com/motorsports/pages/precision-agriculture-rmax> (last accessed June 30, 2017).

50. *Id.*

51. See Yamaha Exemption No. 11448, *supra* note 20.

RMAX began commercial operation in the U.S. in May 2016, spraying against powdery mildew.<sup>52</sup>

### *B. Part 107 Waivers for sUASs*

The Administrator of the FAA has the authority to waive a limited list of Part 107 requirements on sUAS use,<sup>53</sup> so long as the Administrator determines that “the proposed [sUAS] operation can safely be conducted under the terms of [the] waiver.”<sup>54</sup> Anyone may request a waiver, but their request must include a “complete description of the proposed operation and justification that establishes that the operation can safely be conducted under the terms of [the waiver].”<sup>55</sup> The streamlined application consists of a basic online form.<sup>56</sup> With legal counsel, obtaining a Part 107 waiver can cost upwards of \$2,000–\$10,000, depending on the restriction being waived.<sup>57</sup> To date, the FAA has granted 1,058 Part 107 waivers<sup>58</sup> and these waivers are generally in effect for 4 years.<sup>59</sup> The vast majority of waivers granted deal with § 107.29 that, absent a waiver, limits sUAS operation to daylight hours.<sup>60</sup> Common limitations placed on nighttime operation waivers include a requirement that the area in which the drone is operating is sufficiently lit such that any obstacles may be readily observed and that the sUAS is fitted with anti-collision lighting visible for several miles.<sup>61</sup> Importantly, and unlike the Part 11 exemption process detailed immediately below, the waiver application process is highly streamlined. The FAA says that it “will strive to review and issue decisions on waiver and authorization requests within 90 days”

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52. See *Yama RMAX Debuts Commercial Spray Service On Napa Valley Vineyard*, PR NEWSWIRE (May 19, 2016), <http://www.prnewswire.com/news-releases/yamaha-rmax-debuts-commercial-spray-service-on-napa-valley-vineyard-300271880.html>.

53. The full list of waivable requirements is available at 14 C.F.R. § 107.205. Note that this waivable list does not include the ban on hazardous chemical transport, which requires a Part 11 exemption, as detailed in Part III.B. *infra*.

54. 14 C.F.R. § 107.200(a).

55. 14 C.F.R. § 107.200(b).

56. See *Request a Part 107 Waiver*, FED. AVIATION ADMIN., [https://www.faa.gov/uas/request\\_waiver/request\\_part\\_107\\_waiver/](https://www.faa.gov/uas/request_waiver/request_part_107_waiver/) (last accessed Nov. 24, 2017).

57. See, e.g., Jeffrey Antonelli, *Prices for a Part 107 Waiver*, DRONE LAWS (Aug. 07, 2017), <http://dronelawsblog.com/prices-for-part-107-waiver-antonelli-law/>.

58. See *Part 107 Waivers Granted*, FED. AVIATION ADMIN., [https://www.faa.gov/uas/request\\_waiver/waivers\\_granted/](https://www.faa.gov/uas/request_waiver/waivers_granted/) (last accessed July 18, 2017).

59. *Id.*

60. See *id.* There are currently 921 waivers granted exclusively to waive the requirement of § 107.29.

61. See, e.g., Gary Indiana Police Dept., Waiver No. 107W-2017-02836 (FAA July 13, 2017), [https://www.faa.gov/uas/request\\_waiver/waivers\\_granted/media/107W-2017-02836\\_Douglas\\_Drummond\\_CoW.pdf](https://www.faa.gov/uas/request_waiver/waivers_granted/media/107W-2017-02836_Douglas_Drummond_CoW.pdf).

and this review does not require notice and comment.<sup>62</sup> Part 107 waivers may also be secured in combination with Part 11 exemptions, as discussed below in the case of DroneSeed.

