
 **Journal of**
  **Air Law and**
 **Commerce**

**IT'S NOT TOO LATE—THE FAA CAN AMEND ITS
PROPOSED SUAS RULES, RESTORE ITS POSITION AS
A LEADING VOICE IN AVIATION, AND GUARANTEE
THE LONG-TERM SUCCESS OF THE U.S.
UNMANNED AIRCRAFT INDUSTRY**

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I. ABSTRACT

The publication of the Federal Aviation Administration's (FAA) highly-anticipated Notice of Proposed Rulemaking (NPRM) for small unmanned aircraft systems (sUAS)¹ on Febru-

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¹ Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. 9544 (proposed Feb. 23, 2015) (to be codified at 14 C.F.R. pt. 21, 43, 45, 47, 61, 91, 101, 107, 183).

ary 23, 2015, ended years of speculation about how the FAA would propose to integrate sUAS into the National Airspace System (NAS).

Previously, the FAA's unpopular ban on the commercial operation of all unmanned aircraft systems (UAS) and its surprisingly aggressive enforcement posture created a period of uncertainty, chilled investor enthusiasm, and slowed the pace of important research and development involving the many potential uses for sUAS.² Would the FAA's proposed rules usher in a new golden age of aerospace development? Or would innovators, engineers, scientists, and entrepreneurs be forced to comply with a set of burdensome and inflexible regulations derived from preexisting pilot and aircraft certification standards? As it turned out, the FAA's proposed regulations are, on the one hand, less restrictive than die-hard pessimists in the UAS community had predicted.³ On the other hand, the regulations include an outright prohibition on commercial non-line-of-sight operations—a restriction that undermines many of the most promising applications for commercial UAS and is likely to slow the development of see-and-avoid technologies critical to the next generation of UAS.⁴

Weeks after the FAA issued its proposed regulations, the European Aviation Safety Agency (EASA) published its *Concept of Operations for Drones* (also known as the "EASA Framework") and revealed its proposed approach to regulating unmanned aircraft.⁵ In several critical respects, the EASA approach is less restrictive than the FAA's proposed regulatory scheme, and depending on the final content of the FAA's final rule, the appeal of the EASA's more flexible regulations could lure U.S.-based UAS designers and manufacturers away from the United States. Fortunately, the FAA has an opportunity to leapfrog, or

² See FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 336(a)(1), 126 Stat. 11, 77. Compare Jack Nicas & Andy Pasztor, *Drone Flights Face FAA Hit*, WALL ST. J. (Nov. 24, 2014, 11:14 AM), <http://www.wsj.com/articles/drone-flights-face-faa-hit-1416793905> [<http://perma.cc/CV4S-7FN3>], with Ben Popper, *The FAA Just Took a Huge Step Towards Legalizing Commercial Drone Flights*, THE VERGE (Feb. 15, 2015, 10:55 AM), <http://www.theverge.com/2015/2/15/8040647/faa-small-uav-drone-rules-regulations> [<http://perma.cc/7WSF-7UFN>].

³ Popper, *supra* note 2.

⁴ §§ 334(c)(2)(C), 336(a), 126 Stat. at 76–77.

⁵ EUROPEAN AVIATION SAFETY AGENCY, CONCEPT OF OPERATIONS FOR DRONES: A RISK BASED APPROACH TO REGULATION OF UNMANNED AIRCRAFT (May 2015), http://easa.europa.eu/system/files/dfu/204696_EASA_concept_drone_brochure_web.pdf [<http://perma.cc/5Z9Z-6R99>] [hereinafter EASA FRAMEWORK].

at least mirror, the European approach and establish a more flexible sUAS regime by revising the rules proposed in its NPRM before issuing a final rule.

II. INTRODUCTION—SUAS RULEMAKING BACKGROUND

RELEASED IN FEBRUARY 2015, the NPRM ranks among the most eagerly-awaited, oft-delayed, and controversial set of proposed regulations the FAA has released in decades. As the NPRM notes, “[t]he FAA began its small UAS rulemaking in 2005.”⁶ Moving incrementally, in 2008 the FAA convened an Aviation Rulemaking Committee (ARC) to recommend proposed rules on UAS.⁷ The ARC issued a set of proposed recommendations on sUAS regulatory development in April of 2009, six years before the FAA issued its sUAS NPRM, to be implemented in the form of an FAA Special Federal Airworthiness Regulation.⁸

The ARC’s first set of recommendations were, in substance, surprisingly similar to the sUAS regulations the FAA is currently proposing. Among other things, the ARC recommended prohibiting sUAS operations at night, adopted a visual line-of-sight requirement, restricted operations over groups of people, and imposed a speed limit on sUAS of 100 mph (eighty-seven knots).⁹ As the ARC was in the process of issuing its recommendations, it likely became clear to the FAA that integrating UAS into the NAS was going to be both technically and politically challenging. As a result, the ARC’s original recommendations were never adopted. Instead, it would take an additional six years of internal FAA debate and political pressure, coupled with the explosive popularity of sUAS among hobbyists and members of the general public,¹⁰ and the generalized frustra-

⁶ Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. at 9551.

⁷ See *id.* at 9545 (“In April 2008, the FAA chartered the small UAS Aviation Rulemaking Committee (ARC). In April 2009, the ARC provided the FAA with recommendations on how small UAS could be safely integrated into the NAS.”).

⁸ SMALL UNMANNED AIRCRAFT SYS. AVIATION RULEMAKING COMM., COMPREHENSIVE SET OF RECOMMENDATIONS FOR sUAS REGULATORY DEV. iv (proposed Apr. 1, 2009), http://www.faa.gov/regulations_policies/rulemaking/committees/documents/media/SUAS.ARC.RR.20090401.pdf [<http://perma.cc/5YMZ-XPND>].

⁹ *Id.* at 8, 11.

¹⁰ Two years ago, The Volpe National Transportation Systems Center estimated that American consumers and hobbyists had already purchased more than 100,000 small unmanned aircraft with sufficient payload capacity to be used for commercial purposes. U.S. DEP’T OF TRANSP., VOLPE NAT’L TRANSP. SYS. CTR., UN-

tion with the FAA's prohibition on the use of sUAS for commercial purposes, before the FAA issued its proposed rules.

III. THE EVOLVING NATIONAL DEBATE

Unlike other controversial agency rulemakings (e.g., Environmental Protection Agency rulemakings on fuel efficiency standards),¹¹ popular interest in the FAA's regulation of "drones" has been remarkably widespread and the subject of debate far beyond the Beltway and K Street. Throughout the last three or four years, the debate over the widespread use of UAS has shifted dramatically—initially, the public discourse was dominated by an unlikely alliance of civil libertarians and conservative activists who opposed the widespread use of UAS on privacy grounds and framed the UAS debate in distinctly Orwellian terms.¹²

The intensity of these privacy concerns surprised members of the industry and officials at the FAA and led to months of critical, and arguably hyperbolic, coverage in the mainstream media of unmanned aircraft as threats to individual privacy.¹³ Nevertheless, the public's perception of unmanned aircraft changed almost literally overnight in the wake of Amazon CEO Jeff Bezos's December 1, 2013, *60 Minutes* interview and his announcement that an Amazon subsidiary, Amazon Prime Air, was developing technology that would permit it to deliver packages to Amazon customers using fully-autonomous UAS within approximately four years.¹⁴

MANNED AIRCRAFT SYS. (UAS) SERVICE DEMAND 2015–2035 123 (Sept. 2013), http://ntl.bts.gov/lib/48000/48200/48226/UAS_Service_Demand.pdf [<http://perma.cc/8WZG-3LQJ>].

