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SECTION 333: WHAT WE'VE LEARNED AND WHERE WE NEED TO GO

*Amelia Rose Niemi, Esq.**

INTRODUCTION

There are many different technological advances that movies and television have told us the future will hold—flying cars, talking robots, and meals that materialize from thin air. The public is beginning to experience what only previously existed in science fiction. Even though we are not on the Starship Enterprise, National Aeronautics and Space Administration (NASA) is researching the use of 3D printer technology to print food in space.¹ Rosie the Robot may not be our children's nanny for another few generations, but Siri is an excellent secretary for many businessmen and women. Flying cars may not be on the horizon, but we are beginning to see the rise of unmanned autonomous vehicles that are capable of eliminating many dangers humans face.²

A necessary corollary to these technological advancements is a change in law—the not-so-glamorous transitioning process necessary

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1. *3D Printing: Food in Space*, NASA, http://www.nasa.gov/directorates/spacetech/home/feature_3d_food_prt.htm (last visited July 7, 2015).

2. There are many ways to refer to unmanned aircraft: unmanned aircraft system (UAS), unmanned aerial vehicle (UAV), drones, model aircraft, and remote controlled (RC) aircraft, remotely piloted aircraft (RPA). Small unmanned aircraft systems (sUAS) specifically refers to unmanned aircraft that weigh less than fifty-five pounds, as defined in Section 331 of the FAA Modernization and Reform Act of 2012. FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 331(6), 126 Stat. 11, 7 (2012) (codified as amended at 29 U.S.C. § 40101 (2012)). In the Section 333 exemption grants, the FAA refers to "unmanned aircraft" (UAs). This Essay will do the same when referring to commercial UAs, except when quoting other sources. When referring to petitions, grants, and other documents submitted on the FAA's docket, this Essay provides the appropriate docket and exemption numbers parenthetically.

to fully integrate these advances into the lives of the general public. Although this story will not be coming soon to a theater near you, it is a necessary and cumbersome process.

Integrating commercial unmanned aircrafts (UAs) into the United States' national airspace system (NAS) poses an incredibly difficult challenge. On one hand, the technology is new, changes every day, and is literally lifesaving. On the other hand, with new technology comes new sets of risks. Creating laws to meet quick technological advances is difficult. Laws take time to properly craft, negotiate, and compromise, but when the technology changes every day, it can be impossible for legislators to keep up with the new developments.

This Essay reviews the process of integration, focusing on the evolution over the past year of the "Section 333 bridge" (the process commercial UA operators must undergo to legally operate in the United States), and some of the pitfalls that occurred during the bridge period.

Part II of this Essay describes Section 333 as the period between the current period and a period of full integration.³ Part III of this Essay breaks down the timeline of the Section 333 petition process and describes the petitions that have been approved.⁴ Part IV of this Essay describes the problems with the Section 333 rollout.⁵ Part V discusses what can be done now and suggests safety studies and additional acts of Congress.⁶

II. SECTION 333 SPECIAL RULES FOR CERTAIN UNMANNED AIRCRAFT SYSTEMS

Section 333 of the Federal Aviation Administration ("FAA") Modernization and Reform Act is a bridge between the current period—where commercial operation is prohibited absent approval—and full integration.⁷ It requires the FAA to "determine if certain unmanned aircraft systems may operate safely in the national airspace system,"

3. See *infra* notes 7–11 and accompanying text.

4. See *infra* notes 12–46 and accompanying text.

5. See *infra* notes 47–78 and accompanying text.

6. See *infra* notes 79–90 and accompanying text.

7. In 2007, the FAA announced a policy change, banning commercial UA use without specific approval: "The current FAA policy for UAS operations is that no person may operate a UAS in the National Airspace System without specific authority. . . . for UAS operating as civil aircraft the authority is special airworthiness certificates" Unmanned Aircraft Operations in the National Airspace, 72 Fed. Reg. 6689, 6690 (Feb. 13, 2007) (codified at 14 C.F.R. pt. 91). The first FAA approved commercial flight took place six years later in September 2013 in the Arctic. Ed Crooks, *Conoco in Landmark Alaska Drone Flight*, CNBC (Sept. 25, 2013, 2:09 AM), <http://www.cnbc.com/2013/09/25/conoco-in-landmark-alaska-drone-flight.html>.

taking into consideration, at minimum, which types of UAs create a hazard and which do not based on their size, weight, speed, and other factors.⁸ Section 333 also requires the FAA to determine the legal vehicle for operations, and to establish requirements for safe operation.⁹

In May 2014, Jim Williams, then-manager of the FAA's UAS Integration Office, spoke to a packed room at the Association for Unmanned Vehicle Systems International (AUVSI) conference in Orlando, Florida regarding his department's work in expanding UAS use in the NAS.¹⁰ During this presentation, Mr. Williams announced the FAA's plan to implement Section 333 of the FAA Modernization and Reform Act of 2012 and that his office would begin reviewing petitions for exemption under Section 333. The FAA's guidance regarding Section 333 petitions was relatively limited:

Our mission is the safe, efficient and timely integration of Unmanned Aircraft Systems (UAS) into the National Airspace System.

The agency is taking steps under Section 333 of the FAA Modernization and Reform Act of 2012 (FMRA) to move forward with incremental UAS integration of specific, limited, low-risk civil operations in advance of the small UAS rule. FAA Administrator Michael Huerta has identified this activity as a priority.

UAS that can safely operate in a controlled low risk environment may be able to obtain authorization under Section 333. Under the law, the FAA will determine if a certification of waiver, certificate of authorization, or airworthiness certificate is required to authorize operations. Later this year, the FAA will begin considering operational approvals under Section 333 on a case-by-case basis.¹¹

III. THE EVOLUTION OF THE 333 PETITION PROCESS

A. *Summer 2014, the First Petitions, and the First Approvals*

After Mr. Williams' announcement at the AUVSI conference regarding Section 333, the first Petitions for Exemption were filed that

8. FAA Modernization and Reform Act § 333(b)(1) (Other factors include operational capability, proximity to airports and populated areas, and operation within visual line of sight do not create a hazard to users of the national airspace system or the public or pose a threat to national security).

