ITIF | INFORMATION TECHNOLOGY & INNOVATION FOUNDATION

April 20, 2015

Mr. Michael P. Huerta, Administrator
Federal Aviation Administration
U.S. Department of Transportation
1200 New Jersey Avenue SE
Room W12-140, West Building Ground Floor
Washington, DC 20590-0001

RE: Operation and Certification of Small Unmanned Aircraft Systems, Docket ID: FAA-2015-0150

Dear Administrator Huerta,

The Information Technology and Innovation Foundation (ITIF) is pleased to submit these comments in response to the Federal Aviation Administration's (FAA) request for public comment concerning the integration of small, commercial, unmanned aircraft systems (UAS) into the National Airspace System (NAS).[1] ITIF is a nonprofit, non-partisan public policy think tank committed to articulating and advancing a pro-productivity, pro-innovation, and pro-technology policy agenda internationally, in Washington, DC, and in the states. Through its research, policy proposals, and commentary, ITIF is working to advance and support public policies that boost innovation, e-transformation, and productivity.

ITIF applauds the FAA for moving forward on its plan to integrate small, commercial drones into the NAS, as the industry needs a clear set of rules to begin capturing the untapped opportunities presented by this innovative technology. Market analysts estimate that integrating unmanned systems into the NAS will create $13.6 billion in economic value and 70,000 new jobs within the first three years after this plan comes to fruition.[2] UAS will impact many sectors, including agriculture, healthcare, law enforcement, telecommunications, creative arts, retail, and transportation. While the FAA has shown some restraint in its

[1] "Operation and Certification of Small Unmanned Aircraft Systems," *Federal Aviation Administration*, accessed April 1, 2015, https://www.faa.gov/regulations_policies/rulemaking/recently_published/media/2120-AJ60_NPRM_2-15-2015_joint_signature.pdf.
[2] "The Economic Impact of Unmanned Aircraft Systems Integration in the United States," *Association for Unmanned Vehicle Systems International*, March 2013, https://higherlogicdownload.s3.amazonaws.com/AUVSI/958c920a-7f9b-4ad2-9807-f9a4e95d1ef1/UploadedImages/New_Economic%20Report%202013%20Full.pdf.

proposed regulations, such as by correctly deciding not to regulate software or "apps" for UAS, the proposed rules do not provide the flexibility that commercial developers need to rapidly innovate with UAS technology while protecting the safety of citizens.

To that end, ITIF proposes a number of key principles to guide the FAA's rule-making process:

- The FAA should adopt a regulatory framework that bolsters U.S. competitiveness in UAS.
- The FAA should create rules that encourage commercial applications of UAS.
- The FAA should adopt technology-neutral rules for UAS.
- The FAA should adopt a flexible, risk-based approach to addressing UAS safety concerns.

UAS POLICY BACKGROUND

The FAA has had stringent regulations restricting commercial applications of small UAS—defined by statute as "unmanned aircraft weighing less than 55 pounds" since 2005. [3] In 2012, Congress passed the FAA Modernization and Reform Act, which directed the FAA to issue a rule on small UAS that would allow for civil operations in the NAS by September 30, 2015.[4] In Section 333 of this law, Congress directed the FAA to determine whether "certain unmanned aircraft systems may operate safely in the national airspace system."[5] To make this determination, the FAA intends to assess "which types of unmanned aircraft systems, if any, as a result of their size, weight, speed, 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."[6] The FAA must also determine whether a certificate or authorization is necessary to mitigate any potential public risk.

