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# THE GEORGE WASHINGTON UNIVERSITY

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WASHINGTON, DC

Public Interest Comment<sup>1</sup> on  
The Federal Aviation Administration's Proposed Rule:  
Operation and Certification of Small Unmanned Aircraft Systems

Docket ID No. FAA-2015-0150

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## The George Washington University Regulatory Studies Center

The George Washington University Regulatory Studies Center works to improve regulatory policy through research, education, and outreach. As part of its mission, the Center conducts careful and independent analyses to assess rulemaking proposals from the perspective of the public interest. This comment on the Federal Aviation Administration's proposed rule to adopt rules allowing the operation of small unmanned aircraft systems does not represent the views of any particular affected party or special interest, but is designed to evaluate the effect of the FAA's proposal on overall consumer welfare.

### Introduction

This Federal Aviation Administration (FAA) proposal would allow small unmanned aircraft systems (UAS) to operate in the National Airspace System (NAS) pursuant to specific limitations and standards, which address small UAS operation, operator certification, and registration. Small UAS currently may not operate for non-recreational (i.e. commercial) purposes in the NAS. By allowing commercial small UAS to operate, the FAA expects to enable

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<sup>1</sup> This comment reflects the views of the author, and does not represent an official position of the GW Regulatory Studies Center or the George Washington University. The Center's policy on research integrity is available at <http://research.columbian.gwu.edu/regulatorystudies/research/integrity>.

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businesses to use small UAS to improve the efficiency of existing enterprises. Although the FAA foresees “potential societally beneficial applications of small UAS,” it intends to integrate them in a way that poses minimal public risk.<sup>3</sup>

The proposed rule—and this public comment—uses a number of technical terms and acronyms when discussing unmanned aircraft. An unmanned aircraft system (UAS) consists of an “unmanned aircraft...and equipment necessary for the safe operation of that aircraft.”<sup>4</sup> A UAS is deemed “small” if it weighs less than 55 pounds, and “micro,” if is under 2 kilograms (4.4 pounds). The question in the proposal is whether to allow small UAS in the National Airspace System (NAS), which is “a complex collection of facilities, systems, equipment, procedures, and airports operated by thousands of people to provide a safe and efficient flying environment.”<sup>5</sup> Since UAS are unmanned, they have operators, not pilots.

The proposal is divided into four sections: operational limitations, operator certification and responsibilities, aircraft requirements, and implications for model aircraft,<sup>6</sup> which are summarized below.

## Summary of Provisions

### *Operational Limitations*

The unmanned aircraft must weigh less than 55 lbs., and it must at all times remain within the visual line of sight (VLOS) of the operator. This means the aircraft must “remain close enough to the operator for the operator to be capable of seeing the aircraft with vision unaided by any device other than corrective lenses.”<sup>7</sup> The aircraft must operate during daylight hours (official sunrise to sunset times) and “may not operate over any persons not directly involved in the operation.”<sup>8</sup> Aircraft may not achieve airspeed over 100 mph, and must not fly more than 500 feet above ground level. Operators may only operate one small UAS at a time, and they may not operate from a moving vehicle (except from a watercraft on water, which is allowed). Operators must inspect the small UAS before flight, and must not operate carelessly or recklessly, or at all if possessing a physical or mental condition that would interfere with safe operation.

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<sup>3</sup> 80 FR 9545

<sup>4</sup> 80 FR 9545

<sup>5</sup> FAA, “Glossary.”

<[http://www.faa.gov/regulations\\_policies/handbooks\\_manuals/aviation/instrument\\_procedures\\_handbook/media/Glossary.pdf](http://www.faa.gov/regulations_policies/handbooks_manuals/aviation/instrument_procedures_handbook/media/Glossary.pdf)>

<sup>6</sup> The FAA’s original summary of major provisions is included in the Appendix.

<sup>7</sup> 80 FR 9546

<sup>8</sup> Ibid.

### *Operator Certification*

In order to operate a small UAS, operators would be required to “pass an aeronautical knowledge test,” undergo vetting by the Transportation Security Administration, and pass a “recurrent aeronautical knowledge test” every two years.<sup>9</sup> Operators must be at least seventeen years old. Operators must report accidents to the FAA, and they must allow the FAA to inspect or test the UAS or associated documents and records.<sup>10</sup>

### *Aircraft Requirements*

Aircraft must “display markings in the largest practicable manner” and “standard size” if possible.<sup>11</sup>

### *Model Aircraft*

Model aircraft, or UAS that are “used for hobby or recreational purposes”<sup>12</sup> are not subject to the proposed rule.