9. *Id.* § 333(a).

10. James Williams, Manager, UAA Integration Office FAA, AUSVI's Unmanned Systems Conference: Expanding the Use of Unmanned Aircraft Systems in the National Airspace System (May 13, 2014) [hereinafter Williams, AUSIV Conference].

11. Antonelli Law, *Section 333*, DRONES L. BLOG, <http://dronelawsblog.com/wp-content/uploads/2014/05/FAA-Section-333-part-1-at-AUVSI.pdf> (last visited Sept. 20, 2015). Some industries expected to take advantage of Section 333 of the FMRA include movie making, flare stack (oil and gas) monitoring, precision agriculture, surveillance of crops and livestock, application of fertilizer and pesticides, and power line inspections. *Id.*

May by Pictorvision, Inc.,¹² Flying-Cam, Inc.,¹³ Astraeus Aerial,¹⁴ HeliVideo Productions, LLC,¹⁵ Aerial MOB, LLC,¹⁶ RC Pro Productions Consulting, LLC d/b/a Vortex Aerial,¹⁷ Snaproll Media, LLC,¹⁸ and Trimble Navigation, Ltd.¹⁹ All of these petitions, except for Trimble, were requests to fly UAs for the motion picture and television industry. Trimble is a UA manufacturer and requested permission to conduct aerial surveys.²⁰ Throughout the remainder of the summer and into fall, a handful of additional petitions were submitted to the FAA.²¹

12. Pictorvision Inc., Exemption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations (May 27, 2014) (Doc. No.: FAA-2014-0357-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2014-0357-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>.

13. Flying-Cam Inc., Exemption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations (May 27, 2014) (Doc. No.: FAA-2014-0355-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2014-0355-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>.

14. Astraeus Aerial, Exemption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations (May 27, 2014) (Doc. No.: FAA-2014-0352-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2014-0352-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>.

15. HeliVideo Productions LLC, Exemption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations (May 27, 2014) (Doc. No.: FAA-2014-0354-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2014-0354-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>.

16. Aerial MOB, LLC, Exemption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations (May 27, 2014) (Doc. No.: FAA-2014-0353-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2014-0353-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>.

17. RC Pro Productions Consulting LLC, Exemption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations (May 27, 2014) (Doc. No.: FAA-2014-0356-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2014-0356-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>.

18. Snaproll Media LLC, Exemption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations (May 27, 2014) (Doc. No.: FAA-2014-0358-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2014-0358-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>.

19. Trimble Navigation Limited, Exemption Request Under Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations (May 30, 2014) (Doc. No.: FAA-2014-0367-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2014-0367-0001&attachmentNumber=1&disposition=attachment&contentType=pdf> [hereinafter Trimble, Exemption Request].

20. *Id.* (“The requested exemption would permit commercial operation of Trimble UX5, which weighs 5.5 lbs. and performs precision aerial surveys that consist of still photographs taken by onboard cameras. . . . Applications of these UAS devices and associated data processing functions include agriculture, mining, and professional surveying.”).

21. Amazon Prime Air requested to conduct research and development that would potentially lead to drone package delivery. Amazon.com, Amazon Petition for Exemption (July 9, 2014) (Doc. No.: FAA-2014-0474-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2014-0474-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>.

Yamaha requested to use a two hundred-pound unmanned aircraft for precision agriculture ap-

In August 2014, the FAA finally issued a request for additional information, giving an idea of what sort of information was considered relevant.²² For example, the FAA requested the serial numbers of the aircraft to be operated; the aircraft operations manual for the UAs; detailed maintenance procedures, including how to address unscheduled maintenance and the inspection frequency; and an “assessment of the training and qualification differences between private and commercially certificated pilots, and if and how these differences may impact the safety of the proposed operations of . . . UAS(s).”²³

Finally, on September 29, 2014, four months after submission, the FAA issued its first grants of exemption, but only after senior FAA officials not once, but twice, overruled their subordinates to approve the documents.²⁴ These grants had specific conditions and limitations of operation, ranging from the requirement of having a visual observer to see and avoid other aircraft, to developing UAS technician criteria. At that time, the FAA also issued additional steps a commercial drone operator needed to follow, which included registering each device with the registration branch in Oklahoma City, requesting a Notice to Airman (NOTAM) prior to operating, and obtaining a Certificate of Authorization (COA) or Waiver for each commercial operation.²⁵

plications, including crop dusting. Yamaha Motor Corporation, U.S.A., Petition for Exemption for the RMAX Remotely-Piloted Helicopter (July 15, 2014) (Doc. No.: FAA-2014-0397-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2014-0397-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>. Douglas Trudeau requested to use a two-pound drone for real estate photography. Douglas Trudeau, Exemption Request Section 333 of the FAA Reform Act of the Federal Aviation Regulations (July 12, 2014) (Doc. No.: FAA-2014-0481-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2014-0481-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>. Nixon Engineering Solutions, LLC, requested to do photogrammetry for the oil and gas industry. Nixon Engineering Solutions LLC, Request for Exemption under Section 333 of the FAA Reform and Remodernization Act of 2012 and Part 11 of the Federal Aviation Regulations (Sept. 24, 2014) (Doc. No.: FAA-2014-0763-000), <http://www.regulations.gov/contentStreamer?documentId=FAA-2014-0763-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>.

22. E-mail from Rob Pappas, Special Rules Coordinator, UAS Integration Office, Federal Aviation Administration to John McGraw, Agent for Astraeus Aerial, Aerospace Consulting, LLC, and Johnathan B. Hill, Counsel for Astraeus, Cooley LLC (Aug. 7, 2014, 12:03 PM), <http://www.regulations.gov/contentStreamer?documentId=FAA-2014-0352-0091&attachmentNumber=1&disposition=attachment&contentType=pdf>.

23. *Id.*

24. Craig Whitlock, *FAA Drone Approvals Bedeviled by Warnings, Conflict, Internal E-mails Show*, WASH. POST, Dec. 21, 2014, https://www.washingtonpost.com/world/national-security/faa-drone-approvals-bedeviled-by-warnings-conflict-internal-e-mails-show/2014/12/21/69d8a07a-86c2-11e4-a702-fa31ff4ae98e_story.html?tid=ptv_rellink.