The FAA retained its original restrictions on the technology until November 2013, when it began exempting certain technologies on a case-by-case basis. As of the time of this filing, the FAA has granted 128 exemptions under Section 333 out of hundreds of applications.[7] Recently the FAA issued a new policy allowing blanket

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[3] "Operation and Certification of Small Unmanned Aircraft Systems," *Federal Aviation Administration.*
[4] "FAA Modernization and Reform Act of 2012," *U.S. Government Publishing Office*, February 1, 2012, accessed April 1, 2015, http://www.gpo.gov/fdsys/pkg/CRPT-112hrpt381/pdf/CRPT-112hrpt381.pdf.
[5] Ibid.
[6] "Operation and Certification of Small Unmanned Aircraft Systems," *Federal Aviation Administration, 30.*
[7] The number of U.S. applications can be found here: "Operation and Certification of Small Unmanned Aircraft Systems," *Regulations.Gov*, accessed April 1, 2015, http://www.regulations.gov/#!documentDetail;D=FAA-2015-0150-0017; Number of U.S. Exemptions can be found here: "Section 333," *Federal Aviation Administration*, April 9, 2015, https://www.faa.gov/uas/legislative_programs/section_333/.

authorization for UAS below 200 feet for the few companies that have already obtained a Section 333 exemption.[8] The FAA has also exempted others under an experimental airworthiness certification, which has strict rules but allows for testing of specific technologies.[9] The FAA approved these exemptions after significant delays.[10] These delays have created an unnecessary regulatory burden for companies developing and deploying commercial drone technologies.

In seeking to fulfill the requirements put forth by Congress in the FAA Modernization and Reform Act of 2012, the FAA initiated a rule-making process to allow deployment of small, commercial UAS.[11] The proposed rules have many restrictions including: requiring visual line-of-sight operations; banning UAS operations over anyone not involved with the operation; allowing UAS operations only during daylight; limiting first-person view equipment; prohibiting package delivery; and requiring one operator per UAS.[12] The rule-making also creates a new certification process for small UAS operators rather than requiring them to obtain the standard pilot airman certificate.[13]

While ITIF commends the FAA for beginning this rule-making process, the UAS integration plan has been delayed repeatedly. The U.S. Government Accountability Office found that as of December 2014 the FAA had only completed 9 of the 17 requirements for the 2012 Act, and it does not expect the final rules until late 2016 or early 2017.[14] In the absence of FAA action, states have begun to pass their own laws, thereby increasing regulatory uncertainty.[15] As explained in the following section, the slow exemption process, the lack of a final commercial UAS rule, and the patchwork of state laws on UAS are pushing U.S. companies trying to innovate with new UAS technology to go abroad in search of more accommodating regulatory environments.

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[8] "FAA Streamlines UAS COAs for Section 333," Federal Aviation Administration, March 24, 2015, http://www.faa.gov/news/updates/?newsId=82245&omniRss=news_updatesAoc&cid=101_N_U.
[9] "Experimental Category," *Federal Aviation Administration*, accessed April 9, 2015, https://www.faa.gov/aircraft/air_cert/airworthiness_certification/sp_awcert/experiment/
[10] Gregory McNeal, "FAA's Treatment Of Amazon Proves Congress Must Act Or Companies Will Take Drone Research Abroad," *Forbes*, December 12, 2014, http://www.forbes.com/sites/gregorymcneal/2014/12/10/faas-treatment-of-amazon-proves-that-congress-must-acts-or-companies-will-take-drone-research-abroad/.
[11] "Operation and Certification of Small Unmanned Aircraft Systems," *Federal Aviation Administration.*
[12] Ibid, 11.
[13] Ibid, 12.
[14] Gerald Dillingham, "Efforts Made toward Integration into the National Airspace Continue, but Many Actions Still Required," *U.S. Government Accountability Office*, December 10, 2014, http://www.gao.gov/products/GAO-15-254T.
[15] Alan McQuinn, "Don't Let States Make a Mess of Drone Laws," *Republic 3.0*, February 2015, http://republic3-0.com/dont-let-states-make-mess-drone-laws/.