## **Affected Parties and Anticipated Effects**

The proposal will affect parties wishing to use small UAS for commercial purposes. As the FAA currently prohibits civil use of small UAS for commercial purposes, the FAA expects the proposal would allow “small UAS operations that could be conducted under [the] proposed framework.”<sup>13</sup>

## **Statutory Authority**

The FAA has been conducting research on and drafting UAS rulemaking since 2005. In 2008 the Administration “chartered the small UAS Aviation Rulemaking Committee (ARC) to address the incorporation of small UAS in the NAS.”<sup>14</sup>

In 2012, Congress passed the FAA Modernization and Reform Act of 2012, Section 333 of which “directed the Secretary [of Transportation] to determine whether UAS operations posing the least amount of public risk and no threat to national security could safely be operated in the

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<sup>9</sup> Ibid

<sup>10</sup> Ibid.

<sup>11</sup> Ibid.

<sup>12</sup> 80 FR 9550, citing 72 FR 6689, 6690 (Feb.13, 2007). A complete definition of model aircraft can be found at section 336 of Public Law 112-95.

<sup>13</sup> 80 FR 9545.

<sup>14</sup> Thurston, George (2015). “Notice of proposed rulemaking regulatory evaluation: Small unmanned aircraft systems, 14 CFR part 107.” Office of Aviation Policy and Analysis, Economic Analysis Division.

NAS and if so, to establish requirements for the safe operation of these systems in the NAS.”<sup>15</sup> Also in that section, Congress directed the Secretary of Transportation to “issue a final rule on small unmanned aircraft systems that will allow for civil operations of [UAS] in the NAS.”<sup>16</sup>

## Compliance with Regulatory Analysis Requirements

The FAA must adhere to Executive Order 12866 and 13563, which require the Administration to identify the problem the proposal intends to solve, to state monetized costs and benefits, and to consider the effectiveness of regulatory alternatives. The first two “principles of regulation” to which E.O. 12866 directs agencies to adhere are:

- (1) Each agency shall identify the problem that it intends to address (including, where applicable, the failures of private markets or public institutions that warrant new agency action) as well as assess the significance of that problem.
- (2) Each agency shall examine whether existing regulations (or other law) have created, or contributed to, the problem that a new regulation is intended to correct and whether those regulations (or other law) should be modified to achieve the intended goal of regulation more effectively.<sup>17</sup>

An unusual characteristic about the proposal is that it would loosen restrictions for UAS operation rather than tighten them. Thus, consistent with E.O. 12866 principle 2, the FAA is developing regulation to address the problem that its existing regulations, as directed by Congress,<sup>18</sup> prohibit civil use of UAS for commercial purposes without a Section 333 permit. Thus, the proposal identifies a problem of excessively restrictive rules for UAS and intends to “allow” small UAS to operate within a specified regulatory framework.<sup>19</sup>

Surprisingly absent from the FAA’s discussion of the proposal’s purpose is the analysis and defense of the current UAS regulatory framework, which prohibits civil use of UAS for commercial purposes. The FAA treats the proposal as if it is suggesting a change to the unaltered status quo; in reality, the Administration is suggesting a change to an existing restrictive framework.

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<sup>15</sup> 80 FR 9545.

<sup>16</sup> 80 FR 9551.

<sup>17</sup> Exec. Order No. 12866, Regulatory Planning and Review, §1(b).

<sup>18</sup> Public Law 112-95, Section 333.

<sup>19</sup> 80 FR 9545.

The FAA does consider a number of alternatives to the requirements proposed for both operator certification and operational limitations. The discussed alternatives to the operational limitations proposed do not have monetized or quantified benefits and costs; they are unknown.

- The FAA considered “subdivid[ing] small UAS into different categories of unmanned aircraft that would be regulated differently based on their weight, operational characteristics, and operating environment,”<sup>20</sup> but ultimately decided to have only the one category of aircraft weighing less than 55 lbs. Although the FAA expects such a framework will be less “burdensome for the public and the FAA,” it does not consider the impact such categorization may have on investment in research to develop larger unmanned aircraft.<sup>21</sup>
- The FAA considered an alternative to the visual line of sight requirement that would allow UAS operators “to exercise his or her see-and-avoid responsibilities through technological means, such as onboard cameras.”<sup>22</sup> The Administration determined “there is no acceptable technological substitute for direct human vision in small UAS operations at this time.” However, by banning onboard cameras as a means of exercising see-and-avoid responsibilities, the FAA may decrease the incentive for investment in technological see-and-avoid substitutes.
- The FAA considered allowing small UAS to operate outside of sunlight hours and at vertical levels higher than 500 feet, but determined that increased training and certification requirements necessary to ensure small UAS “do not pose a hazard” to “people on the ground” would be too burdensome and costly.<sup>23</sup> The FAA does not include estimates of either the benefits of allowing such expanded operation, nor does it estimate the additional training and certification costs deemed too “burdensome.”<sup>24</sup>

The FAA does not discuss or provide evidence for why its preferred alternative in each case would provide the highest net benefits, as required by executive order.