25. *E.g.*, *In re Astraeus Aerial*, Doc. No. FAA-2014-0352, Grant of Exemption, 27 (Sept. 25, 2014).

One of the most important, and controversial aspects of these grants—and the grants to follow—was the FAA’s requirement that the pilot in command (PIC) hold a pilot certificate.²⁶ In *Astraeus Aerial’s* petition, the FAA analyzed the differences between a commercial pilot certificate and a private pilot certificate to determine the appropriate level of pilot certification for unmanned flight.²⁷ At that point, the FAA found “that the additional manned airmanship experience of a commercially certified pilot would not correlate to the airmanship skills necessary” for the proposed operations.²⁸ As a result, the FAA required that the PIC must hold, at minimum, a private pilot certificate both because the PIC will have the airman knowledge obtained during flight school and “pilots holding a private pilot certificate are subject to security screening by the Department of Homeland Security.”²⁹ Despite the imposed limitations, the companies who received their exemptions were now the only companies legally allowed to operate in the United States.

B. Winter 2014–2015, Congressional Hearings, and More Approvals

The next set of petitions was not approved for another three months, on December 10, prior to the House Subcommittee on Aviation, Committee on Transportation and Infrastructure Hearing.³⁰ Although some of the conditions and limitations remained the same from the Hollywood Seven, differences began to emerge.

For example, while the FAA still required N-Number registration³¹ and the issuance of COAs and NOTAMs prior to operation (like it did in the original grants) the following condition appeared: “The UA may not be operated over congested or densely populated areas. These areas include but are not limited to the yellow areas depicted on [relevant sectional charts]. However, aeronautical charts may not reflect pertinent local information.”³² Although this condition does not appear in many of the later grants, it raised the question: What is a congested area? As with U.S. Supreme Court Justice Stewart’s

26. *Id.* at 17–18.

27. *In re Astraeus Aerial*, Doc. No. FAA-2014-0352, Grant of Exemption at 15.

28. *Id.* at 18.

29. *Id.* at 16–18.

30. *In re Clayco, Inc.*, Doc. No. FAA-2014-0507, Grant of Exemption, 21 (Dec. 10, 2014); *In re Trimble Navigation Ltd.*, Doc. No. FAA-2014-0367, Grant of Exemption, 26 (Dec. 10, 2014); *In re VDOS Global, LLC*, Doc. No. FAA-2014-0382, Grant of Exemption, 16 (Dec. 10, 2014); *In re Woolpert, Inc.*, Doc. No. FAA-2014-0506, Grant of Exemption, 13 (Dec. 10, 2014).

31. *In re Clayco*, Doc. No. FAA-2014-0507, Grant of Exemption at 20 (“All aircraft operated in accordance with this exemption must . . . have identification (N-Number) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.”).

32. *Id.* at 20.

description of obscenity, “I know it when I see it”,³³ the FAA does not have a precise definition: “The Administrator has not pronounced a precise definition that includes the factors of the density of the population in an area; whether there is surface traffic in the vicinity; or the numbers and proximity of residences, buildings, or structures.”³⁴

Another area in which the FAA made a major announcement was the PIC qualification process. FAA notes:

Although Section 333 provides limited statutory flexibility relative to 49 USC § 44704 for the purposes of airworthiness certification, it does not provide flexibility relative to other sections of Title 49. The FAA does not possess the authority to exempt from the statutory requirement to hold an airman certificate as prescribed in 49 USC § 44711.³⁵

In January 2015, the grant given to Douglas Trudeau, a Tucson, Arizona realtor who received approval through this process, sparked and increased interest in filing Section 333 petitions.³⁶ This led to many similar petitions being submitted to the FAA.³⁷ At that time, the

33. *Jacobellis v. Ohio*, 378 U.S. 184, 197 (1964).

34. *Sturgell v. Folk*, N.T.S.B. Order No. EA-5404, 2008 WL 3883489, at *6 (Aug. 15, 2008). “The FAA has stated that there is no precise definition of a ‘congested area’ and official U.S. Government aeronautical charts and NOTAMs provide general guidance for developing a proposed route” *In re Trimble Navigation*, Doc. No. FAA-2014-0367, Grant of Exemption at 18.

35. *In re Trimble Navigation*, Doc. No. FAA-2014-, Grant of Exemption at 14, 18.

36. *In re Douglas Trudeau*, Doc. No. FAA-2014-0481, Grant of Exemption (Jan. 5, 2015).

37. *See, e.g.*, Silver Fern Homes, LLC, Exemption Request Section 333 of the FAA Reform Act of 2012 (Doc. No.: FAA-2015-0294-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2015-0294-0001&attachmentNumber=1&disposition=attachment&contentType=pdf> (posted Feb. 6 2015); Michale’s Drone Photograph, L.L.C., Exemption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations (Jan. 26 2015) (Doc. No.: FAA-2015-0235-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2015-0235-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>; Jason Youn Photography LLC, Exemption Request Section 333 of the FAA Reform Act of the Federal Aviation Regulations (Jan. 22, 2015) (Doc. No.: FAA-2015-0233-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2015-0233-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>; Jeffrey Galindo, Exemption Request Section 333 of the FAA Reform Act of the Federal Aviation Regulations (Doc. No.: FAA-2015-0116-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2015-0116-0001&attachmentNumber=1&disposition=attachment&contentType=pdf> (posted Jan. 20, 2015); Norman Hirsch, Exemption Request Section 333 of the FAA Reform Act of the Federal Aviation Regulations (Jan. 14, 2015) (Doc. No.: FAA-2015-0108-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2015-0108-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>; Photo-Flight Aerial Media, Petition of Photoflight Aerial Media for Exemption Pursuant to Section 333 of the FAA Reform Act (Jan. 13, 2015) (Doc. No.: FAA-2015-0111-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2015-0111-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>; Mark Sobczyk, Exemption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations (Jan. 9, 2015) (Doc. No.: FAA-2015-0052-0001), <http://www.regulations.gov/contentStreamer?documentId=FAA-2015-0052-0001&attachmentNumber=1&disposition=attachment&contentType=pdf>; Nick Patillo, Ex-

FAA began approving a handful of petitions every few weeks, but due to the large number of new petitioners, it was evident that something needed to change. At the end of February 2015, the FAA had approved twenty-eight grants and one amendment out of the 550 petitions that had been submitted.³⁸ It was evident that something would need to change.