THE FAA SHOULD ADOPT A REGULATORY FRAMEWORK THAT BOLSTERS U.S. COMPETITIVENESS IN UAS

The FAA's slow regulatory response to the development of UAS has left the United States poised to lose competitive advantage in this growing industry. Some U.S.-based companies have begun to relocate to other countries with more permissible laws to develop and test these devices.[16] For example, one company is testing new UAS technology at a Canadian facility located four-tenths of a mile from the U.S. border because the approval process in Canada is much faster. This company faced a six-month wait to gain an exemption in the United States, whereas they received approval in Canada in just three weeks.[17] In that six-month time period, the UAS model that the FAA approved became outdated as the company moved on to a newer model for testing.[18]

Likewise, another U.S. company is testing its technology in Australia because of that country's more permissive policies. Australia's Civil Aviation Safety Authority—the agency in charge of UAS in Australia—has not yet finalized its drone laws, yet it still allows operators to test outdoors if they receive a certificate and submit their test area for approval.[19] The Australian process calls for a simple "manufacturer conducted training course" for operators' certificates and for operators to undertake UAS tests far from civilians to ensure safety in testing.[20] Australia uses a rigorous risk assessment to balance safety concerns with innovation, thereby

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[16] Alan McQuinn, "Commercial Drone Companies Fly Away from FAA Regulations, Go Abroad," *Inside Sources*, September 30, 2014, http://www.insidesources.com/commercial-drone-companies-fly-away-from-faa-regulations-go-abroad/.

[17] Ed Pilkington, "Amazon tests delivery drones at secret Canada site after US frustration," *The Guardian*, March 30, http://www.theguardian.com/technology/2015/mar/30/amazon-tests-drones-secret-site-canada-us-faa.

[18] The FAA recently allowed for Amazon to test its latest model of research UAS. The newly won approval, which was granted after only one week, shows the FAA's ability to offer exemptions in a timelier manner. See, Sai Sachin and Lisa Schumaker, "Amazon gets green light from U.S. regulators for new drone tests," *Reuters*, April 9, 2015, http://www.reuters.com/article/2015/04/10/us-amazon-com-aircraft-idUSKBN0N103Z20150410; Jay Greene, "Amazon says FAA-approved drone is already obsolete," *The Seattle Times*, March 24, 2015, http://www.seattletimes.com/business/amazon/amazon-says-faa-drone-approval-already-obsolete/.

[19] The FAA takes a significantly longer amount of time to approve outdoor testing sites, even if they are a great distance from population centers. See, Ed Pilkington, "Amazon tests delivery drones at secret Canada site after US frustration," *The Guardian*; "Regulations and Policy," *Civil Aviation Safety Authority*, accessed April 2, 2015, http://www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_90900.

[20] Alan McQuinn, "Commercial Drone Companies Fly Away from FAA Regulations, Go Abroad," *Inside Sources*; "Regulations and Policy," *Civil Aviation Safety Authority*.

allowing services such as package delivery.[21] France, too, offers more permissive rules for UAS activities, such as allowing UAS operations beyond line of sight for operators using first-person view technology.[22] The FAA's proposed rules should offer similar flexibility so the United States does not risk further loss of competitiveness in UAS technologies.

THE FAA SHOULD ENCOURAGE COMMERCIAL UAS APPLICATIONS

While the FAA should continue to make safety paramount, a central goal of the FAA's UAS policy should be to promote commercial activity. The FAA's stated mission is to "to provide the safest, most efficient aerospace system in the world," and it does this with consideration for economics, environmental responsibility, efficiency, and the safeguarding of the public investment.[23] Therefore, the FAA's goal should be to optimize both safety and commercial value when it comes to the integration of UAS into the NAS. Until now, UAS operations have been almost entirely for non-commercial purposes. The FAA's rule-making to commercialize drones should emulate the government's past success at transforming the Internet from a noncommercial network into the vibrant commercial behemoth it is today.[24] By promoting the safe and secure integration of commercial UAS into the NAS, the FAA will unlock economic opportunities for many stakeholders, including farmers, journalists, energy and infrastructure inspectors, rescue workers, photographers, and everyday consumers. The result will be greater productivity and innovation.