## Regulatory Analysis

### Benefits and Costs—but also Opportunity Costs—Expected

The FAA includes a thorough analysis of expected costs over a five-year period for applicants and owners of small UAS as well as for the government, as detailed below.

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<sup>20</sup> Thurston (2015) p. 72.

<sup>21</sup> Ibid.

<sup>22</sup> Ibid.

<sup>23</sup> Ibid., p. 76

<sup>24</sup> Ibid.

TOTAL AND PRESENT VALUE COST SUMMARY BY PROVISION  
[Thousands of current year dollars]

Type of cost	Total costs (000)	7% P.V. (000)
Applicant/small UAS operator:		
Travel Expense .....	\$151.7 .....	\$125.9
Knowledge Test Fees .....	\$2,548.6 .....	2,114.2
Positive Identification of the Applicant Fee .....	\$434.3 .....	383.7
Owner:		
Small UAS Registration Fee .....	\$85.7 .....	70.0
Time Resource Opportunity Costs:		
Applicants Travel Time .....	\$296.1 .....	245.3
Knowledge Test Application .....	\$108.9 .....	90.2
Physical Capability Certification .....	\$20.0 .....	17.7
Knowledge Test Time .....	\$1,307.1 .....	1,082.9
Small UAS Registration Form .....	\$220.5 .....	179.7
Change of Name or Address Form .....	\$14.9 .....	12.3
Knowledge Test Report .....	\$154.9 .....	128.5
Pre-flight Inspection .....	Not quantified ...	.....
Accident Reporting .....	Minimal cost .....	.....
Government Costs:		
TSA Security Vetting .....	\$1,026.5 .....	906.9
FAA—sUAS Operating Certificate .....	\$39.6 .....	35.0
FAA—Registration .....	\$394.3 .....	321.8
Total Costs .....	\$6,803.1 .....	5,714.0

\* Details may not add to row or column totals due to rounding.

Source: 80 FR 9579

The FAA does not monetize or otherwise quantify expected benefits from “opening up new commercial aviation activities.”<sup>25</sup> This value is the social and economic gain from enabling new markets to emerge or develop, such as aerial photography, precision agriculture, search and rescue, bridge inspection, crop monitoring, and others.<sup>26</sup> However, since UAS are a nascent technology, the FAA is uncertain about the safety and privacy risks they might pose to the public.

The FAA uses as its baseline for analyzing the impacts of the proposal the current general ban on commercial use of small UAS without exemptions. However, it is important to consider not only the benefits and costs of the proposal relative to that baseline, but also the opportunity cost of foregone benefits not realized because the proposal does not go far enough to integrate small UAS. Might more permissive standards allow for broader use of the technology, unlocking further economic gains? The FAA’s greatest challenge in this proposal is achieving the right balance between protecting against potential risks associated with the new technology and unleashing the potential for large social gains.

If the FAA issues regulations that are unnecessarily restrictive, and continues to be slow to revise those standards as new information comes available, the foregone gains that would have been realized if UAS operations were authorized could be large. The aforementioned industries stand

<sup>25</sup> 80 FR 9578.

<sup>26</sup> 80 FR 9545, 9578.

to contribute vast amounts of economic activity: the Association for Unmanned Vehicle Systems International estimates this value at over \$10 billion per year.<sup>27</sup>

### **The National Airspace System and property rights**

Troy A. Rule of the Sandra Day O'Connor School of Law at Arizona State University identifies a number of “disruptive new innovations” that, in the past, “exposed gaps or ambiguities in property law.”<sup>28</sup> Radio broadcasting, petroleum-fueled engines, and the Internet were all disruptive innovations that thrust relevant aspects of property law into debate.<sup>29</sup> Consequently, new laws were made for broadcast frequencies and the electromagnetic spectrum, for oil and gas, and for domain name rights and online assets.<sup>30</sup>

This customized response to disruptive innovation that Rule describes is strikingly different from the FAA’s “Procrustean” approach to UAS regulation, in which the Administration is forcing a new, disruptive technology into a dissimilar, existing framework. Commissioner Maureen Ohlhausen of the U.S. Federal Trade Commission describes this “Procrustean” approach as “tak[ing] complicated ideas, technologies, or people, and forc[ing] them to fit our preconceived models.”<sup>31</sup> The FAA uses the word “integrate” to describe its long-run intention for UAS and the NAS. In order to *integrate*, and not simply *force* UAS into the NAS, the FAA must consider how primary users of the NAS (e.g. manned aircraft) and new users (UAS) can achieve the socially optimal balance of NAS use. This may require revisiting existing rules for current users of the NAS rather than affording them the amenity of the status quo.