### *C. Part 11 Exemptions*

The FAA can exempt an individual from *any* FAA regulation by submitting a request for a Part 11 exemption. This pathway, however, is far more burdensome than the Part 107 waiver process as it requires publication in the Federal Register and opportunity for public comment.<sup>63</sup> The FAA requires that the petition be submitted at least 120 days before the petitioner anticipates the exemption is required.<sup>64</sup> Additionally, Part 11 exemptions are typically only valid for 2 years, as opposed to 4 years under a Part 107 waiver.<sup>65</sup> The FAA does, however, provide guidance to individuals seeking a Part 11 exemption<sup>66</sup> and a searchable database called the Automated Exemption System (AES) is accessible to the public.<sup>67</sup>

One company, DroneSeed,<sup>68</sup> has successfully petitioned the FAA for numerous exemptions under Part 11, as well as a Part 107 Waiver, for aerial pesticide application by a sUAS.<sup>69</sup> DroneSeed's business model includes the use of sUASs to apply pesticides and re-seed tree populations after a clear-cut in remote forest areas.<sup>70</sup> These sUASs are designed to fly mostly autonomously, relying on GPS and pre-programmed maps and surveys to control flight paths.<sup>71</sup> Since DroneSeed's aircraft are all under 55 lbs., they are the first pesticide-

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62. See *Request a Part 107 Waiver or Operation in Controlled Airspace*, FED. AVIATION ADMIN., [https://www.faa.gov/uas/request\\_waiver/](https://www.faa.gov/uas/request_waiver/) (last accessed July 18, 2017) (detailing the step by step process to request a Part 107 waiver).

63. See 14 C.F.R. § 11.85.

64. *Id.*

65. See *Guidelines for Submitting a Petition for Exemption*, FED. AVIATION ADMIN., at 23, [https://www.faa.gov/regulations\\_policies/rulemaking/media/Petition\\_For\\_Exemption\\_Guide.pdf](https://www.faa.gov/regulations_policies/rulemaking/media/Petition_For_Exemption_Guide.pdf) (last accessed July 18, 2017).

66. See *id.* at 7–20; The full list of required information submitted as a part of the petition is detailed in 14 C.F.R. § 11.81.

67. See *generally Automated Exemption System*, FED. AVIATION ADMIN., <http://aes.faa.gov/AES.asp> (last accessed July 18, 2017).

68. See *generally* DRONESEED, <https://www.droneSeed.co/> (last accessed July 14, 2017).

69. See DroneSeed, Co., Exemption No. 17261, Regulatory Docket No. FAA-2016-9247 (FAA Mar. 19, 2017), <https://www.regulations.gov/document?D=FAA-2016-9247-0005>. The FAA erroneously labeled DroneSeed's petition as a Section 333 exemption request in the Federal Register. See 81 Fed. Reg. 90045. DroneSeed submitted a public comment noting that its petition specifically requested relief under Part 11. Interestingly, when FAA approved the petition for exemption, it cited neither Section 333 nor Part 11 as its authority to grant an exemption. The FAA noted, again erroneously, that it received no public comments in response to its notice in the Federal Register.

70. See DroneSeed, *Petition for exemption*, at 3–4, 22 (September 27, 2016), <https://www.regulations.gov/document?D=FAA-2016-9247-0001>.

71. See *id.*

dispensing UASs to fall under the Section 107 rules.<sup>72</sup> The FAA cited the Section 333 exemption granted for the Yamaha RMAX drone to similarly exempt DroneSeed from § 137 requirements like shoulder harnesses and certain aerial maneuvers.<sup>73</sup> DroneSeed's granted Part 11 petition included a critical exemption which was unavailable under the Part 107 waiver: the ability to transport hazardous materials, namely pesticides.<sup>74</sup> The FFA noted that DroneSeed's "intended use would involve far smaller quantities of economic poisons than currently allowed and carried under part 137."<sup>75</sup> As such, "a limited grant of exemption from § 107.36 [the ban on carriage of hazardous material] is consistent with [the aerial applicator rules] to permit the use of small UAS for agricultural operations under part 137." The FAA ultimately granted the exemption, but limited it to "the use of any economic poison as defined in § 137.3."<sup>76</sup>

