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RULING THE SKIES OR DROWNING IN RULES? A LOOK AT THE FAA'S SLUGGISH PROGRESS IN DEVELOPING RULES AND FORCES THAT MIGHT BE SHAPING THE FUTURE OF DRONE USE IN THE UNITED STATES

Thomas D. Lovett[*]

INTRODUCTION

For many, the term drone probably conjures ominous ideas of science fiction and government secrecy like the "mind probe" droid Darth Vader employed to interrogate Princess Leia while captive aboard the Death Star,[1] or a CIA-operated surveillance system lurking around in the sky.[2] However, the reality of the matter is that human-drone interaction is no longer a concept of the future, but one of the present. More importantly, not all drones operate with suspicious intentions.[3] Drones possess unique characteristics that will ensure their usefulness in the future, and welcomed or not, they are ready to carve out their place in our society.[4] Countries across the globe are currently fielding the intricacies of making room for drone use, and the United States is no exception.[5] The American government has taken heed of a push for the use of drones in the United States.[6] However, the U.S. government's response has been unenthusiastic and continues to drag out. While the rest of the world's governments experiment with drone technology in their countries, the U.S. government continues to fiddle with a library of regulations that may inhibit the expansion of a potentially significant economic opportunity.[7]

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1. STAR WARS EPISODE IV: A NEW HOPE (Lucasfilm Ltd. 1977).
2. THE NOVEMBER MAN (Irish DreamTime SPD Films 2014).
3. *See* Kelsey D. Atherton, *Drones Make Good Jogging Companions*, POPULAR SCI. (Apr. 23, 2015), http://www.popsci.com/study-says-drones-make-good-jogging-companions; *Microsoft's Drones to Catch Mosquitos and Help Stop Epidemics*, BUS. STANDARD (June 16, 2015), http://www.business-standard.com/article/pti-stories/microsoft-s-drones-to-catch-mosquitoes-and-help-stop-epidemics-115061600347_1.html.
4. *Airplane Pilots Reporting Increase in Drone Encounters in the Sky*, CBS DENV. (May 4, 2015), http://denver.cbslocal.com/2015/05/04/airplane-pilots-reporting-increase-in-drone-encounters-in-the-sky/.
5. Larry Downes, *The FAA's Baby Steps Toward Private Drone Regulations Are Too Little Too Late*, WASH. POST (Feb. 16, 2015), http://www.washingtonpost.com/news/innovations/wp/2015/02/16/the-faas-baby-steps-toward-private-drone-regulations-are-too-little-too-late/.
6. FAA Modernization and Reform Act of 2012, Pub. L. 112-95 (2012) (Congress first acknowledged the need to address drone use by including provisions in the FAA Modernization and Reform Act of 2012 concerning drone technology in Title III, Subtitle B titled, Unmanned Aircraft Systems.).
7. Bart Jansen, *Watchdogs: FAA Won't Meet 2015 Deadline for Drone Safety*, USA TODAY (Feb. 5, 2014), http://www.usatoday.com/story/news/nation/2014/02/05/faa-drones-inspector-general-gao/5226427/.

Drones already have a strong presence in the United States.[8] The idea of regulating their operation is a natural one that makes sense. However, simply regulating a new technology from a blank slate is inefficient, futile, and disabling. From an economic perspective, the U.S. government is behind the curve in handling the integration of drone technology with the complex structure of today's society.[9] The Federal Aviation Administration (FAA), the government agency tasked with promulgating regulations for drone technology, seems to be taking steps in the wrong direction with its approach to drone regulation.[10] A more nourishing approach, one mindful of the immense economic impact drones have the potential to provide, would insulate the development of drone technology from overregulation that could severely handicap the United States in its never-ending fight to maintain economic dominance across the globe. According to the FAA's Unmanned Aircraft Systems (UAS) Roadmap, drones fit a category of aircraft known as Unmanned Aircraft (UA).[11]

The FAA defines an UA as:

> A device used or intended to be used for flight in the air that has no onboard pilot. This device excludes missiles, weapons, or exploding warheads, but includes all classes of airplanes, helicopters, airships, and powered-lift aircraft without an onboard pilot. UA do not include traditional balloons . . . rockets, tethered aircraft and un-powered gliders.[12]

Drones are referenced by many other names—Unmanned Aerial Vehicle (UAV) is one more worth mentioning.[13] This article examines the trajectory of drone use through the near future, explores issues surrounding the prospect of harmonizing commercial drone applications with everyday life, and suggests considerations and limits for regulating drones so as not to stifle their economic growth and contributions.