Unfortunately, the proposed rules place unnecessary restrictions on commercial activity. For example, the proposed rules do not prohibit UAS from being used to transport goods as long as it is not done for compensation and the aircraft weighs less than 55 pounds, yet it does prohibit package delivery.[25] This presumably allows for research or for internal operations by businesses to transport their own property between different locations. However, this distinction is arbitrary—the safety of goods transported by UAS

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[21] "How to become a safe RPA operator," *Civil Aviation Safety Authority, Accessed April 9, 2015, http://www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD:1001:pc=PC_101985.*

[22] Rudy Ruitenberg, "What the French Know About Drones That Americans Don't," *Bloomberg Businessweek*, March 16, 2015, http://www.bloomberg.com/news/articles/2015-03-16/what-the-french-know-about-drones-that-americans-don-t.

[23] "Mission," *Federal Aviation Administration*, April 23, 2010, http://www.faa.gov/about/mission/; and in regard to airport systems, see "Mission and Responsibilities," *Federal Aviation Administration*, April 21, 2014, http://www.faa.gov/airports/central/about_airports/CE_mission/.

[24] Walter Isaacson, *The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution* (New York: Simon and Schuster, 2014), 400-402.

[25] "Operation and Certification of Small Unmanned Aircraft Systems," *Federal Aviation Administration*, 39.

does not depend on whether the UAS operator receives payment—and it directly limits commercial UAS activity. Put simply, the FAA rules should not restrict UAS operators from receiving compensation.

The proposed FAA rules also create significant inefficiencies that would make many commercial activities infeasible. For example, the rules do not allow UAS to operate beyond the line of sight, even with precautions such as multiple other visual observers or with first-person view technology. This restriction would make many commercial applications, such as package delivery, prohibitively expensive or impractical, and unnecessarily raise costs for other uses. Additional restrictions, including those on night flights, flights over people not involved in the operation of UAS, and load-bearing and towing operations, will likely offer only marginal improvements in safety, if any. For example, flying at night can be less risky than during the daytime because there are generally fewer people outside in the event of an accident. Moreover, these questionable safety recommendations would come at great cost to useful applications of this technology.[26]

The FAA should work with the private sector to expeditiously create safety guidelines and best practices for the production and use of UAS. Delays in its UAS rule-making also postpone the development of innovations in UAS safety. By opening the doors for commercial UAS activity, the FAA will support industry efforts to improve safety by allowing additional testing and research. The private sector will likely be a useful partner for the FAA in the development of UAS regulations because it has an incentive to create safe services to limit liability for damage or injury and to promote public acceptance of UAS.

THE FAA SHOULD ADOPT TECHNOLOGY-NEUTRAL RULES FOR UAS

The FAA should adopt technology-neutral rules that neither favor nor disadvantage particular technologies, so as to create a level playing field for innovation. While the FAA should take into account differences in technologies, it should create rules that treat unmanned aircraft similarly to manned aircraft.

When it comes to regulating the use of the technology, neutral rules would allow FAA-certified UAS operators to do with a drone the same things that an FAA-certified pilot can do with a manned helicopter, plane, or blimp, as long as there are no additional, unmitigated safety concerns. The FAA should not create rules that restrict UAS operations in ways that are not comparable with other technologies. For example, if

[26] It is not clear the FAA's safety recommendations would greatly improve safety. For example, a 10lbs UAS would present comparable risk to a 5lbs UAS carrying a 5lbs cargo. Similarly, flying a UAS in a park as a hobbyist over 20 people would offer similar risk as flying that same UAS over 20 people involved in its operation.

businesses can use helicopters to take aerial photos then they should be able to use UAS to do the same. This approach would avoid having the government unfairly tilt the playing field for a particular technology.