DroneSeed also requested, and was granted, a Part 107 Waiver to operate more than one drone per pilot.<sup>77</sup> The waiver, however, contains several key limitations. To begin, it requires that all operation be conducted in "remote (rural) forestry sites" and requires several notification procedures to "restrict access by non participating persons."<sup>78</sup> Additionally, the pilot in command must "identify operational area obstacles and boundaries so as to avoid collision with, or damage to property" and the sUAS must use high-visibility paint to "facilitate rapid identification of errant [sUASs]."<sup>79</sup> The waiver also contains requirements that the software and any redundancies are fully functional before beginning operations and that if any component fails, the other sUAS are not affected and that the operator is visually and audibly alerted to the failure.<sup>80</sup> This cumbersome process of applying for multiple exemptions and waivers would have to be conducted by each and every operator wishing to use sUASs in the pesticide-applicator

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72. See FAA Exemption No. 17261, *supra* note 68 at 2.

73. *Id.* at 1, 9.

74. See *id.* at 9, 12.

75. *Id.* at 7.

76. *Id.* at 12. Note that "economic poison" is defined in 14 C.F.R. § 137.3 as "(1) any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, nematodes, fungi, weeds, and other forms of plant or animal life or viruses, except viruses on or in living man or other animals, which the Secretary of Agriculture shall declare to be a pest, and (2) any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant." This definition is functionally equivalent to the definition of "pesticide" under FIFRA § 2(u).

77. See DroneSeed, Waiver No. 107W-2016-01297 (FAA Nov. 16, 2016). This waives the limitation of § 107.35 which states that "A person may not operate or act as a remote pilot in command or visual observer in the operation of more than one unmanned aircraft at the same time." As of July 14, 2017, 18 individuals and companies have received a waiver of the § 107.35 limitation to multiple drone operation.

78. *Id.* at 3.

79. *Id.*

80. *Id.*

marketplace. DroneSeed's success demonstrates that the FAA is open to the use of drones as pesticide applicators; however, the current complex approval process serves as a significant barrier to entry for potential competitors.

#### IV. FAA AND EPA CAN FACILITATE THE ADOPTION OF UASs IN PESTICIDE APPLICATION

There are several, relatively straightforward, regulatory actions which both the FAA and EPA can take to facilitate the adoption of UASs in aerial pesticide application. First, the FAA could initiate rulemaking to amend or append the regulations of pesticide-dispensing aircraft under Section 137 which meet the description of a UAS to automatically exempt them from a list of inapplicable regulations, for example, §§ 137.19(e)(2) (certain aerial maneuvers) and 137.31(b) (safety restraints). This automatic exemption would both provide clarity to potential operators as well as reduce the regulatory hurdles required when receiving approval for UAS use.

Second, the FAA can initiate rulemaking to add the ban on hazardous material transport to the list of waivable restrictions under the Part 107 Waiver process. The FAA could limit, as it did in the case of DroneSeed, the waiver to those materials defined as "economic poisons" under FAA regulations, or simply adopt the statutory definition of pesticide contained within FIFRA.<sup>81</sup> Importantly, the Administrator of the FAA would still retain discretion whether or not to grant the waiver if there were serious safety concerns.

Third, the EPA in the short-term could promulgate an interpretive rule, not subject to notice and comment, that UASs qualify as "helicopters" for the purpose of pesticide label restrictions. This rule would provide clarity to UAS operators, but would be limited to those pesticides for which application from a helicopter/rotocopter under prescribed conditions has been demonstrated safe. For a longer-term solution, the EPA could develop internal guidelines to be included in evaluating and proscribing future pesticide labels. These guidelines could take advantage of the unique benefits of UASs where traditional aircraft may be unsafe as methods of pesticide application or simply modify traditional restrictions in light of the technological features of UASs.

#### V. CONCLUSION

Updates to the FAA and EPA regulations dealing with the aerial pesticide applications are overdue, especially in light of the advent of

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81. See 14 C.F.R. § 137.3, *supra* note 75.

sUASs as a possibly safer and cheaper substitute for traditional fixed-wing or helicopter/rotocopter aerial applicators. In the meantime, a combination of Section 333 exemptions, Part 107 Waivers, Section 11 exemptions—depending on the size of the UAS—are a viable, albeit expensive and time-consuming, alternative to permit limited use and testing of sUASs for aerial pesticide application in the near future.