¹¹ See Bryan Walsh, *White House to Toughen Fuel Standards for Heavy-Duty Vehicles*, TIME: ECOCENTRIC (Feb. 18, 2014), <http://science.time.com/2014/02/18/white-house-to-toughen-fuel-standards-for-heavy-duty-vehicles/> [<http://perma.cc/76BZ-KKT9>].

¹² Wells C. Bennett, *Civilian Drones, Privacy, and the Federal-State Balance*, BROOKINGS INSTITUTION 2 (Sept. 2014), <http://www.brookings.edu/research/reports2/2014/09/civilian-drones-and-privacy#ftn2> [<http://perma.cc/9CY2-MMGS>].

¹³ Jack Nicas, *Privacy Group Sues FAA Over Drone Rules*, WALL ST. J. (Mar. 31, 2015, 7:48 PM), <http://www.wsj.com/articles/privacy-group-sues-faa-over-drone-rules-1427845718> [<http://perma.cc/CSK4-ZMT8>].

¹⁴ Matt McFarland, *Amazon Prime Air: Rounding up the Skepticism on Drones*, WASH. POST (Dec. 2, 2013), <http://www.washingtonpost.com/news/innovations/wp/2013/12/02/amazon-prime-air-rounding-up-the-skepticism-on-drones/> [<http://perma.cc/R7K7-V6NK>]; Mike Snider, *Amazon Looks to Gain Liftoff for Drone Delivery Testing*, USA TODAY (Aug. 17, 2014, 4:04 AM), <http://usat.ly/IoFMWOH> [<http://perma.cc/H333-3EXA>]; David Streitfeld, *Amazon Delivers*

While the media's initial response to the Amazon proposal verged on the incredulous, especially with respect to the company's optimistic timeline for implementation, the audacity of the Amazon Prime Air proposal nevertheless captured the attention and imagination of the media and the public and recast the debate over "drones."¹⁵ Going forward, the most ardent privacy-based critiques would no longer define the terms of the UAS debate. Instead, the debate over the use of sUAS would focus more on the myriad of potential commercial applications for sUAS that range from aerial surveying, facility inspection (e.g., inspection of power company infrastructure, electrical lines, etc.), 3-D mapping, precision agriculture, news gathering, and the growing unpopularity of the FAA's blanket prohibition on the use of sUAS for any of these commercial applications.¹⁶

In late 2015, the FAA responded to growing concerns over the operations of sUAS near sporting events, over car and vehicle accidents, and in close vicinity to other aircraft (including, in one instance, a police helicopter), and convened a task force of industry participants (the Task Force) to prepare recommendations on registering sUAS in order to identify operators of sUAS involved in accidents or operating in an unsafe manner.¹⁷ The final recommendations of the Task Force, while not binding at this juncture, are based on the following fundamental principles:

- sUAS weighing less than 250 grams and over fifty-five pounds and sUAS operated indoors should not be subject to the registration requirement;
- UAS operators should be able to register with the FAA by completing an electronic registration form through the web or through an application;

Some Pie in the Sky, N.Y. TIMES (Dec. 2, 2013), <http://www.nytimes.com/2013/12/03/technology/amazon-delivers-some-pie-in-the-sky.html> [<http://perma.cc/X56Z-WC4B>].

¹⁵ Streitfeld, *supra* note 14.

¹⁶ Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. 9544, 9525 (proposed Feb. 23, 2015) (to be codified at 14 C.F.R. pt. 21, 43, 45, 47, 61, 91, 101, 107, 183); Eric Gakstatter, *Is It Legal to Fly Drones for Mapping in the United States?*, GEOSPATIAL SOLUTIONS (Nov. 11, 2013), <http://geospatial-solutions.com/is-it-legal-to-fly-drones-in-the-united-states/> [<http://perma.cc/2J6J-4WZ9>]; Bart Jansen, *FAA Lets 4 Companies Fly Commercial Drones*, USA TODAY (Dec. 10, 2014, 2:23 PM), <http://usat.ly/1Dathhm> [<http://perma.cc/FUN9-AXZD>].

¹⁷ See UNMANNED AIRCRAFT SYSTEMS (UAS) REGISTRATION TASK FORCE (RTF) AVIATION RULEMAKING COMMITTEE (ARC), TASK FORCE RECOMMENDATIONS FINAL REPORT (Nov. 21, 2015), http://www.faa.gov/uas/publications/media/rtfarcfinalreport_11-21-15.pdf.

- UAS operators should immediately receive an electronic certificate of registration and a personal universal registration number for use on *all* sUAS owned by that person;
- UAS operators should be required to mark the registration number on all applicable sUAS prior to their operation in the NAS unless the operator provides the FAA with the serial number of the aircraft he or she plans to operate;
- Only operators 13 years and older should be permitted to register sUAS.¹⁸

IV. FAA POLICY ON UAS (2005–2015)

The FAA's jurisdiction over unmanned aircraft (including model aircraft) has only recently been established as a dispositive matter.¹⁹ Prior to the issuance of the recent NPRM, there have been no regulations specifically addressing the operation of unmanned or model aircraft.²⁰ Instead, model aircraft operations have largely been overseen by the non-profit Academy of Model Aeronautics (AMA)²¹ and, until recently, the FAA's guidance on model airplane safety was limited to a single, non-mandatory Advisory Circular.²² Under the stewardship of the

¹⁸ *Id.* at A-1–A-2.

¹⁹ *Huerta v. Pirker*, No. EA-5730, 2014 WL 8095629, at *4–5 (N.T.S.B. Nov. 17, 2014).

²⁰ Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. at 9545. *See Huerta*, 2014 WL 8095629, at *2 (“Title 49 U.S.C. § 40102(a)(6) defines ‘aircraft’ as ‘any contrivance invented, used, or designed to navigate, or fly in, the air.’ Similarly, 14 C.F.R. § 1.1 defines ‘aircraft’ for purposes of the FARs, including § 91.13, as ‘a device that is used or intended to be used for flight in the air.’ The definitions are clear on their face. . . . [and] do not exclude even a ‘model aircraft’ from the meaning of ‘aircraft.’ Furthermore, the definitions draw no distinction between whether a device is manned or unmanned. An aircraft is ‘any’ ‘device’ that is ‘used for flight.’ We acknowledge the definitions are as broad as they are clear, but they are clear nonetheless.”).

²¹ *See* ACAD. OF MODEL AERONAUTICS, NAT'L MODEL AIRCRAFT SAFETY CODE (2014), <http://www.modelaircraft.org/files/105.pdf> [<http://perma.cc/9WXC-M7PG>]. The AMA has approximately 175,000 members and is responsible for maintaining safe flying clubs throughout the United States where model aircraft are flown in accordance with a set of safety guidelines prepared jointly by the AMA and the FAA. *What is the AMA?*, ACAD. OF MODEL AERONAUTICS, <http://www.modelaircraft.org/aboutama/whatisama.aspx> [<http://perma.cc/HX5A-ESBP>] (last visited Nov. 6, 2015). The FAA and AMA have worked closely with each other in recent years as RC aircraft have grown more sophisticated (e.g., FAA and AMA agreed on a training and certification program for RC pilots intending to fly high-speed turbine-powered airplanes). *See* ACAD. OF MODEL AERONAUTICS, TURBINE WAIVER APPLICATION, <http://www.modelaircraft.org/files/510-d.pdf> [<http://perma.cc/5NGP-2PVD>].