Similarly, the FAA should not subject commercial UAS operators to substantially different rules than hobbyists using the same technology for non-commercial purposes. Hobbyists are exempt from the current rule-making and instead must abide by section 336 of the FAA Modernization and Reform Act of 2012 as long as they meet five conditions: (1) aircraft must be flown as a hobby, (2) it must be flown under a community-based set of safety standards, (3) it must weigh less than 55 pounds, (4) it must give right of way to manned aircraft, and (5) it must not be flown within five miles of an airport unless air traffic control is properly notified.[27] The FAA should not permit hobbyists to use UAS for activities that it prohibits for commercial purposes. The level of risk is independent of whether the UAS operator receives compensation. For example, hobbyists taking pictures with UAS present no more risk than professional photographers using UAS.[28]

Clearly, all technologies are not the same. The safety concerns associated with a 5-pound toy are not the same as those associated with a 55 pound UAS, and neither bears the same level of risk as a manned helicopter. Where there are differences in technology, the FAA should establish rules that recognize the risks distinct to (or irrelevant to) particular technologies. For example, a UAS operator should not be forced to learn parachute or crash-landing protocol as part of his or her operator certification given that no one will be jumping out of the unmanned aircraft.

THE FAA SHOULD ADOPT A FLEXIBLE, RISK-BASED APPROACH TO ADDRESS UAS SAFETY CONCERNS

The FAA should recognize that, as with manned flight, it is impossible to completely remove risk, and to do so would limit the significant benefits of commercial aviation. To create a level playing field for UAS technology and encourage safety-related innovation, the FAA should create flexible rules based on its accepted level of risk for manned aircraft. Ideally, the FAA should set a threshold for acceptable risk that the private sector would have to meet or exceed to operate UAS. This would involve the FAA giving the private sector

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[27] "FAA Modernization and Reform Act of 2012," *U.S. Government Publishing Office.*

[28] Robert Atkinson, Daniel Castro, and Alan McQuinn, "ITIF Comments on the FAA Model Aircraft Rules," *Information Technology and Innovation Foundation*, July 24, 2014, http://www.itif.org/publications/itif-comments-faa-model-aircraft-rules.

more freedom to make improvements to UAS technology as long as those improvements reduce the actuarial risk of an accident.

The FAA should not simply replicate the rules applied to manned aircraft for UAS safety regulations. First, safety principles designed for manned aircraft do not always make sense for UAS. For example, the FAA's fundamental principle for collision avoidance in the NAS is to require aircraft operators to maintain vigilance "so as to see and avoid other aircraft."[29] This principle makes sense for manned aircraft, but makes less sense for UAS where operators are not necessarily located near the aircraft. Attempting to use a framework designed for manned aircraft results in unrealistic proposals such as rules prohibiting flights without line of sight and flights at night.[30] Second, at least for the near future, the speed of innovation for UAS is likely to exceed that of manned aircraft, so the FAA should create a regulatory framework that allows new innovations to quickly enter the market if they improve the safety and efficiency of UAS. For example, UAS operators should be allowed to fly using first-person view equipment that allows users to see and avoid other aircraft as if they themselves were in the aircraft as long as they can show the technology sufficiently mitigates risk. Similarly, if it proves effective, manufacturers should integrate software that safely lowers unmanned aircraft to the ground in the event of a disconnection between the aircraft and the UAS operator.[31] By creating flexible rules that allow companies to quickly seek and obtain approval for methods that improve safety, the FAA can help stimulate innovation.

Flexible, risk-based rules are especially important since certain types of UAS, such as micro UAS (also known as "micro drones") pose significantly less safety risk than others. Micro UAS weigh less than 4.4 pounds (2 kg), travel under 35 mph, and are required to be made of "frangible" material that breaks up or yields easily upon collision to lessen the damage of impact.[32] Because these vehicles break up upon contact, the safety risks for their use are significantly lower than for larger UAS. The FAA has proposed reducing some restrictions on micro UAS, such as the requirement that operators obtain a UAS operator certification, but it has kept others such as line-of-sight requirements and prohibitions on autonomous flight.[33]

This is progress, but any micro UAS rules should also be flexible, risk-based rules and should allow manufacturers of micro UAS more freedom to innovate. By adopting flexible rules, the FAA can allow low-