8. FED. AVIATION ADMIN., INTEGRATION OF CIVIL UNMANNED AIRCRAFT SYSTEMS (UAS) IN THE NATIONAL AIRSPACE SYSTEM (NAS) ROADMAP 6 (1st Ed. 2013).

9. Downes, *supra* note 5.

10. Kaveh Waddell, *CNN and FAA Team Up to Test Drones*, NAT'L J. (May 6, 2015), http://www.nationaljournal.com/tech/2015/05/06/CNN-FAA-Team-Up-Test-Drones (discussing the expectations of the FAA's new "Pathfinder" Program, the economic forces behind its creation, and the adverse effects of waiting to engage in this type of research).

11. FED. AVIATION ADMIN., *supra* note 8, at 8.

12. *Id.*

13. *See* Mark Edward Peterson, *The UAV and the Current and Future Regulatory Construct for Integration into the National Airspace System*, 71 J. AIR L. & COM. 521 (Summer 2006) (using the term Unmanned Aerial Vehicles throughout).

I. HISTORY OF DRONES AND A FUTURE OUTLOOK

A. Drone Use in the Past

Like Eli Whitney's cotton gin, the first steam-powered locomotive, or Steve Jobs' iPod, drones have their own story. Elmer Sperry is credited with being the first person to jumpstart the development of functional drones.[14] Sperry's efforts culminated in the successful testing of a Curtiss Sperry Aerial Torpedo, an event that many consider, "the first pilotless flight of a specifically designed pilotless aircraft."[15] Historically, drone technology and unmanned flight have not developed at the same pace as manned flight.[16] For the most part, government and military necessity have fueled the development of drone technology.[17] By the early 1920s, the U.S. Navy was integrating radio-controlled capabilities with airplanes.[18] The Navy's integration of radio-controls ultimately yielded the first remote-control flight of an aircraft without a pilot on board.[19]

World War II ushered in the first reliable drone applications.[20] The most notable advancements of this era were primarily combat-oriented—drones designed to safely deliver ordnance behind enemy lines.[21] From the Cold War through Vietnam, the United States shifted the focus of drone applications from unmanned bombers to intelligence gathering and surveillance missions.[22] Through the 1970s and 1980s, progress with drone technology waned in the United States, but other countries initiated further research and development.[23] Israel and Japan both made substantial progress with military drone programs, and Japan developed agricultural uses that demonstrated a successful model for commercial use.[24] Japan's success with agricultural drone operations is an accomplishment of which the FAA should take better notice. Agricultural drone applications would be an excellent avenue by which the FAA could provide a focused regulation in a short period of time. Allowing agricultural drone operations with defined regulations as soon as possible would be a significant advantage for the United States since agricultural uses are expected to account for the majority of commercial drone use in the near future.[25]

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14. LAURENCE R. NEWCOME, UNMANNED AVIATION, A BRIEF HISTORY OF UNMANNED AERIAL VEHICLES 15 (2004).

15. Peterson, *supra* note 13, at 521, 538–39 (Although the Curtiss Sperry Aerial Torpedo did not incorporate remote-control capability, it was a significant step toward the modern drone—it incorporated gyrostabilizers to allow the aircraft to pilot itself for nearly 1000 yards.).

16. NEWCOME, *supra* note 14.

17. Peterson, *supra* note 13, at 541–46.

18. *Id.* at 540.

19. NEWCOME, *supra* note 14, at 37–38.

20. Peterson, *supra* note 13, at 521, 542.

21. NEWCOME, *supra* note 14, at 68–69 (describing the U.S. Navy's TDR-1 Assault Drone, which dropped explosive ordnance on Japanese targets and later developed the capability to drop its payload and then direct the aircraft itself into an enemy target in a final attack).