²² *See* U.S. DEP'T OF TRANSP., FAA, ADVISORY CIRCULAR 91-57 (June 9, 1981).

AMA, model aircraft safety has historically been a non-issue; to qualify for the AMA's insurance program, members must operate their aircraft at a chartered AMA flying club, of which there are more than 2,400, and comply with a comprehensive set of safety guidelines developed by the AMA.²³ Furthermore, each flying club provides instruction for the novice pilot, typically through the use of tethered Radio Control (RC) transmitters, that allow the experienced pilot to take over control of the aircraft if an accident is imminent.²⁴

The success of the AMA oversight scheme allowed the FAA to focus its resources on its traditional mission of regulating the nation's airlines, private aircraft, airports, and airspace. Arguably, the FAA's single-minded focus on regulating the airline industry and overseeing the safety of manned flight in the NAS may have prevented it from staying abreast of developments in the unmanned aircraft sector. Although the FAA's first advisory rule committee on UAS was formed in 2008, and the committee worked quickly to issue proposed guidelines in 2009, the guidelines languished for years.²⁵ It was only after Congress ordered the FAA to begin the process of integrating UAS into the NAS that the FAA began pursuing UAS regulation in earnest.²⁶ By that time, however, the Volpe National Transportation Systems Center estimated that American consumers and hobbyists had purchased more than 100,000 sUAS with sufficient payload capacity to be used for commercial purposes.²⁷

In the absence of any formal rules regulating the operation of unmanned aircraft, the FAA first attempted to apply the terms of its Advisory Circulate on model aircraft to sUAS operations.²⁸ The FAA then adopted a policy that to be operated for commercial purposes, a small unmanned aircraft had to be certified as airworthy by the FAA (a painstakingly complex and time-consuming process intended to ensure that manned aircraft are safe

²³ See ACAD. OF MODEL AERONAUTICS, CLUB CHARTERING GUIDE 17, <http://www.modelaircraft.org/files/905.pdf> [<http://perma.cc/R6S4-RAHM>].

²⁴ See ACAD. OF MODEL AERONAUTICS, TIPS FOR NEWCOMERS, <http://www.modelaircraft.org/files/704.pdf> [<http://perma.cc/NK4T-GE7J>].

²⁵ See *supra* Part II.

²⁶ See *supra* Part II.

²⁷ U.S. DEP'T OF TRANSP., VOLPE NAT'L TRANSP. SYS. CTR., UNMANNED AIRCRAFT Sys. (UAS) SERVICE DEMAND 2015–2035, at 123 (2013), http://ntl.bts.gov/lib/48000/48200/48226/UAS_Service_Demand.pdf [<http://perma.cc/8WZG-3LQJ>].

²⁸ Unmanned Aircraft Operations in the National Airspace System, 72 Fed. Reg. 6689 (Feb. 13, 2007).

to fly), registered with the FAA in Oklahoma City (i.e., be issued an “N number”), and operated by a licensed pilot.²⁹ In 2007, the FAA issued a policy statement providing that “no person may operate a UAS in the National Airspace System without specific authority.”³⁰ Under the policy statement, public sUAS (i.e., sUAS operated by federal or local government agencies and law enforcement) could operate pursuant to the Certificates of Waiver and the FAA Advisory Circular 91-57 on Model Aircraft Operations, which authorized only recreational sUAS operations.³¹ Civil, non-recreational operators could obtain FAA authority only in the form of a Special Airworthiness Certificate, and while a Special Airworthiness Certificate authorized research and development operations and demonstration flights, it explicitly precluded operations for hire or compensation.³² As a result, commercial UAS operations in the U.S. were effectively banned.³³

V. CONGRESS ACTS (2012)

In response to growing frustration with the FAA’s timeline for addressing integration of UAS into the NAS in a timely manner, Congress took matters into its own hands by enacting the FAA Modernization Act.³⁴ Provisions in the Act required the FAA to, among other things, (i) streamline and accelerate the operation of UAS in the NAS by both public entities and commercial operators;³⁵ (ii) issue regulations for the operation of sUAS by Au-

²⁹ Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. 9544, 9549–50 (proposed Feb. 23, 2015) (to be codified at 14 C.F.R. pt. 21, 43, 45, 47, 61, 91, 101, 107, 183); FAA, AIRCRAFT REGISTRY: REGISTER AN AIRCRAFT (2015), https://www.faa.gov/licenses_certificates/aircraft_certification/aircraft_registry/register_aircraft/ [http://perma.cc/ZDP7-U7FS]; FAA, AIRCRAFT REGISTRY: UNMANNED AIRCRAFT (UA) (2015), https://www.faa.gov/licenses_certificates/aircraft_certification/aircraft_registry/UA/ [http://perma.cc/7K4G-HE33].

³⁰ See Unmanned Aircraft Operations in the National Airspace System, 72 Fed. Reg. at 6690 (explaining how AC 91-57 functions).

³¹ *Id.* at 6689–90.

³² FAA, ORDER 8130.34C, AIRWORTHINESS CERTIFICATION OF UNMANNED AIRCRAFT SYSTEMS AND OPTIONALLY PILOTED AIRCRAFT 2–4 (Aug. 2, 2013), http://www.faa.gov/documentLibrary/media/Order/Order_8130_34C.pdf [http://perma.cc/6XPQ-CT2C].

³³ See Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. at 9549–50 (describing difficulties of applying current regulatory scheme to UAS).

³⁴ FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, 126 Stat. 11.

³⁵ *Id.* § 332(a).

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gust 14, 2014;³⁶ (iii) create and implement a plan to integrate all civil UAS into the NAS by September 30, 2015;³⁷ and (iv) establish six geographically diverse test sites for UAS testing and development.³⁸ In addition, Congress mandated that the FAA establish areas in the Arctic where UAS could be operated for both research and commercial purposes and directed the FAA to negotiate international agreements necessary to permit UAS operations in those areas.³⁹ Further, Section 333 of the Act directed the Secretary of Transportation to issue exemptions that would allow certain safe, low-risk UAS operations to take place prior to issuance of final rules governing sUAS operations.⁴⁰ The Act also directed the FAA to develop and implement standards for operation of public UAS no later than December 15, 2013.⁴¹ Finally, the Act prohibited the FAA from establishing rules or regulations that would govern the operation of model aircraft, which were defined as unmanned aircraft flown within visual line-of-sight for recreational or hobby purposes.⁴²

VI. RECENT DEVELOPMENTS

Although the FAA has established the six UAS test areas mandated by Congress,⁴³ it was unable to issue regulations governing sUAS operations until just recently. In September 2014, the FAA took its first step to integrate sUAS and issued a total of six exemptions under Section 333 authorizing limited sUAS operations and invited other potential operators to submit applications.⁴⁴ To obtain an exemption under Section 333, applicants must, among other things, show how the proposed sUAS operation will be conducted to minimize risk to the NAS and persons and property on the ground, propose pre-flight

³⁶ *Id.* § 332(b)(1).