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[29] "Operation and Certification of Small Unmanned Aircraft Systems," *Federal Aviation Administration.*
[30] Ibid.
[31] Ibid.
[32] Ibid.
[33] Micro UAS are able to fly over people not involved with their use, Ibid.

risk applications of light-weight, micro UAS that it might prohibit in larger UAS. [34] For example, Sensefly's Ebee Ag micro UAS, used for agricultural purposes such as monitoring and mapping crops to assess their health, presents low safety risk with its wingspan of 38 inches and a weight of only 1.56 pounds.[35] The value of these micro UAS lie in their ability to methodically cross a field and stitch the images together into a single, high-resolution map. However, this is only possible with autonomous flight, which is prohibited under the proposed rules. The FAA should allow micro UAS to operate, even autonomously, if they meet the FAA-approved level of risk.

By allowing for a flexible, risk-based approach to UAS regulation, the FAA will encourage innovators to work in an expedient way to reduce risk and bring better, safer products and services to market. This forward-looking approach will allow for maximum innovation, lowering costs for this budding industry to the ultimate benefit of consumers. For example, a recent report estimates that if Amazon were allowed to deliver small packages with UAS technology, it could drive down costs for one-day delivery to one dollar.[36] Services like this would bring an unprecedented level of value and convenience to consumers.

CONCLUSION

The FAA has the ability to usher in a new wave of safety and innovation with its rule-making for small, commercial UAS. With this technology, energy companies, construction companies, and government transportation departments will be able to inspect their infrastructure without endangering workers. Search-and-rescue operations will be able to cover more ground and potentially save more lives. Artists, photographers, and cinematographers will be able to enhance their art by capturing high-quality photos and film with low-cost alternatives to helicopters. Journalists will be able to use UAS technologies to better cover disasters, weather, sports, and the environment. Farmers will be able to use drones to improve their efficiency, monitor their livestock, protect their crops, and cut their costs. Retailers will be able to deliver goods to

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[34] *See,* Matthew Bieschke and Brendan Schulman, "Petition of UAS America Fund, LLC to Adopt 14 C.F.R; Part 107 To Implement Operational Requirements for Micro Unmanned Aircraft Systems," *UAS America Fund*, December 18, 2014, http://www.kramerlevin.com/files/upload/UAS%20America%20Fund%20Petition%20Rulemaking.pdf.
[35] "eBee: The drone for precision agriculture," *senseFly*, accessed April 2, 2015, https://www.sensefly.com/fileadmin/user_upload/images/eBee-Ag-brochure.pdf.
[36] Spencer Soper, "Amazon Drones Could Deliver Packages for Just $1, Study Suggests," *Bloomberg Business*, April 10, 2015, http://www.bloomberg.com/news/articles/2015-04-10/amazon-drones-could-deliver-packages-for-just-1-study-suggests.

consumers faster and more efficiently. There could be vast improvement to Americans' daily lives if this technology is interwoven into society—including cost savings, innovative services, and more jobs.

Regulations should not thwart technological innovation, but rather be used to help spur desirable innovation.[37] The FAA should be firmly committed to bolstering U.S. competitiveness in UAS technology and promoting commercial UAS activity. To achieve this, it should commit to embracing technology neutrality and integrating a flexible, risk-based approach to safety concerns.

Sincerely,

Robert D. Atkinson
President and Founder, The Information Technology and Innovation Foundation

Daniel Castro
Vice President, The Information Technology and Innovation Foundation

Alan McQuinn
Research Assistant, The Information Technology and Innovation Foundation

[37] Joe Kennedy, "Reforming Regulation to Drive International Competitiveness," *Information Technology and Innovation Foundation*, March 16, 2015, http://www.itif.org/publications/reforming-regulation-drive-international-competitiveness; and Luke Stewart, "The Impact of Regulation on Innovation in the United States: A Cross-Industry Literature Review," *Information Technology and Innovation Foundation, November 14, 2011,* http://www.itif.org/publications/impact-regulation-innovation-united-states-cross-industry-literature-review.