22. Peterson, *supra* note 13, at 521, 543.

23. *Id.* at 545–46.

24. *Id.* at 546.

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

B. Drone Use Now

Today, drones enjoy a wide variety of applications and can fairly be characterized as a common item.[26] Current successful uses for drones include hurricane hunting, 3-D mapping, wildlife conservation, agricultural development, and search and rescue.[27] While agricultural drone technology is just emerging in the United States, it is currently widespread in other countries[28] and has been that way for years.[29] Other current uses include: wildfire mapping, disaster management, law enforcement, telecommunication, oil and gas exploration, and freight transport.[30] The 2013 Economic Impact Report released by the Association for Unmanned Vehicle Systems International (AUVSI) acknowledged that, "[b]ecause of current airspace restrictions, non-defense use of UAS has been extremely limited."[31] However, the report outlined the utility of drones and expressed some motives for getting this technology in the air: "[p]resent-day UAS have longer operational duration and require less maintenance than earlier models . . . . In addition, they can be operated remotely using more fuel efficient technologies . . . . These aircraft can be deployed in a number of different terrains and may be less dependent on prepared runways."[32] Drone technology has grown extensively to date, and the current frustration with the FAA's failure to adequately address regulation issues is only a temporary setback for its continued progression.

C. Drone Use in the Future

Anticipated uses for drone technology offer a promising outlook. From an economic standpoint, American businesses are poised to expand the commercial drone market as far and as fast as possible.[33] Despite regulatory uncertainty, six of the most prolific commercial drone companies have recently attracted wealthy investors.[34] The financial backing that those investors are considering is substantial—potentially hundreds of millions of dollars.[35] Even more encouraging,

26. Tom Risen, *Drone Market Grows at CES 2015*, U.S. NEWS (Jan. 8, 2014), http://www.usnews.com/news/articles/2015/01/08/faa-touts-growing-drone-market-at-ces-2015 (discussing a growing interest in drone technology and industry efforts to supply a growing consumer base).

27. Brian Handwerk, *5 Surprising Drone Uses (Besides Amazon Delivery)*, NAT'L GEOGRAPHIC (Dec. 2, 2013), http://news.nationalgeographic.com/news/2013/12/131202-drone-uav-uas-amazon-octocopter-bezos-science-aircraft-unmanned-robot/.

28. Christopher Doering, *Growing Use of Drones Poised to Transform Agriculture*, USA TODAY (Nov. 23, 2014), http://www.usatoday.com/story/money/business/2014/03/23/drones-agriculture-growth/6665561/, *archived at* http://perma.cc/3T8Q-C4ED (listing other countries that use drones for agriculture: Canada, Australia, Japan, and Brazil).

29. Saurabh Anand, *Hovering on the Horizon: Civilian Unmanned Aircraft*, 26 AIR & SPACE L. 9, 9–10 (2013) (pointing out that Japanese farmers have been using drones for more than twenty years).

30. JENKINS & VASIGH, *supra* note 25.

31. *Id.*

32. *Id.*

33. W.J. Hennigan and Melody Petersen, *California's Commercial Drone Industry Is Taking Off*, ORLANDO SENTINEL (June 13, 2015), http://www.orlandosentinel.com/business/la-fi-drones-20150614-story.html#page=1.

34. *Id.*

35. *Id.*

all of these companies are headquartered in the United States.[36] The FAA realizes the potential that drone technology has to expand in several fields.[37] First, security awareness includes uses for disaster response, search, and support to rescuers.[38] Second, communications and broadcast uses include news/sporting event coverage.[39] A third, and highly controversial, use will be cargo transport.[40] Fourth, spectral and thermal analysis uses can provide critical infrastructure monitoring for power facilities, ports, and pipelines.[41] And finally, popular commercial uses like photography, aerial mapping and charting, and advertising.[42]

The expected applications for drone technology are constantly growing. However, the agriculture industry, perhaps more so than any other, looks for drones to make a tremendous impact on techniques, efficiency, and effectiveness in its operations.[43] Along with public safety, agriculture is expected to cover ninety percent of the potential markets for drones in the United States.[44] Moreover, the agricultural industry is very unique in the contested atmosphere of commercial drones, privacy, and safety. First, agricultural drone use would occur almost exclusively in low-populated areas.[45] The locations where drones will be employed for these agricultural uses should alleviate the FAA's concerns about safety and should therefore justify an exception for agricultural uses. Specifically, precision agriculture will be the main thoroughfare of commercial drone use.[46] The immense potential for agricultural drones is more easily understood after a look at the potential uses.