³⁷ *Id.* § 332(a)(3).

³⁸ *Id.* § 332(c).

³⁹ *Id.* § 332(d).

⁴⁰ *Id.* § 333.

⁴¹ *Id.* § 334(b).

⁴² *Id.* § 336; *see also id.* § 335 (directing the FAA to undertake “all safety studies necessary to support the integration of unmanned aircraft systems into the national airspace system”).

⁴³ *Test Sites*, FAA, https://www.faa.gov/uas/legislative_programs/test_sites/ [http://perma.cc/KQ9M-LTYJ] (last modified Aug. 4, 2015).

⁴⁴ *See* Press Release, Dept. of Transp., U.S. Transportation Secretary Foxx Announces FAA Exemptions for Commercial UAS Movie and TV Production (Sept. 25, 2014), http://www.faa.gov/news/press_releases/news_story.cfm?newsId=17194 [http://perma.cc/7LUZ-PPFV].

and other procedures, and demonstrate how the proposed procedures would provide a level of safety equivalent to that provided by current FAA rules.⁴⁵ The FAA issued a total of 1,732 exemptions and rejected 399 applications as of September 24, 2015, and will continue to accept applications during the pendency of the sUAS rulemaking.⁴⁶

On March 25, 2015, the FAA issued an interim rule authorizing recipients of a Section 333 exemption authority to fly at altitudes of up to 200 feet anywhere in the country except restricted airspace and other areas where the FAA explicitly prohibits UAS operations.⁴⁷ Until issuance of the interim rule, the FAA required operators to apply for authority to operate within a particular block of airspace.⁴⁸

VII. SUMMARY OF THE NPRM

The NPRM applies to unmanned aircraft that weigh less than fifty-five pounds (twenty-five kilograms) and are used for commercial or business purposes (i.e., as a civil aircraft in air commerce).⁴⁹ Under the NPRM, an sUAS may operate during daylight hours at an altitude of up to 500 feet above ground level.⁵⁰ sUAS may not operate at speeds exceeding eighty-seven knots (100 mph) or when flight visibility falls below three statute miles.⁵¹ More significantly, the sUAS must remain within the visual line-of-sight of the sUAS operator at all times.⁵² While the NPRM allows the use of visual observers to assist the operator, the operator must nevertheless be able to view the sUAS at all times.⁵³ Cameras on the sUAS or use of vision enhancing devices (other than corrective lenses) may not be used to satisfy the vis-

⁴⁵ See FAA, PUBLIC GUIDANCE FOR PETITIONS FOR EXEMPTION FILED UNDER SECTION 333 (2014), http://www.faa.gov/uas/legislative_programs/section_333/how_to_file_a_petition/media/section333_public_guidance.pdf [<http://perma.cc/JBX7-A6QR>].

⁴⁶ See *Section 333*, FAA, http://www.faa.gov/uas/legislative_programs/section_333/ [<http://perma.cc/63HW-AXLS>] (last modified Aug. 21, 2015).

⁴⁷ See *FAA Streamlines UAS COAs for Section 333*, FAA, <http://www.faa.gov/news/updates/?newsid=82245> [<http://perma.cc/GS53-43HH>] (last modified Mar. 24, 2015).

⁴⁸ *Id.*

⁴⁹ Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. 9544, (proposed Feb. 23, 2015) (to be codified at 14 C.F.R. pt. 21, 43, 45, 47, 61, 91, 101, 107, 183).

⁵⁰ *Id.* at 9546.

⁵¹ *Id.*

⁵² *Id.*

⁵³ *Id.*

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ual line-of-sight requirement.⁵⁴ The operator of the sUAS must maneuver the sUAS in a manner that yields the right-of-way to all other aircraft.⁵⁵

The NPRM allows sUAS to operate in uncontrolled (Class G) airspace without prior permission and in controlled airspace (Class B, C, D, and E) with permission from the relevant air traffic control (ATC) center.⁵⁶ Operation over any uncovered person not involved in the operation of the sUAS is prohibited, as is carrying cargo for hire.⁵⁷ A covered person is a person under a structure that is capable of reasonably protecting him or her if the sUAS were to fall.⁵⁸

The commercial operator of the sUAS must obtain an FAA-issued unmanned aircraft operator's certificate with an sUAS rating, which requires the operator to pass a written FAA-developed knowledge test covering ten subject areas, prove his or her identity, register with the FAA, and be successfully vetted by the Transportation Security Administration.⁵⁹ In addition, the sUAS must be registered with the FAA and the sUAS must display on its body the FAA assigned registration number.⁶⁰ Obtaining an operator's certificate and registration is expected to take six to eight weeks, but there is currently no information on the content of the written exam.⁶¹

The rules would not apply to sUAS operated strictly for recreational or hobby purposes.⁶² Finally, the rules would prohibit reckless or careless operations of sUAS by any person, including persons operating the sUAS on a recreational or hobby basis.⁶³

Comments on the NPRM were due by April 24, 2015.⁶⁴ A final rule is not expected before the end of 2015.⁶⁵

⁵⁴ *Id.*

⁵⁵ *Id.*

⁵⁶ *Id.*

⁵⁷ *Id.* at 9546, 9553.

⁵⁸ *Id.* at 9587.

⁵⁹ *Id.* at 9546, 9569–70, 9572, 9574.

⁶⁰ *Id.* at 9546.

⁶¹ *Id.* 9569, 9572.

⁶² *Id.* at 9555.

⁶³ *Id.*

⁶⁴ *Id.* at 9544.

⁶⁵ Graham Warwick, *FAA Urged to Act Fast on Final Small-UAS Rule*, AVIATION DAILY (Feb. 15, 2015), <http://aviationweek.com/commercial-aviation/faa-urged-act-fast-final-small-uas-rule> [<http://perma.cc/48GX-L5UU>]. If prior rulemakings by the FAA are any guide, publication of a final rule appears to take anywhere from fourteen months to several years. *See, e.g.*, Ultralight Vehicles; Operating Requirements, 47 Fed. Reg. 38770, 38770 (Sept. 2, 1982) (final rule establishing

VIII. RESPONSE TO THE NPRM FROM
INDUSTRY PARTICIPANTS

As a general matter, members of the UAS industry were pleased to learn that the NPRM was less restrictive than many had predicted.⁶⁶ In particular the proposed rules do not require that the operator of an sUAS hold a private or commercial pilot's license or that the sUAS be certified as airworthy by the FAA.⁶⁷ The decision to allow operation in controlled airspace with approval of the responsible air traffic control was also well received.⁶⁸ In general, the industry had been bracing for a more conservative approach based on recent actions by the FAA to allow specific operations under Section 333 and the FAA's aggressive enforcement of its prohibition on commercial UAS operations.⁶⁹

IX. THE EASA CONCEPT OF OPERATIONS FOR DRONES

In contrast, the European Aviation Safety Agency (EASA) framework lays out a three-tiered framework for unmanned aircraft operations in Europe and proposes "stakeholders consulta-

14 C.F.R. Part 103, the proposed rule for which was published July 27, 1981); Certification of Recreational Pilots and Annual Flight Review Requirements for Recreational Pilots and Non-Instrument-Rated Private Pilots With Fewer Than 400 Flight Hours, 54 Fed. Reg. 13028, 13028 (Mar. 29, 1989) (final rule establishing recreational pilot certificates, the proposed rule for which was published June 25, 1985).