C. *Spring 2015 and Streamlined Processes*

In March and April 2015, the FAA changed its policy in two ways by creating a summary grant process and instituting a “blanket-COA” for certain UA operations.

1. *Summary Grants*

The FAA developed the summary grant process as a tool that would allow expedited review of previously-approved UAs for previously-approved uses.³⁹ The most important aspect was that these grants were not published in the Federal Register to solicit comments, which significantly decreased the time necessary for approval.⁴⁰ The FAA limited the analysis needed for each approval, because many UAs are mass-produced and become a known-quantity after the first one is approved.

The FAA also streamlined the conditions in Summary Grants. Rather than individually address the weight and speed of each UA, the FAA began listing the maximum weight as “less than 55 pounds including payload” or maximum speed as “exceeding 87 knots (100 miles per hour).”⁴¹ At that time, the FAA also lowered manned aircraft certification. PICs, moving forward, only needed a sport pilot

emption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations (Doc. No.: FAA-2015-0022-0002), <http://www.regulations.gov/contentStreamer?documentId=FAA-2015-0022-0002&attachmentNumber=3&disposition=attachment&contentType=pdf> (posted Jan. 7, 2015).

38. See *Authorizations Granted via Section 333 Exemptions*, FED. AVIATION ADMIN. (Aug. 11, 2015 1:47 PM), http://www.faa.gov/uas/legislative_programs/section_333/333_authorizations/, for an updated list of authorized grants. All of the petitions waiting approval can be found on the regulations.gov website. Antonelli Law’s Drone/UAS Practice Group monitors all the submitted petitions and all the granted petitions and will report Section 333 activity on Antonelli Law, DRONE L. BLOG (Aug 11, 2015), <http://dronelawsblog.com/>.

39. *FAA Summary Grants Speed UAS Exemptions*, FED. AVIATION ADMIN., <http://www.faa.gov/news/updates/?newsId=82485> (last modified Apr. 9, 2015, 3:11 PM)

40. See, e.g., *In re Kovar & Assocs., LLC*, Doc. No. FAA-2015-1331, Grant of Exemption (June 25, 2015).

41. See, e.g., *In re Owlcam, LLC*, Doc. No. FAA-2015-0163, Grant of Exemption, 3 (Apr. 20, 2015).

license and either a third class medical certificate or a U.S. driver's license.⁴²

2. *Blanket COA*

The second change the FAA made was the issuance of a blanket 200-foot COA.⁴³ This document is now issued with every Summary Grant under Section 333, and allows a petitioner to operate up to 200 feet above ground level (AGL) without filing additional paperwork.⁴⁴ Petitioners are still required to request a NOTAM twenty-four hours in advance of an operation. Moreover, petitioners who wish to operate between 200 feet and 400 feet AGL are still required to submit additional documentation⁴⁵ that can take up to sixty business days for approval.⁴⁶

IV. PROBLEMS WITH THE ROLLOUT

A. *Timing*

The first major problem encountered with the Section 333 process is the timing. It took the FAA over two years to develop the program.⁴⁷ After Mr. Williams's announcement that the FAA would begin accepting petitions for exemption, it took nearly a year before the process became streamlined under the Summary Grant process.⁴⁸ Although this streamlined process allowed the FAA to work through the backlog of petitions that accumulated and process newly submit-

42. *Id.* at 4.

43. *FAA Streamlines UAS COAs for Section 333*, FED. AVIATION ADMIN., <http://www.faa.gov/news/updates/?newsId=82245> (last modified Mar. 24, 2015, 12:46 PM).

44. *Id.*

45. *Petitioning for Exemption Under Section 333*, FED. AVIATION ADMIN., http://www.faa.gov/uas/legislative_programs/section_333/how_to_file_a_petition/ (last modified Oct. 21, 2015, 12:34 PM) ("After receiving a grant of exemption, petitioners who want to fly outside these blanket parameters will be eligible to apply for a separate COA specific to the airspace required for their operation.")

46. *UAS Civil COA*, FED. AVIATION ADMIN., <https://oeaaa.faa.gov/oeaaa/external/uas/portal.jsp> (last visited Oct. 26, 2015) ("The FAA will endeavor to process civil COA applications within sixty (60) business days (excludes federal holidays and weekends).")

47. The FMRA was signed into law on February 14, 2012. *H.R. 658 (112th): FAA Modernization and Reform Act of 2012*, GOVTRACK.US, <https://www.govtrack.us/congress/bills/112/hr658> (last visited Oct. 26, 2015). However, the FAA did not begin accepting Section 333 petitions until May 2014. Williams, AUSIV Conference, *supra* note 10; see also *Press Release—FAA To Consider Exemptions for Commercial UAS Movie and TV Production*, FED. AVIATION ADMIN. (June 2, 2014), http://www.faa.gov/news/press_releases/news_story.cfm?newsId=16294 (announcing that petitions have begun to be filed).