> Precision agriculture refers to two segments of the farm market: remote sensing and precision application. A variety of remote sensors are being used to scan plants for health problems, record growth rates and hydration, and locate disease outbreaks. Such sensors can be attached to ground vehicles, aerial vehicles and even aerospace satellites. Precision application, a practice especially useful for crop farmers and horticulturists, utilizes effective and efficient spray techniques to more selectively cover plants and fields.[47]

The future of drones in the United States is bright. The FAA's regulation blunders will only impede commercial drone applications in the United States for so

36. *Id.*
37. FED. AVIATION ADMIN., *supra* note 8, at 7.
38. *Id.*
39. *Id.*
40. *Id.*
41. *Id.*
42. *Id.*
43. *See* Doering, *supra* note 28.
44. JENKINS & VASIGH, *supra* note 25, at 2.
45. Doering, *supra* note 28.
46. JENKINS & VASIGH, *supra* note 25, at 2.
47. *Id.*

long. In fact, drone operators are already crossing into gray areas just to advance their commercial interests.[48]

II. PROBLEMS WITH REGULATIONS

The FAA faces an unprecedented task in creating regulations for drone technology. Analyzing the creation of regulations for a new platform of technology yields a variety of issues. First, a look at how the FAA regulates aircraft generally is key to understanding the complexities of integrating drone technology. Second, an evaluation of the FAA's authority to regulate drones reveals an important issue that might explain the inefficiency associated with the FAA's construction of rules. Third, analysis of the inherent challenges of regulating drone technology reveals why a comprehensive set of rules at the outset is not realistic. Fourth, a comparison of different countries' approaches to regulating drone technology illuminates the weaknesses of the FAA's approach.

A. How the FAA Regulates Aircraft

The FAA was created as the Federal Aviation Agency in 1958 "to provide for the regulation and promotion of civil aviation in such manner as to best foster its development and safety, and to provide for the safe and efficient use of the airspace by both civil and military aircraft, and for other purposes."[49] In 1966, Congress moved to consolidate national transportation matters under a Department of Transportation.[50] When the Department of Transportation became active in 1967, the Federal Aviation Agency became the Federal Aviation Administration.[51] The Federal Aviation Regulations (FARs) were codified by Congress under Title 14–Aeronautics and Space–of the Code of Federal Regulations.[52] Additional relevant regulations created by the Transportation Security Administration (TSA) appear in Title 49 of the United States Code.[53] The FARs cover Part 1 through Part 95 of Title 14.[54]

Part 11 outlines the FAA's rulemaking process.[55] The FAA creates rules in accordance with the Administrative Procedure Act (APA).[56] The FAA may propose, adopt, amend, or repeal regulations by issuing one or more documents: 1) an advance notice of proposed rulemaking; 2) a notice of proposed rulemaking; 3) a supplemental notice of proposed rulemaking; 4) a final rule; 5) a final rule with request for comments; and/or 6) a direct final rule.[57]

48. *See* Huerta v. Pirker, N.T.S.B. Order No. EA-5730 (2014).
49. Fed. Aviation Act of 1958, Pub. L. No. 85-726, 731 (1958).
50. *From Agency to Administration*, FED. AVIATION ADMIN. (Feb. 19, 2015, 4:23 PM), https://www.faa.gov/about/history/brief_history/#agency.
51. *Id.*
52. Fed. Aviation Reg., 14 C.F.R. §§ 1.1–198.17 (2015).
53. 49 U.S.C. §§ 40101–46507 (2015).
54. 14 C.F.R. §§ 1.1–198.17.
55. *Id.* §§ 11.3–11.19.
56. *Id.* § 11.25.
57. *Id.*