⁶⁶ Terry Dunn, *What People Should Know About FAA's Proposed Drone Rules*, JAMIE & ADAM TESTED (Feb. 17, 2015, 1:45 PM), <http://www.tested.com/tech/concepts/494320-what-you-should-know-about-faas-proposed-drone-rules/> [<http://perma.cc/2FW8-ZAFG>].

⁶⁷ Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. at 9550, 9565.

⁶⁸ Letter from Small UAV Coalition to Honorable Michael Huerta, Adm'r, Fed. Aviation Admin. 16 (Mar. 17, 2015), <http://www.smalluavcoalition.org/wp-content/uploads/2015/03/SUAV-Coalition-ltr-to-Huerta-re-sec-333-reform.pdf> [<http://perma.cc/FL7U-3XE8>].

⁶⁹ *Authorizations Granted Via Section 333 Exemptions*, FAA, http://www.faa.gov/uas/legislative_programs/section_333/333_authorizations/ [<http://perma.cc/TB4F-D8PA>] (last modified Sept. 28, 2015) (lists all exemptions granted by the FAA pursuant to Section 333 of Public Law 11-95). As of March 15, 2015 all of those authorizations required the sUAS operator to have at least a private pilot's license and medical certificate, operate under 400 feet, remain outside controlled airspace, and within visual line-of-sight, amongst other requirements. *See, e.g.*, Letter from John Barbagallo, Acting Deputy Dir., Flight Standards Serv., FAA, to William Donberg, President, Aetos Grp., Inc. 8-9, 11 (Mar. 13, 2015), https://www.faa.gov/uas/legislative_programs/section_333/333_authorizations/media/Aetos_Group_Inc_11209.pdf [<http://perma.cc/H6AE-DZPC>].

tion” to develop the details of each tier.⁷⁰ Under the current proposed framework, proposals for the least regulated tier of sUAS would be circulated in draft by June 2015, followed by “concrete regulatory proposals” to be submitted to the European Commission by December 2015.⁷¹

The European proposal would categorize UAS based on their proposed use and the level of risk associated with that particular activity and would include an Open Category, Specific Operation Category, and Certified Category.⁷² The Open Category would apply to “very low risk drone operations” and would not require an operator’s certificate or authorization from the EASA, even for commercial operations.⁷³ Operations would be limited to direct visual line-of-sight within 500 meters of the operator at altitudes below 150 meters and outside of specified areas (airports and prohibited areas).⁷⁴ The size limit of the Open Category will be determined after stakeholders’ consultation.⁷⁵ Thus as proposed, the Open Category will be significantly less restrictive for commercial operators than the NPRM.⁷⁶

The Specific Operation Category would cover operations that involve more risk than is acceptable in the Open Category.⁷⁷ Operators would propose specific plans identifying the risks and mitigation measures to the appropriate national aviation authority.⁷⁸ If approved, the national aviation authority would issue the operator an “Operations Authorization.”⁷⁹ The EASA Framework envisions that operators could be given the “privilege” of approving their own safety risk assessments in the future.⁸⁰ The approach of the Specific Operation Category is similar to the current Section 333 exemption process used by the FAA, though without limitation on the type of operations that could be considered and approved.⁸¹

⁷⁰ EASA FRAMEWORK, *supra* note 5, at 10.

⁷¹ *Id.* at 10.

⁷² *Id.* at 1.

⁷³ *Id.* at 4.

⁷⁴ *Id.*

⁷⁵ *Id.*

⁷⁶ *Compare id.* at 3, with Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. 9544, 9546 (proposed Feb. 23, 2015) (to be codified at 14 C.F.R. pt. 21, 43, 45, 47, 61, 91, 101, 107, 183).

⁷⁷ EASA FRAMEWORK, *supra* note 5, at 4.

⁷⁸ *Id.*

⁷⁹ *Id.*

⁸⁰ *Id.*

⁸¹ *Compare id.* at 4–5, with PUBLIC GUIDANCE FOR PETITIONS FOR EXEMPTION FILED UNDER SECTION 333, FAA 4 (Sept. 25, 2014), <http://www.faa.gov/uas/legis->

The third proposed tier is the Certified Category, which would apply when “the aviation risks rise to a level akin to normal manned aviation” operations, presumably the carriage of passengers or cargo.⁸² At present, this category applies to UAS with a maximum takeoff mass exceeding 150 kilograms, though this weight limit could change based on the limits decided upon for the other two categories.⁸³ Full type certification would be required for the Certified Category, as well as licensing of pilots and approval of operators.⁸⁴

X. AN OPPORTUNITY FOR THE UNITED STATES

The Open Category proposed by the EASA illustrates the extent to which the FAA and the EASA disagree on the risks sUAS pose to the general public.⁸⁵ Nevertheless, the EASA proposal could serve the FAA’s purposes should the FAA decide to ease certain restrictions proposed in the NPRM.⁸⁶ Assuming that any changes the FAA makes prior to issuance of the final rule will fall short of the EASA’s deregulation of sUAS operations in the Open Category, the FAA can respond to safety concerns by characterizing its rule as significantly more protective of the public than the EASA’s proposal.⁸⁷ Furthermore, while it is unlikely the FAA will radically liberalize its rules, the FAA could adopt the EASA’s proposal if it became clear that members of the United States UAS industry were poised to relocate their operations to Europe in the event the FAA failed to provide sUAS operators and manufacturers the same freedoms proposed in the Open Category.

In view of the EASA’s willingness to dispense with its jurisdiction over Open Category sUAS operations, the EASA’s decision to prohibit non-line-of-sight operations is surprisingly conservative.⁸⁸ The EASA’s prohibition on non-line-of-sight operations also provides the United States with an opportunity to differenti-

lative_programs/section_333/how_to_file_a_petition/media/section333_public_guidance.pdf [http://perma.cc/JBX7-A6QR].

⁸² EASA FRAMEWORK, *supra* note 5, at 5–6.

⁸³ *Id.* at 6.

⁸⁴ *Id.*

⁸⁵ Compare *id.* at 4, with Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. 9544, 9546 (proposed Feb. 23, 2015) (to be codified at 14 C.F.R. pt. 21, 43, 45, 47, 61, 91, 101, 107, 183).

⁸⁶ See EASA FRAMEWORK, *supra* note 5, at 4.

⁸⁷ See Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. at 9545, 9547–48.