48. In March 2015, nearly a year after the FAA began accepting Section 333 petitions, the FAA announced the new summary grant process. *FAA Streamlines UAS COAs for Section 333*, *supra* note 43.

ted petitions more quickly, there is still a period of months between submission and approval.⁴⁹ At the end of 2014, only twelve companies were approved to legally operate in the United States, which led to an oligopoly in the industry.⁵⁰ Individuals who chose to follow the rules and submit a petition were forced to wait in limbo while risk-takers were able to build their business. Several of the petitions that were submitted in the summer 2014 were not approved until the spring 2015.⁵¹

This timing matter has been symptomatic of FAA regulations related to UAs. Section 332 of the FAA Modernization and Reform Act of 2012 requires full UA integration by September 30, 2015, and provides a number of other deadlines along the way.⁵² The proposed rule for sUAS integration was published in February 2015 for notice and comment.⁵³

Despite the congressionally mandated deadlines at the Subcommittee on Aviation, Committee on Transportation and Infrastructure hearing before the House of Representatives on December 10, 2014, Dr. Gerald L. Dillingham, Director of Physical Infrastructure Issues in the U.S. Government Accountability Office testified that “the most important provisions of the 2012 Act have been significantly delayed or are unlikely to be achieved by the mandated dates.”⁵⁴ Dr. Dillingham also noted that although the FAA met the congressional mandate to integrate civil UAS into the NAS, “that plan does not contain details on how it is to be implemented, and it is therefore uncertain how

49. For example, Nixon Engineering Solutions, LLC, originally submitted in September 2014, was finally approved over six months later in April 2015, while Home Debut, originally submitted in April 2015, was approved at the end of June 2015. Home Debut, Inc., Doc. No. FAA-2015-1457, Grant of Exemption (June 30, 2015); Nixon Engineering Solutions, LLC, Doc. No. FAA-2014-0763, Grant of Exemption (Apr. 1, 2015).

50. *FAA Grants Real Estate, Agricultural UAS Exemptions*, FED. AVIATION ADMIN. (Jan. 6, 2015), <http://www.faa.gov/news/updates/?newsId=81164> (“Before these exemption approvals, the FAA had granted 12 exemptions to 11 companies in a variety of industries.”).

51. Amazon Prime Air did not receive its Exemption until April 8, 2015. *In re Amazon.com*, Doc. No. FAA-2014-0474, Grant of Exemption (Apr. 8, 2015). Yamaha, which has been operating its RMAX, a large UA, in Japan, Australia, and other countries for over twenty years, did not receive its approval until May 1, 2015. *In re Yamaha Motor Corp. U.S.A.*, Doc. No. FAA-2014-0397, Grant of Exemption (May 1, 2015).

52. The FAA Modernization and Reform Act of 2012. FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 332(a)(3), 126 Stat. 11,73–74 (2012) (codified as amended at 49 U.S.C. 40101 (2012)).

53. Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. 9544 (Feb. 23, 2015) (to be codified in scattered parts of 14 C.F.R.).

54. *Unmanned Aerial Systems, Efforts Made Toward Integration into the National Airspace Continue, but Many Actions Still Required: Hearings Before the Subcomm. on Aviation of the H. Comm. on Transp. & Infrastructure*, 114th Cong. 4–5 (2014) [hereinafter *UAS Hearings*] (statement of Gerald L. Dillingham, Director, Physical Infrastructure Issues).

UASs will be safely integrated and what resources this integration will require.”⁵⁵

On June 17, 2015, during the House Oversight Committee meeting, Congressman John Mica (FL-07) reviewed the deadlines of Section 332 with Michael Whitaker, Deputy Director of the FAA.⁵⁶ Mr. Whitaker stated that the Small UAS Notice of Proposed Rulemaking (NPRM) would be final by June 2016.⁵⁷ It remains to be seen whether the FAA will meet the June 2016 deadline it imposed itself for the final rule integrating sUAS into the NAS.

B. Unpreparedness That Leads to Inconsistency

As a result of the FAA being unprepared for the Section 333 rollout, it changed the requirements a number of times throughout the past year. One example of this lack of preparedness that has led to inconsistency is the manned aviation requirement. In August 2014, the FAA had yet another decision to make regarding the appropriate level of experience.⁵⁸ The first several petitions required commercial UA operators to hold a private pilot license, a requirement that was later lowered to a sport pilot license.⁵⁹

Additionally, the amount of information needed for submission significantly lessened. The Hollywood Seven submitted operating procedures including detailed discussions regarding maintenance schedules, but the FAA has since lessened this requirement and now require petitioners to “follow the . . . manufacturer’s maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.”⁶⁰

Finally, the sUAS NPRM that was released in February (although it kept some of the same rules such as requiring flights to occur during daylight hours and within the operator’s visual line of sight) eliminates

55. *Id.* at 6.

56. *Drones: The Next Generation of Commerce?: Hearing Before the H. Comm. on Oversight & Gov’t Reform*, 114th Cong. (2015) (statement of Michael Whitaker, Deputy Administrator of the Federal Aviation Administration) (watch the video at <https://www.youtube.com/watch?v=Cqig1REESD0>).

57. Oversightandreform, *6-17-2015 Drones: The Next Generation of Commerce?*, YOUTUBE (June 17, 2015), <https://www.youtube.com/watch?v=Cqig1REESD0>.

58. *In re Astraeus Aerial*, Doc. No. FAA-2014-0352, Grant of Exemption, 15 (Sept. 25, 2014).

59. *FAA Summary Grants Speed UAS Exemptions*, *supra* note 39 (“The agency now allows operations under these exemptions by people who hold a recreational or sport pilot certificate. Previously, Section 333 operators were required to have at least a private pilot certificate. The newly added certificates are easier to obtain, and therefore less costly, than a private pilot certificate.”).

60. *See, e.g., In re Astraeus Aerial*, Doc. No. FAA-2014-0352, Grant of Exemption at 24; *Volo Pervidi, LLC*, Doc. No. FAA-2015-0880, Grant of Exemption, 4 (June 5, 2014).

some of the consistently-required conditions and limitations in the Section 333 grants. For example, if the rules are finalized as drafted, sUAS operators will be allowed to fly up to 500 feet AGL, as opposed to the current limit of 400 feet AGL, and will not need a visual observer during commercial operations.⁶¹ These requirements, however, are mandatory for commercial operators.⁶² The FAA controls who will fly legally at the moment—the over 1,800 petitions and amendments that have been approved is a significantly smaller number than the number of companies who wish to operate now.⁶³ Some of NPRM's more liberal requirements could also have been implemented in early 2015, along with the Summary Grant and Blanket-COAs as part of a gradual move towards integration. Instead, these are heightened restrictions that may suddenly disappear when the NPRM is final, leading one to wonder why they are necessary now.

C. *Requiring Any Level of Manned Certification*

The third major problem with the rollout is the FAA's requirement that the individual operating the UA must have a manned pilot certification.⁶⁴ Although the requirements have been lessened from requir-

61. Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. 9544, 9546 (Feb. 23, 2015) (to be codified in scattered parts of 14 C.F.R.).