The FAA regulates airspace with a class system.[58] The complexity of the FAA's airspace regulations poses a daunting hurdle to swift and effective drone regulations. The FAA has six different classes of airspace and additional provisions for restricted and prohibited areas.[59] Primarily, the FAA classifies airspace in two categories: regulatory and non-regulatory.[60] Regulatory airspace will be the focus of attention for dealing with commercial drone technology. The regulatory classes are comprised of Class A, B, C, D, and E airspace areas, as well as restricted and prohibited areas.[61] Class A airspace covers elevations between 18,000 feet and 60,000 feet.[62] Class B airspace targets the airspace around major airports and creates a type of inverted circular-pyramid shape up to 10,000 feet.[63] Class C airspace focuses on the airspace around smaller airports and usually includes elevations up to 4000 feet.[64] Class D airspace controls the airspace around airports with only an operational control tower from ground level to 2500 feet.[65] Generally, Class E airspace extends from 1200 feet to 17,999 feet.[66] Additionally, Class E airspace may consist of any airspace that does not qualify as Class A, B, C, or D airspace.[67]

The complex network of airspaces that the FAA has developed for regulating manned aircraft creates a dilemma for drones. The FAA's policy statement regarding drones can be found in the UAS Roadmap, a regulatory plan mandated by the FAA Modernization and Reform Act of 2012: "The FAA is responsible for developing plans and policy for the safe and efficient use of the United States' navigable airspace."[68] Those responsibilities include "coordinating efforts with national security and privacy policies so that the integration of UAS into the National Airspace System is done in a manner that supports and maintains the United States Government's ability to secure the airspace and addresses privacy concerns."[69] The plan looks to ensure that "the FAA will harmonize, when appropriate, with the international community for the mutual development of civil aviation in a safe and orderly manner."[70] Although the FAA's classification of airspace works great for manned aircraft, the classification system was not designed to accommodate drone technology.[71] Concepts for the assimilation of drone technology into the national airspace are forthcoming, but special consideration must be given to the fact that regulation of the national airspace currently only imagines manned aircraft.[72]

58. *Id.* §§ 91.126–91.135.
59. *Id.* §§ 71.31–71.71.
60. FED. AVIATION ADMIN., *Aeronautical Information Manual*, Ch. 3-1-1 (a)(1), (2) (2015).
61. *Id.*
62. 14 C.F.R. § 71.33.
63. *Aeronautical Information Manual*, *supra* note 60 at Ch. 3-2-3 (a) (referencing a diagram in *Fig* 3-2-1, which depicts the inverted circular-pyramid shape).
64. *Id.* (Class C airspace has a structure of airspace around airports similar to that of Class B airspace.).
65. *Id.* at Ch. 3-2-5 (a).
66. *Id.* at Ch. 3-2-6 (d), (e)(5).
67. *Id.* at Ch. 3-2-6 (a).
68. FED. AVIATION ADMIN., *supra* note 8, at 9.
69. *Id.*
70. *Id.*
71. Stefan A. Kaiser, *UAV's: Their Integration into Non-Segregated Airspace*, 36 AIR & SPACE L. 161, 165–69 (2011).
72. *Id.* at 168.

B. The FAA's Authority to Regulate Drones

Many would argue that because drones fly, the FAA's authority to regulate them is firmly settled. However, neither of the definition sections in Title 49 of the United States Code[73] nor Title 14 of the Code of Federal Regulations mentions drones at all.[74] Importantly, many of the definitions in those statutes and regulations are applicable to various aspects of drone use.[75] Nonetheless, the absence of a specific item in the statutory grants of authority for the FAA illuminates some doubt as to whether Congress has appropriately conferred the power to govern drones to the FAA.[76] Congress' FAA Modernization and Reform Act of 2012 delivered some guidance on basic questions of drone regulation.[77] However, two other points undermine the notion that the FAA has authority to regulate drones.[78]

First, even supposing that the FAA does have authority to regulate drones, its actions have been inconsistent with that duty.[79] Second, the FAA Modernization and Reform Act of 2012 did not provide confirmation of the FAA's authority to regulate drones.[80] The FAA Modernization and Reform Act of 2012 merely asked the FAA to integrate drones with the national airspace and develop a set of regulations for drone use; it did not expressly grant authority to govern drones.[81] Ultimately, the FAA will have full authority over drone activity in the United States; however, the current status of that authority poses an interesting question in the face of frustrating obstacles for would-be commercial drone users. Additionally, the remote control characteristics of most drone products may pose a challenge of authority with the Federal Communications Commission.