### **Setting Standards and Setting the Ceiling for Innovation**

The FAA should include an analysis of how its design of UAS regulations may influence the course of innovation in aviation. Proposed limitations on small UAS weight, the requirement that operators maintain visual line of sight, and the limitation of only one unmanned aircraft per operator could reduce the rewards to future innovation that is outside the bounds of the current regulatory framework. The Administration’s recognition that UAS technology is evolving is evident. For example, the proposed rule states:

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<sup>27</sup> Jenkins, Darryl and Bijan Vasigh (2013). “The economic impact of unmanned aircraft systems integration in the United States.” Association for Unmanned Vehicle Systems International.

<sup>28</sup> Rule, Troy A. (2015). “Airspace in an age of drones.” 95 B.U. L. Rev. 155, p. 186.

<sup>29</sup> Ibid.

<sup>30</sup> Ibid, p. 186-187

<sup>31</sup> Ohlhausen, Maureen K (2014). *The Procrustean problem with prescriptive regulation*. 23 COMMLAW CONSPPECTUS 1, p. 2. <http://scholarship.law.edu/commlaw/vol23/iss1/2>

The FAA also notes that, because UAS-associated technologies are rapidly evolving at this time, new technologies could come into existence after this rule is issued or existing technologies may evolve to the extent that they establish a level of reliability sufficient to allow those technologies to be relied on for risk mitigation. These technologies may alleviate some of the risk concerns that underlie the provisions of this rulemaking like the line of sight rule.<sup>32</sup>

Similarly, in its 2013 “Integration of Civil Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) Roadmap” the FAA writes:

Overlaying the integration of UAS is the need to remain aware of the changing characteristics and requirements of the evolving NAS. The long-term focus for UAS operations is the refinement and updating of regulation, policy, and standards. The end-state is to implement streamlined processes for the continued integration of UAS into the NAS.<sup>33</sup>

Investment in aviation innovation will only occur to the extent that marginal returns will exceed the marginal cost of the investment. The likelihood of an investment in UAS innovation breaking even or generating positive returns is greatly diminished if regulatory restrictions impede or prevent technological innovations from reaching the market. Investment in innovation to improve the safety and control of UAS beyond the operators’ visual lines of sight may never occur if investors do not expect the FAA to lift the VLOS requirement. Similarly, valuable commercial uses that can only be achieved by larger (i.e. heavier) unmanned aircraft (such as package delivery or agricultural applications), or UAS that allow operators to control more than one aircraft, are less likely to emerge given the FAA’s restrictions.

## **Conclusion: Retrospective Review and Regular Updating of the Rule will be Crucial**

The FAA suggests that this rule will be the first step in a long, complex path of UAS integration into the NAS. The Administration will be challenged to ensure that this incremental approach occurs at a pace that closely mirrors market and technological changes. Because UAS are nascent technologies, the FAA has very little information on the potential benefits and risks. Retrospective review involving ambitious data collection is essential to structuring the future steps in the integration framework.

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<sup>32</sup> 80 FR 9552

<sup>33</sup> Federal Aviation Administration. “Integration of Civil Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) Roadmap.” (2013). First Edition. p. 38.”  
[https://www.faa.gov/uas/legislative\\_programs/uas\\_roadmap/media/UAS\\_Roadmap\\_2013.pdf](https://www.faa.gov/uas/legislative_programs/uas_roadmap/media/UAS_Roadmap_2013.pdf)

Perhaps most importantly, the FAA should set regular deadlines for issuing final rules to update UAS integration standards. Specifically, it should commit to removing some of the requirements (e.g., size, VLOS, etc.) at dates certain unless experience justifies maintaining them. As mentioned, the FAA began considering how to integrate UAS into the NAS in 2005. A decade later, the Administration has made its first proposal for how making the first, very limited step. In order for UAS to be truly integrated into the NAS, the FAA must commit now to ensure the rulemaking process going forward is more dynamic, and respectful of the societal gains innovation can bring.