62. *Section 333 Frequently Asked Questions (FAQ)*, FED. AVIATION ADMIN., http://www.faa.gov/uas/legislative_programs/section_333/333_faqs/ (last modified Aug. 17, 2015, 3:31 PM).

Do I need a Section 333 grant of exemption if I'm not charging for my services?

A. Unless you are flying only for hobby or recreational purposes, you will need FAA authorization via a Section 333 grant of exemption to fly your unmanned aircraft system (UAS) for your business. This applies even if you are only flying to supplement or aide your business and not charging fees for doing so.

.....

The FAA just published new rules for operating smallUAS commercially. Do I still need a Section 333 exemption?

A. Yes. The Small UAS Notice of Proposed Rulemaking (NPRM) was published in February 2015, and the public comment period closed in April 2015. The FAA must analyze all comments received before issuing the final small UAS rule. Until a final rule is issued, no part of this rule is in effect and current regulations continue to apply, meaning that commercial operators must petition for and receive a Section 333 grant of exemption.

Id.

63. As of October 26, 2015, the FAA has approved over 2,000 petitions for exemption. *Section 333*, FED. AVIATION ADMIN., http://www.faa.gov/uas/legislative_programs/section_333/ (last modified Aug. 21, 2015, 2:22 PM). However, my office keeps track of all the filed petitions to the best of our ability, and the number of filed petitions as of October 2015, is 3400. Additionally, I speak with many people at conferences and in my general practice who wish to operate, but have not yet gone through the 333 process.

64. *FAA Summary Grants Speed UAS Exemptions*, *supra* note 39 (“The agency now allows operations under these exemptions by people who hold a recreational or sport pilot certificate.”).

ing a pilot private license to requiring a sport pilot license, these are burdensome to obtain. Additionally, manned flight is more dangerous than unmanned flight, and the skill set learned at flight school does not translate to unmanned flight.

1. *The Manned Pilot Certification Process is Burdensome*

The first major issue with requiring any level of manned certification is that it is burdensome to the individual wishing to operate a UA, due to the time needed to obtain the license and the cost of flight school.

To obtain a sport pilot certificate with an airplane category and single-engine land or sea class privileges, an individual must pass a knowledge exam and log at least twenty hours of flight time, fifteen of which must be with a flight instructor and five of which must be solo.⁶⁵ These flight hours must include: (1) two hours of cross-country flight training; (2) two hours of flight training with an instructor in preparation for the practical test discussing pre- and post-flight procedures, airport operations, ground reference maneuvers, and emergency operations, among other items; (3) ten takeoffs and landings, with each landing involving a flight in the traffic pattern at an airport; and (4) one solo cross-country flight that travels at least seventy-five nautical miles in distance, contain, at minimum, two full-stop landings, and has one segment that is at least twenty-five nautical miles.⁶⁶

However, the majority of the listed requirements have no direct relationship to the current requirements for small unmanned aircraft operators. Under the current requirements for commercial operators, unmanned aircraft must remain five nautical miles from an airport with an operational control tower,⁶⁷ so the time spent learning to land in a traffic pattern at an airport is useless. Most unmanned aircraft will not travel more than a mile or two from its operator, and are currently limited to line of sight operations. DJI's Phantom 3, for example, has a range of 1.2 miles (2 kilometers),⁶⁸ and will likely return to where its operator is at the end of an operation. Training time spent on a flight with multiple stops along the way would not be needed by a UA operator.

65. 14 CFR § 61.313 (2010) (certification of pilots, flight instructors, and ground instructors).

66. *Id.*

67. *FAA Streamlines UAS COAs for Section 333*, *supra* note 43.

68. DJI, PHANTOM 3 (PROFESSIONAL) USER MANUAL v.1.4, at 49, http://download.dji-innovations.com/downloads/phantom_3/en/Phantom_3_Professional_User_Manual_v1.4_en_0915.pdf.

2. *Manned Flight Poses More Risks than Unmanned Flight*

The FAA recognized the dangers inherent in manned aviation since the first Grants of Exemption under Section 333:

Manned helicopters . . . can weigh 6,000 lbs. or more and are operated by an onboard pilot, in addition to other onboard crewmembers, as necessary. The petitioner's UA will weigh less than 55 lbs. with no onboard pilot or crew. The pilot and crew will be remotely located from the aircraft. The limited weight significantly reduces the potential for harm to participating and nonparticipating individuals or property in the event of an incident or accident. The risk to an onboard pilot and crew during an incident or accident is eliminated with the use of a UA for the aerial filming operation.

Manned aircraft are at risk of fuel spillage and fire in the event of an incident or accident. The UA carries no fuel, and therefore the risk of fire following an incident or accident due to fuel spillage is eliminated.⁶⁹

Despite the well documented and acknowledged safety advantages to using UAs, this manned certification requirement added an additional, unnecessary danger to the industry.

3. *The Skill Set Does Not Translate from Manned Aircraft to Unmanned Aircraft*

The FAA, like other national airspace regulators that considered the issue, has concluded that UA operations conducted by persons who do not hold a pilot's license can still achieve the equivalent level of safety of current operations by manned aircraft with pilots holding a private or commercial pilot's license. In its recent UAS NPRM, the FAA stated:

While these airman certification requirements are necessary for manned aircraft operations, they impose an unnecessary burden for many small UAS operations. This is because a person typically obtains a private or commercial pilot certificate by learning how to operate a manned aircraft. *Much of that knowledge would not be applicable to small UAS operations because a small UAS is operated differently than manned aircraft.* In addition, the knowledge currently necessary to obtain a private or commercial pilot certificate would not equip the certificate holder with the tools necessary to safely operate a small UAS. . . . Thus, requiring persons wishing to operate a small UAS to obtain a private or commercial pilot certificate imposes the cost of certification on those persons, but does not result in a significant safety benefit because the process of obtaining

69. *In re Astraeus Aerial*, Doc. No. FAA-2014-0352, Grant of Exemption, 13 (Sept. 25, 2014), https://www.faa.gov/uas/legislative_programs/section_333/media/Astraeus_Aerial-11062.pdf.