C. The Challenges of Regulating Drones

A smaller concern with regulating drones may be found in the difficulty of appeasing the lobbying efforts associated with this new endeavor. Surely UPS and FedEx, two of the most critical players in the success of online ordering, have a lot to lose if drone technology can become a viable alternative to delivering packages ordered from the internet. Amazon.com's (Amazon) recent plans to utilize drone technology for faster shipping pose a major threat to UPS and FedEx's share of the economic value in online sales. Another difficulty of regulating drones is their potential for innovation.

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73. 49 U.S.C. § 40102 (2012).
74. 14 C.F.R. § 1.1.
75. 49 U.S.C. § 40102; 14 C.F.R. § 1.1.
76. John Frank Weaver, *Free the Beer Drones, Maybe the FAA Doesn't Have the Authority to Regulate Unmanned Aerial Vehicles*, SLATE (Mar. 5, 2014), http://www.slate.com/articles/technology/future_tense/2014/03/faa_drone_regulations_the_agency_might_not_have_the_authority_to_regulate.html.
77. FAA Modernization and Reform Act of 2012, Pub. L. 112-95 (2012).
78. Weaver, *supra* note 76.
79. *Id.*
80. *Id.*
81. FAA Modernization and Reform Act of 2012, Pub. L. 112-95 (2012).

D. The FAA Is Behind the International Curve

The United States is currently trailing other countries in the effort to integrate drone technology with national airspace.[82] Specifically, Australia, Japan, and the United Kingdom are a step ahead of the FAA in this process.[83]

1. Australia

Within its Civil Aviation Safety Regulations (CASR), Australia's aviation authority, the Civil Aviation Safety Authority (CASA), has already created Part 101 for regulation of Unmanned Aircraft and Rocket Operations.[84] The CASA has also produced several Advisory Circulars (AC) for UAV Operations, Design Specifications, and Maintenance and Training of Human Resources. With respect to commercial drone activity, the CASA requires an operator certificate (OC).[85] The OC may be acquired by different standards from that of the Air Operator Certificate (AOC) used for manned aircraft.[86]

Additionally, drone operators must complete a number of other requirements: 1) obtain a certificate of airworthiness in a "Restricted" or "Experimental" category; 2) obtain a radio operator's certificate of proficiency; 3) pass an aviation license theory exam; 4) pass an instrument rating theory exam; 5) complete an operations course conducted by the drone's manufacturer; and 6) have at least five hours of operation time.[87] The CASA's approach to integrating drone technology with national airspace is easy. The CASA requires any UAV "to fully adhere to all requirements, including equipment and ATC regulations, placed upon pilot-on-board aircraft operating in the same class of airspace."[88]

2. Japan

Japan's immense agricultural industry has driven the development of the most effective model for drone integration in the world.[89] Japan's approach is fairly simple: the Japanese Ministry of Agriculture, Forest, and Fisheries (MAFF) and the Japanese Agricultural Aviation Association (JAAA) developed safety standards for drone technology including flight performance, airframes, inspection, and maintenance.[90] The JAAA's regulations operate a registration system for drones and their operators, and also mandates that pilots obtain training and certification specifically for drones.[91] The FAA should consider a similar streamlined approach whereby commercial drone use could flourish and simultaneously help shape the

82. Peterson, *supra* note 13, at 583.
83. *Id.*
84. *Id.*
85. *Id.*
86. *Id.*
87. *Id.*
88. Peterson, *supra* note 13, at 583.
89. *Id.*
90. *Id.*
91. *Id.*

future of drone regulations. Focusing on quick regulations for agricultural uses, or even adopting a similar version of regulations to those of the JAAA just to get agricultural drones operating across the country would not only be of great economic benefit but could also develop a model for regulations addressing drone use in urban environments.