⁸⁸ See EASA FRAMEWORK, *supra* note 5, at 4.

ate itself from the EASA in a positive way and incentivize UAS developers and operators to remain in the United States. If the FAA is serious about facilitating the development of new technologies in the United States and supporting the growth of the U.S. unmanned aircraft industry, it should reverse its decision to prohibit non-line-of-site operations.⁸⁹

XI. THE FAA HAS SUFFICIENT STATUTORY AUTHORITY TO PERMIT NON-LINE-OF-SITE OPERATIONS

The FAA cites Section 333 of the FAA Modernization Act as the primary authority for issuing its proposed sUAS regulations despite the fact that Section 333 does not on its face refer to “small unmanned aircraft systems.”⁹⁰ Furthermore, Section 333 only provides the FAA with flexibility to waive the statutory requirement for airworthiness certificates.⁹¹ Most importantly, the FAA appears to interpret the reference in Section 333(b)(1) to “visual line of sight” as requiring the FAA to limit sUAS operations to daylight hours and as prohibiting non-line-of-sight operations.⁹² The opposite, in fact, is true—Congress adopted a line-of-sight restriction only for those operations it wanted the FAA to approve immediately or on a near term basis.⁹³

Thus, by using its existing authority under Title 49, United States Code, rather than relying on Section 333 of the FAA Modernization Act, the FAA could significantly expand the types of sUAS operations allowed under the final rule without compromising safety. Putting in place a broader, more flexible regime now, ahead of Europe, will encourage the UAS industry, much of which is based in the United States, to remain in the United

⁸⁹ See Letter from Paul Misner, Vice President for Global Public Policy, amazon.com, to Honorable Anthony Foxx, Sec’y, U.S. Dep’t of Transp., and Honorable Michael Huerta, Adm’r, U.S. FAA 3 (Apr. 24, 2015), <https://fortunedotcom.files.wordpress.com/2015/04/amazon-faa-small-uas-nprm-comments.pdf> [<http://perma.cc/MWA9-YUHS>].

⁹⁰ See Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. at 9544; FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 333, 126 Stat. 11, 65–66.

⁹¹ FAA Modernization and Reform Act of 2012 § 333.

⁹² See *id.* § 333(b)(1); Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. at 9546.

⁹³ See Brandon Bellows, *Floating Toward A Sky Near You: Unmanned Aircraft Systems and the Implications of the FAA Modernization and Reform Act of 2012*, 78 J. AIR L. & COM. 585, 603–06 (2013) (Section 334 of the FAA Modernization and Reform Act states the expedited measures the Secretary of Transportation must take when issuing guidance on Section 333 sUAS.).

States rather than utilize foreign regulatory mechanisms for more speedy authorizations.

XII. “SENSE AND AVOID” VERSUS “SEE AND AVOID”

The FAA’s interest in relying on Section 333 may be explained, at least in part, by the requirement in Section 332(a)(2)(A)(ii) of the FAA Modernization Act that the final rule for sUAS “ensure that any civil unmanned aircraft system includes a sense and avoid capability.”⁹⁴ Section 331(5) of the FAA Modernization Act specifically defines “sense and avoid capability” as “the capability of an unmanned aircraft to remain a safe distance from and to avoid collisions with other airborne aircraft.”⁹⁵ This congressional definition is less restrictive than the FAA’s requirement in 14 C.F.R. 91.113(b) that “vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft.”⁹⁶ The congressional definition encompasses the objective of the “see and avoid” rule without the limitation that a person using visual means must accomplish the objective.⁹⁷

As the FAA asserts in the NPRM, “[t]his see-and-avoid requirement is at the heart of the FAA’s regulatory structure mitigating the risk of aircraft colliding in midair. As such, in crafting this proposed rule, the FAA sought a standard under which the small UAS operator would have the ability to see and avoid other aircraft similar to that of a manned-aircraft pilot.”⁹⁸ Section 332(a)(2) directs that the final rule on sUAS will “ensure” use of “sense and avoid capabilities.”⁹⁹ Instead, it appears the FAA interprets the “visual line of sight” reference in Section 333(b)(1) to require that civil sUAS operations be limited to daylight hours within the visual range of the operator.¹⁰⁰

⁹⁴ FAA Modernization and Reform Act of 2012 § 332(a)(2)(A)(ii).

⁹⁵ *Id.* § 331(5).

⁹⁶ *See* Right-of-Way Rules: Except Water Operations, 14 C.F.R. § 91.113(b) (2015).

⁹⁷ *See id.*

⁹⁸ Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. 9544, 9560 (proposed Feb. 23, 2015) (to be codified at 14 C.F.R. pt. 21, 43, 45, 47, 61, 91, 101, 107, 183).

⁹⁹ FAA Modernization and Reform Act of 2012 § 332(a)(2)(A)(ii).

¹⁰⁰ *See id.* § 333(b)(1); Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. at 9547. “Of these factors, operation within visual line of sight is a primary factor for evaluation. At this point in time, we have determined that technology has not matured to the extent that would allow small UAS to be used safely in lieu of visual line of sight without creating a hazard to other

That Congress intended that sUAS be operated beyond a line-of-sight limitation is evident from the fact that Congress expressly adopted a line-of-sight requirement in the FAA Modernization Act only for those operations that Congress wanted approved immediately or on a very near term basis: (i) in Section 333 for determinations made within 180 days of enactment;¹⁰¹ (ii) in Section 334 for agreements entered into within 90 days of enactment;¹⁰² and (iii) in Section 336, which was effective upon enactment.¹⁰³ The proposed rule in the NPRM falls well short of the congressional directive.

XIII. POSSIBLE SOLUTIONS THAT COULD PERMIT BEYOND-LINE-OF-SIGHT OPERATIONS

The FAA should carefully encourage and consider comments on how the proposed rule could be modified to accommodate beyond-line-of-sight operations of sUAS.¹⁰⁴ Without general authorization for sUAS to operate beyond line of sight, U.S. leadership in UAS will be undermined and commercial development will be significantly inhibited.¹⁰⁵ It is worth noting that all of the military uses of sUAS and UAS have involved non-line-of-sight operations since their very inception more than twenty years ago.¹⁰⁶ The same is true for UAS operations by public entities over the preceding decade.¹⁰⁷

users of the NAS or the public, or posing a threat to national security.” *See* Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. at 9551. The FAA never discusses in the NPRM how they made this determination or the facts that support the determination. *See id.*

¹⁰¹ FAA Modernization and Reform Act of 2012 § 333(a). “[W]hich types of unmanned aircraft systems, if any, as a result of their . . . operation within visual line of sight do not create a hazard to users of the national airspace system or the public . . .” *Id.* § 333(b)(1).

¹⁰² *Id.* § 334(c). “[A]llow a government public safety agency to operate unmanned aircraft weighing 4.4 pounds or less, if operated—(i) within the line of sight of the operator . . .” *Id.* § 333(c)(2)(C)(1).

¹⁰³ *See id.* §§ 3, 336. “[T]he term ‘model aircraft’ means an unmanned aircraft that is . . . (2) flown within visual line of sight of the person operating the aircraft . . .” *Id.* § 336(c).

¹⁰⁴ *See* Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. at 9552.

¹⁰⁵ *See* David Morgan, *FAA Considers Beyond-Line-of-Sight Drone Initiatives*, sUAS NEWS (May 4, 2015), <http://www.suasnews.com/2015/05/35684/faa-considers-beyond-line-of-sight-drone-initiatives> [<http://perma.cc/5ENM-8523>].

¹⁰⁶ *See Fact Sheet—Unmanned Aircraft Systems (UAS)*, FAA (Jan. 6, 2014), https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=14153 [<http://perma.cc/K9ZV-T3QU>].

¹⁰⁷ *See id.*

It is difficult to see how sUAS, when operated under appropriate behavioral rules, pose a grave risk to aircraft or persons such that no operations beyond line of sight can be allowed for civil sUAS. The combination of rules proposed in the NPRM and existing FAA rules already provides a significant measure of safety for both manned aircraft and sUAS.¹⁰⁸ The NPRM proposes to limit all sUAS operations to below 500 feet, which means that manned aircraft and sUAS operated in compliance with the rules should not be operating in the same airspace.¹⁰⁹ In addition, the NPRM proposes that sUAS operations, like all other aircraft operations, only be permitted in controlled airspace with appropriate clearance by, and communication with, air traffic control.¹¹⁰ Since air traffic control would be aware of the sUAS in its airspace and could direct both the sUAS operator and other aircraft, sUAS pose no greater risk than manned aircraft operating under instrument flight rules.