the certificate does not equip those persons with the tools necessary to mitigate the public risk posed by small UAS operations.⁷⁰

The FAA's conclusion that manned aircraft flying experience is unnecessary for the operation of a UA is supported by the FAA and the Army Research Laboratory's research. For example, one Army Research Laboratory study concluded: "[T]he specific motor skills needed to control the radio-controlled UAV would have to be learned by aviators independently of the motor skills learned in flying an aircraft. In particular, the somatic and visual cues that pilots use during aircraft landings would not be useful for radio-controlled landings."⁷¹ Additional research reports lend further support for the exclusion requested. For example, a report sponsored by the FAA concluded that "Certain systems, like the U.S. Army Hunter and Shadow systems, are successfully flown by pilots with no manned aircraft experience."⁷²

In addition, foreign government airspace regulators examined the issue and consistently recognized that the skills required to fly a manned aircraft are irrelevant to operating an UA. For that reason, they concluded that UA operators do not need a manned pilot's license.⁷³

70. Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. 9544, 9550 (Feb. 23, 2015) (to be codified in scattered parts of 14 C.F.R.) (emphasis added).

71. MICHAEL J. BARNES, ET AL., ARMY RESEARCH LAB., ARL-TR-2081, CREW SYSTEMS ANALYSIS OF UNMANNED AERIAL VEHICLE (UAV) FUTURE JOB AND TASKING ENVIRONMENTS 12 (2000), <http://www.dtic.mil/dtic/tr/fulltext/u2/a374230.pdf>.

72. KEVIN W. WILLIAMS, CIVIL AEROSPACE MED. INST., FED. AVIATION ADMIN., DOT/FAA/AM-07/3, UNMANNED AIRCRAFT PILOT MEDICAL CERTIFICATION REQUIREMENTS 2 (2007), <http://fas.org/irp/program/collect/ua-pilot.pdf>; see, e.g., JASON S. MCCARLEY & CHRISTOPHER D. WICKENS, INST. OF AVIATION, AVIATION HUMAN FACTORS DIV., UNIV. OF ILL. AT URBANA-CHAMPAIGN, HUMAN FACTORS IMPLICATIONS OF UAVS IN THE NATIONAL AIRSPACE 13 (2004), <http://www.tc.faa.gov/logistics/grants/pdf/2004/04-G-032.pdf>.

73. A number of other countries do not require manned certification, but require training specific to the UA prior to commercial operation. See, e.g., TRANSP. CAN., CIVIL AVIATION, AC 600-004, GUIDANCE MATERIAL FOR OPERATING UNMANNED AIR VEHICLE SYSTEMS UNDER AN EXEMPTION (2014), <http://www.tc.gc.ca/media/documents/ca-opssvs/ac-600-004.pdf>; AUSTRAL. GOV. CIVIL AVIATION SAFETY AUTH., REQUIREMENTS FOR A UAV OPERATORS CERTIFICATE 1, <https://www.casa.gov.au/operations/standard-page/how-become-safe-rpa-operator> (follow the "Requirements for a UAV Operators Certificate"); *Remote Pilot Qualifications*, EUROUSC, <http://eurousc.com/pilot-qualifications/> (last visited Aug. 11, 2015). The United Kingdom recently began developing licensing requirements for UA operators. CIVIL AVIATION AUTH., SAFETY & AIRSPACE REGULATION GRP., CAP 722, UNMANNED AIRCRAFT SYSTEM OPERATIONS IN UK AIRSPACE—GUIDANCE 44–45 (6th ed., 2015), <https://www.caa.co.uk/docs/33/CAP%20722%20Sixth%20Edition%20March%202015.pdf> (requiring no licensing for pilots operating UAS weighing less than 7 kilograms).

D. Extra Scrutiny of Commercial Flights While Hobbyists Have Free Reign

A final problem encountered during this rollout process is the heightened requirements commercial operators must abide by while hobbyists are given significantly more latitude. Part of this stems from Section 336, which forbids the FAA to regulate hobbyist or recreational drone use. That said, the FAA does have authority to “pursue enforcement action against persons operating model aircraft who endanger the safety of the national airspace system.”⁷⁴

Commercial UA operators have significantly more at risk than hobbyist fliers. Commercial grade drones can cost tens of thousands of dollars, while hobby grade drones can be purchased for a few hundred dollars.⁷⁵ Commercial operators have their livelihood to think of, whereas many hobbyists are not as dedicated to studying manuals or taking training lessons. There are many news stories from summer 2015 of drone users—many, but not all, hobbyists—who failed to consider the impact of their flight before operating. Recently, an individual flew a UA over a forest fire, preventing firefighters from using manned aircraft to combat the flames.⁷⁶ At parades across the country, UAs have spiraled out of control injuring others in the crowd.⁷⁷ The FAA partnered in the “Know Before You Fly” campaign to encourage awareness in hobby usage.⁷⁸ However, by pursuing individuals who act in a careless or reckless manner, the FAA could discourage some of the usage that gives safe UA users a bad name.

V. WHAT CAN BE DONE NOW?

Despite the hurdles that are currently faced, there are ways to prepare for the 2016 Final Rule, and what comes next. I present two options: first, take advantage of the Congressional mandate to test UAs in preparation for integration found in Section 335;⁷⁹ second,

74. FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 336(b), 126 Stat. 11, 77 (2012).

75. DJI STORE, http://store.dji.com/product/phantom-2?from=buy_now (last visited July 8, 2015).

76. Pia Bergqvist, *Drone Grounds Firefighting Aircraft*, FLYING MAG., June 25, 2015, <http://www.flyingmag.com/news/drone-grounds-firefighting-aircraft-san-bernardino-county>.

77. See, e.g., Associated Press, *Drone Flying over Seattle Parade Crashes, Strikes Woman*, WASH. TIMES, June 29, 2015, <http://www.washingtontimes.com/news/2015/jun/29/drone-flying-over-seattle-parade-crashes-strikes-w/>; Jason Molinet, *Drone Crashes Into Crowd at Memorial Day Parade in Marblehead, Mass.*, N.Y. DAILY NEWS, May 26, 2015, <http://www.nydailynews.com/news/national/drone-crashes-crowd-memorial-day-parade-mass-article-1.2235360>.