A. STROBE LIGHTS COULD INCREASE VISIBILITY

With respect to threats to aircraft operating under visual flight rules in uncontrolled airspace, readily available technology could be used in combination with existing FAA regulations to address those concerns. For example, requiring sUAS that operate beyond line of sight to operate with an anti-collision strobe light visible through 360 degrees for three miles would alert other pilots in the vicinity of the sUAS.¹¹¹ The proposed rules already require sUAS to operate below the normal flight minimums of other aircraft, which means the possibility of collision is remote in all situations other than when a manned aircraft is operating below normal minimums, for example when landing or taking off.¹¹² The anti-collision strobe should be adequate to alert manned aircraft to the presence of the sUAS, but as an added precaution, beyond-line-of-sight operations could be pro-

¹⁰⁸ See Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. at 9546; FAA Modernization and Reform Act of 2012, Title III—Safety.

¹⁰⁹ See Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. at 9547.

¹¹⁰ See *id.*

¹¹¹ Ernest E. Anderson et al., *A Legal Analysis of 14 C.F.R. Part 91 “See and Avoid” Rules to Identify Provisions Focused on Pilot Responsibilities to “See and Avoid” in the National Airspace System*, 80 J. AIR L. & COM. 53, 151–52 (2015) (discussing lighting rules on airplanes due to visual flight requirements).

¹¹² See Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. at 9547; Minimum Safe Altitudes: General, 14 C.F.R. § 91.119(c) (2015).

hibited within five miles of any airport, thus removing beyond-line-of-sight sUAS operations from the primary areas where manned aircraft are permitted to operate below 500 feet.¹¹³

Requiring a strobe light visible from the ground for sUAS operations beyond line of sight would serve to alert people on the ground of the sUAS presence.¹¹⁴ As a further precaution, sUAS operating beyond line of sight could be required to maintain an altitude of not less than twenty feet when engaged in level flight in order to provide an increased margin of safety for operator error. To protect persons on the ground, takeoff and landing beyond the operator's line of sight could be prohibited unless such activity is conducted either (i) no closer than 500 feet from any person or structure; (ii) with a visual observer and no closer than 50 feet from any person; or (iii) on private property with the permission of the owner and no closer than 100 feet from any person not participating in the sUAS operation.¹¹⁵

B. USE OF TRANSPONDERS

The FAA could also require that sUAS operating beyond the operator's line of sight be equipped with transponders that (i) identify the aircraft as unmanned; (ii) provide the registration number of the sUAS; and (iii) transmit the altitude, airspeed,

¹¹³ See Right-of-Way Rules: Except Water Operations, 14 C.F.R. § 91.113(d)–(f) (2015). 14 C.F.R. 91.113(d) already requires pilots of manned, powered aircraft to maneuver to avoid balloons, gliders, airships, and aircraft towing another aircraft or refueling. In addition, 14 C.F.R. 113(f) requires pilots of overtaking aircraft to maneuver clear of the aircraft being overtaken. Given that sUAS would be restricted to below 500 feet and less than eighty-seven knots, there is no reason that aircraft operating beyond five miles from an airport and below 500 feet could not be required to avoid sUAS operating with a strobe.

¹¹⁴ Press Release, AV Web, NAAA Launches UAV Safety Campaign (July 29, 2015) <http://www.avweb.com/press-releases/725.html> [<http://perma.cc/UB7S-MLPW>].

¹¹⁵ See Letter from John S. Duncan, Dir., Flight Standards Serv., FAA, to Mark A. Dombroff, Counsel for Wilbur-Ellis Company 9–12 (Mar. 25, 2015), https://www.faa.gov/uas/legislative_programs/section_333/333_authorizations/media/Wilbur-Ellis_Company_11223.pdf [<http://perma.cc/3PZ3-B7WA>] (stating rules for flying beyond the visual line of sight in a granted exemption request). Such an approach would allow companies that wish to demonstrate the viability of commercial package delivery using sUAS to work with property owners to ensure the safety of people on the ground during package delivery, for example by requiring the property owner to designate an access controlled area, such as a fenced yard, in which beyond line of sight deliveries could be made at an agreed upon time.

and heading of the sUAS.¹¹⁶ Persons operating transponder-equipped sUAS could be required to alert local ATC and possess hand-held radio equipment that would allow the operator to communicate with ATC in real time to ensure appropriate separation between the sUAS and manned aircraft.¹¹⁷ This would be another way of using existing technology to address the see-and-avoid concern.

C. DESIGNATED AREAS FOR BEYOND-LINE-OF-SITE OPERATIONS

If the FAA finds that rules for beyond-line-of-sight operations are not possible on a nationwide basis, another option is to designate specific areas where manned aircraft are either prohibited or required to yield the right-of-way to sUAS in order to permit beyond-line-of-sight operations.¹¹⁸ These designated areas could be chosen to minimize risks to people on the ground—for example, designated stretches of beach and coastal waters or unpopulated rural areas.¹¹⁹ Creating such areas now would allow companies interested in perfecting sense-and-avoid capabilities and gaining experience with beyond-line-of-sight operations to do so without having to obtain individual authorizations.¹²⁰ This is the approach Congress already adopted for Arctic areas in Section 332(d)(1) of the FAA Modernization Act,¹²¹ and the United Kingdom has already taken this approach with its use of segregated airspace designations specifically to allow beyond line-of-sight UAS operations.¹²²

¹¹⁶ See Letter from Small UAV Coalition to Honorable Michael Huerta, Adm'r, Fed. Aviation Admin. 5 (Apr. 22, 2015), <http://www.smalluavcoalition.org/wp-content/uploads/2015/03/SUAV-Coalition-ltr-to-Huerta-re-sec-333-reform.pdf> [<http://perma.cc/MVT6-6ZGW>] [hereinafter Small UAV Coalition Letter].

¹¹⁷ See generally STEVE HENRIKSEN, NASA, UNMANNED AIRCRAFT SYTEM CONTROL AND ATC COMMUNICATIONS BANDWIDTH REQUIREMENTS (2008), <http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20080010686.pdf> [<http://perma.cc/G72C-56BR>].

¹¹⁸ See Small UAV Coalition Letter, *supra* note 116, at 4.

¹¹⁹ See *id.*

¹²⁰ See *id.*

¹²¹ FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 332(d)(1), 126 Stat. 11, 75 (“The plan for operations in these permanent areas shall include the development of processes to facilitate the safe operation of unmanned aircraft beyond line of sight. Such areas shall enable over-water flights from the surface to at least 2,000 feet in altitude, with ingress and egress routes from selected coastal launch sites.”).

¹²² See *Airspace and Avoiding Collisions*, CIVIL AVIATION AUTH., <http://www.caa.co.uk/default.aspx?pageid=11186> [<http://perma.cc/9A4X-MZGK>] (last visited Nov. 6, 2015) (stating “Sense-and-Avoid . . . acts as a substitute for See-and-Avoid in manned aircraft”).