78. KNOW BEFORE YOU FLY, <http://www.knowbeforeyoufly.org> (last visited July 8, 2015).

79. FAA Modernization and Reform Act § 335.

consider additional acts of Congress, such as S. 1314, recently introduced by Senator Cory Booker (D-NJ).⁸⁰

A. Section 335 Safety Studies

Section 335 is simple—the FAA is required to “carry out all safety studies necessary to support the integration of unmanned aircraft systems into the national airspace system.”⁸¹ Although at the December 10, 2014 hearing, Dr. Dillingham reported that the test site operators were uncertain “about what research and development should be conducted to support the integration process.”⁸² The FAA recently streamlined the COA process for conducting research at the six test sites. Researchers are now given many of the same permissions that companies operating under the Section 333 Blanket-COA received, including permission to operate up to 200 feet AGL. Researchers can also operate various types of UAs under a single COA.⁸³

The FAA made progress into the Section 335 safety studies at their test sites. In June 2015, for example, the first large UA test flight occurred at the Griffiss International Airport UAV Test Site in Oneida County, New York.⁸⁴ Tests of this sort need to continue in preparation for integration.

Additionally, the FAA is preparing to expand the boundaries of legal UA flight. Currently, all operations must occur within the operator's or visual observer's line of sight.⁸⁵ In May 2015, the FAA announced the Pathfinder Initiative, a partnership with CNN, Precision Hawk, and BNSF Railway, the goal of which was to explore beyond⁸⁶ the type of operations that were proposed in the NPRM.⁸⁷ Although the FAA has now added a fourth company, CACI, to this

80. Commercial UAS Modernization Act, S. 1314, 114th Cong. (2015).

81. FAA Modernization and Reform Act § 335.

82. *UAS Hearings*, *supra* note 54, at 8 (statement of Gerald L. Dillingham, Director, Physical Infrastructure Issues).

83. *FAA Streamlines COAs for UAS Test Sites*, FED. AVIATION ADMIN., <http://www.faa.gov/news/updates/?newsId=82947> (last updated May 21, 2015, 4:30 PM).

84. Mark Weiner, *What's That in the Sky Above CNY? The First Test Flight of a Large Drone (Video)*, SYRACUSE (June 24, 2015), http://www.syracuse.com/politics/index.ssf/2015/06/whats_that_in_the_sky_above_cny_the_first_test_flight_of_a_large_drone_video.html.

85. *See, e.g.*, Aerial Inspection Resources, Inc., Doc. No. FAA-2015-0261, Grant of Exemption, 3 (May 5, 2015), https://www.faa.gov/uas/legislative_programs/section_333/333_authorizations/media/Aerial_Inspection_Resources_LLC_11467.pdf.

86. *Focus Area Pathfinders*, FED. AVIATION ADMIN., http://www.faa.gov/uas/legislative_programs/pathfinders/ (last modified Aug. 18, 2015, 1:19 PM). The initiative was announced on May 6, 2015, with the goal of exploring “the next steps in [UA] operations beyond type of operations the agency proposed in the draft [sUAS] rule it published in February.” *Id.*

87. *FAA Expands Unmanned Aircraft Pathfinder Efforts*, FED. AVIATION ADMIN., <http://www.faa.gov/news/updates/?newsId=83927> (last modified Oct. 7, 2015, 11:17 AM).

initiative, this type of research must expand into new areas to prepare for integration moving forward.

B. Additional Acts of Congress

Another way to promote further growth would be for Congress to pass additional legislation related to UA operations. On May 13, 2015, Senator Cory Booker (D-NJ) introduced S. 1314, Commercial UAS Modernization Act. This bill would add Sections 337 and 338 to the 2012 Modernization Act. Section 337 would permit commercial operations prior to the finalized sUAS rule, so long as the operator meets certain requirements including: (1) obtaining liability insurance and UA registration; and (2) operating under 500 feet AGL and within the line of site.⁸⁸ Section 338 would create an additional position within the FAA to help facilitate commercial operations.⁸⁹ The Senate bill would also mandate additional research, including the creation of an Air Traffic Management Pilot Program.⁹⁰ While S. 1314 would ameliorate some of the issues discussed previously (including the wait for individual approval), it does not specifically eliminate the current requirement to have a manned pilot certification.

VI. CONCLUSION

Integration is coming. As more companies are approved, there is an increased desire to use drones commercially. In 2013, AUVSI released a report indicating that within the first three years of integration, more than 70,000 jobs will be created, leading to an economic impact of more than \$13.6 billion.⁹¹ The FAA has done a lot with what it was given. After all, Congress gave little guidance in the Modernization and Reform Act. Full integration is a momentous task, and will continue to involve conversations that we are now having—ranging from House of Representatives and Senate committee hearings, to the safety studies being conducted at the designated test sites, to review of how the companies who received exemptions under 333 are operating.

Steps can be taken to ease into integration—passage of Senate bill 1314 would be one step, in addition to testing and increased access to the six UAS Test Sites. Elimination of manned certification would

88. Commercial UAS Modernization Act, S. 1314, 114th Cong. § 2 (2015)

89. *Id.* § 3(a).

90. *Id.* § 4(a), (d).

91. DARRYL JENKINS & BIJAN VASIGH, ASS'N FOR UNMANNED VEHICLE SYS. INT'L, THE ECONOMIC IMPACT OF UNMANNED AIRCRAFT SYSTEMS INTEGRATION IN THE UNITED STATES 2 (2013).

also give more access to individuals and companies unable to spend time obtaining a sport pilot license.⁹² Our vision of the future now includes delivery drones coming to high-rise apartments in downtown Chicago, and high-school students taking classes in both driver's education and UA operation. Hopefully our laws will continue to adapt and evolve so this vision can occur.

92. See, e.g., BARNES ET AL., *supra* note 71, at 12; WILLIAMS, *supra* note 72, at 2. But see MCCARLEY & WICKENS, *supra* note 72, at 13 (suggesting that past research has conflicting conclusions).