D. ADDITIONAL OPERATOR CERTIFICATION FOR BEYOND LINE OF SIGHT

The FAA could also consider requiring additional operator certification for beyond-line-of-sight operation of sUAS, just as pilots operating under instrument flight rules must obtain additional training and demonstrate additional proficiency.¹²³ In addition, the FAA could consider requiring small unmanned aircraft operating beyond line of sight to carry additional equipment—for example, first person view capability spanning not less than a 150 degree forward arc if a visual observer is not being used and/or a GPS tracking capability at the operator's station to inform the operator of the small unmanned aircraft's location at all times and allow recovery of lost aircraft. The FAA could also consider requiring onboard control capabilities that result in the aircraft going into a hover followed by a slow vertical descent to earth accompanied by a warning noise should its control link become inoperable.

These are just some examples of simple, readily achievable behavioral rules combined with existing technologies to permit safe integration of beyond-line-of-sight operations for sUAS into the NAS effective upon implementation of the final rule.¹²⁴ Other options most certainly exist, and the FAA should consider such options so that the final rule can accommodate, at least to some extent, all sUAS operations as Congress directed in Section 332 of the FAA Modernization Act.¹²⁵

XIV. ADDITIONAL AREAS TO CONSIDER FOR CHANGES TO THE PROPOSED RULE

In addition to beyond-line-of-sight operations, there are other beneficial uses of sUAS that the proposed rules would prohibit. Prime among these is nighttime operations.¹²⁶ While there may be good reasons to prohibit all nighttime sUAS operations, some nighttime operations could be safely permitted under a final rule.¹²⁷ Many of the same safeguards discussed above for

¹²³ Letter from John S. Duncan, Dir., Flight Standards Serv., FAA., to Mark A. Dombroff, Counsel for Wilbur-Ellis Company 9 (Mar. 25, 2015), https://www.faa.gov/uas/legislative_programs/section_333/333_authorizations/media/Wilbur-Ellis_Company_11223.pdf [<http://perma.cc/3PZ3-B7WA>] (Licensed pilot must fly UAS when exemption has been granted.).

¹²⁴ See Small UAV Coalition Letter, *supra* note 116, at 4.

¹²⁵ FAA Modernization and Reform Act of 2012 § 332.

¹²⁶ See Small UAV Coalition Letter, *supra* note 116, at 12.

¹²⁷ See *id.* at 12–13.

beyond-line-of-sight operations could be applied to allow safe nighttime operations.¹²⁸ At a minimum, designation of segregated areas for sUAS operations would allow companies to develop sense-and-avoid capabilities and perfect training and operations techniques for both beyond-line-of-sight and nighttime operations.

The proposed rule also prohibits flying small unmanned aircraft over any person not “directly involved” in the sUAS operation.¹²⁹ The NPRM states that “[a] person is directly involved in the operation when his or her involvement is necessary for the safe operation of the small unmanned aircraft.”¹³⁰ This definition may prove to be too limiting, with the result of prohibiting many beneficial uses of sUAS.¹³¹ For example, it will be difficult to use sUAS in search-and-rescue operations if the sUAS cannot fly over searchers on the ground or hover over victims to assess their injuries in real time.¹³² Use of sUAS for farm work, construction, inspections, and news reporting may all be unnecessarily limited if sUAS cannot operate over people who are aware of the sUAS presence and are participating in the work the sUAS is doing.¹³³ The proposed restriction is designed to protect people on the ground from a falling sUAS.¹³⁴ People who are aware of the sUAS and are working with that sUAS are in no greater danger than the visual observer or sUAS operator. Modifying the restriction in the final rule to prohibit flying sUAS over persons not “participating” in the sUAS activity would still protect uninvolved persons while also permitting greater beneficial uses of sUAS.¹³⁵

Another modification that should be considered is waiver authority analogous to those found in other parts of Title 14, Code of Federal Regulations.¹³⁶ The “certificates of waiver” and “certificates of authorization” that the FAA grants to allow civil aircraft operations on a case-by-case basis outside the parameters of

¹²⁸ *See id.*

¹²⁹ Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. 9544, 9546 (proposed Feb. 23, 2015) (to be codified at 14 C.F.R. pt. 21, 43, 45, 47, 61, 91, 101, 107, 183).

¹³⁰ *Id.* at 9563.

¹³¹ *See* Small UAV Coalition Letter, *supra* note 116, at 15.

¹³² *Id.*

¹³³ *See id.*

¹³⁴ *See* Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. at 9557.

¹³⁵ *See* Small UAV Coalition Letter, *supra* note 116, at 15.

¹³⁶ *See, e.g.,* Policy and Procedures, 14 C.F.R. § 91.903(a) (2015).

the existing rules should be applicable to sUAS operations. Especially in light of the fact that Section 333 of the FAA Modernization Act may not provide ongoing authority for exemptions, it is prudent to include waiver authority under the FAA's existing authority under Title 49 in the new Part 107.¹³⁷

Finally, it is surprising that the FAA did not seek comment on requiring operators to procure a minimal level of insurance as part of the final regulations.¹³⁸ The NPRM notes in the chart comparing Canadian regulations with the proposed rules that Canada requires insurance of 100,000 Canadian dollars for its sUAS, which are limited to 4.4 pounds.¹³⁹ Similarly, unmanned aircraft operators in the UK and Europe are required to carry third party liability insurance when engaged in commercial operations.¹⁴⁰ Given the cautionary approach taken by the FAA in the NPRM, requiring insurance would be one way of ensuring that persons and property on the ground and/or in the air that are injured or damaged by a collision with an sUAS are able to be compensated.

XV. CONCLUSION

The publication of the NPRM presents the United States with an opportunity to establish rules that will influence UAS development and that the United States will use for decades to come. The EASA framework has established more flexible rules for sUAS than the FAA's current proposed rules. The FAA should make significant modifications to its proposed rule, most importantly, by eliminating the restrictions on non-line-of-sight operations. By approving a more flexible, forward-looking regime that addresses a broader range of civil sUAS operations, the FAA would encourage UAS operators and manufactures to keep their innovation and industry in the United States.

¹³⁷ See PUBLIC GUIDANCE FOR PETITIONS FOR EXEMPTION FILED UNDER SECTION 333, FAA (Sept. 25, 2014), http://www.faa.gov/uas/legislative_programs/section_333/how_to_file_a_petition/media/section333_public_guidance.pdf [http://perma.cc/JBX7-A6QR].

¹³⁸ See Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. at 9557.

¹³⁹ *Id.*

¹⁴⁰ UK CIVIL AVIATION AUTHORITY, CAP 722, UNMANNED AIRCRAFT SYSTEM OPERATIONS IN UK AIRSPACE—GUIDANCE §§ 2.21–2.23 (6th ed. 2015), <http://www.caa.co.uk/docs/33/CAP%20722%20Sixth%20Edition%20March%202015.pdf> [http://perma.cc/9JLK-VS4].

The FAA has previously demonstrated that it possesses the requisite legal authority to establish unique rules for different types of aircraft and aircraft operations. The FAA can use the same existing legal authority to adopt more flexible rules than those proposed in the NPRM for unmanned aircraft systems.

Comments on the NPRM should encourage the FAA to use its existing legal authority in Section 44701(f) of Title 49, United States Code, and advocate common-sense rules that allow beyond-line-of-sight operations for sUAS so that all sUAS can be safely integrated into the NAS as Congress directed.