3. The United Kingdom

The United Kingdom's Civil Airspace Authority (CAA) first reacted to drone technology with regulations for "Unmanned Aerial Vehicle Operations in UK Airspace–Guidance" (CAP 722).[92] The United Kingdom has since relinquished regulatory authority to the European Union, the Joint Aviation Authorities of Europe, and the European Organization for the Safety of Air Navigation, but the CAA's regulations are still helpful in addressing the FAA's options.[93] Like Australia, CAP 722 provided for safety and operation standards equivalent to those of manned aircraft.[94] However, CAP 722 delegated authority to impose even stricter standards than those of manned aircraft.[95] The European Union created a task force to handle drone regulations.[96] The task force developed recommendations for regulating light UAVs weighing less than 330.7 pounds.[97] The task force's recommendations utilized a kinetic energy standard by which to measure the safety hazards associated with particular drones, a standard created by the CAA in its "CAA Light UAC Policy."[98]

The CAP 722 also categorized drones into different classes based upon the type of airspace in which they would be used.[99] The FAA has recently reacted in a similar way by creating a class of drone that will have an easier time obtaining exemptions to fly.[100] However, the FAA could take a closer look at the regulatory concepts of these three countries and integrate their more streamlined approach in making drone regulations in the United States.

III. PROPOSED APPROACH TO REGULATING AND BENEFITS THAT MAY BE DERIVED

Difficulty inheres with the task of creating law for any new technology, and the same is true for drone regulations. History has taught us that the creation of law is always a complex undertaking involving innumerable considerations. Nonetheless, the creation of law does not occur in a vacuum. The law develops and adapts as the need arises, and while foresight is crucial to creating new laws, it cannot be the sole

92. *Id.*
93. *Id.*
94. Peterson, *supra* note 13, at 583.
95. *Id.*
96. *Id.*
97. *Id.*
98. *Id.*
99. *Id.*
100. John Goglia, *FAA Speeds Up Small Drone Exemptions. But Why Not Just Issue Blanket Exemption?*, FORBES (Apr. 12, 2015), http://www.forbes.com/sites/johngoglia/2015/04/12/faa-speeds-up-small-drone-exemptions-but-why-not-just-issue-blanket-exemption/.

focus. The FAA appears to have a mindset that drone regulations should be perfect and complete, ready to resolve any issues that may arise with regard to the legal impact of drones. Such an outlook is just unrealistic. The FAA's approach to drone regulations is taking far too long and ruining valuable opportunities.[101] A more relaxed approach in developing these regulations would ease the strain on economic drone expansion. First, the FAA should consider lowering the barrier to entry of the drone market. More specifically, the FAA should focus on creating rules for agricultural drone uses. Second, the FAA should place more focus on the economic benefits for the country as a whole, and absorb less influence from lobby groups opposed to drone technology. Third, the FAA should go ahead and settle on a set of rules and improve them as needed, allowing society and the economy to dictate what is necessary and most effective. Finally, a cost-benefit analysis will show what the United States has to gain if the FAA adopted a less cumbersome approach.

The first point of action, lowering the entry barrier to the drone market, would be a simple change that could make a world of difference in the U.S. economy. Large corporations, like Amazon, GoogleX, and GoPro, seeking to harness drone technology to expand their services have had great difficulty in developing drone programs in the United States.[102] Even more troubling however, is the difficulty that small businesses are encountering as they attempt to utilize drones for their work.[103] The difficulty of accessing the drone market in America is easy to see. The FAA's current practice for issuing authorization to commercially operate drones relies on a conditional, temporary certification system.[104] The FAA's system requires those seeking to utilize drones for commercial purposes to obtain a Certificate of Authorization.[105] Typically, the FAA's handling of certificate applications is sluggish.[106]

The second point of action, controlling the influence of lobby groups and focusing on what is best for the country, might not be as realistic as the first but would still foster the most beneficial outcome for regulations. The third point of action, asking the FAA to promptly set rules and allow society and the economy to dictate how those rules should be molded, would boost the development of drone technology in America.

Lastly, if the FAA integrated these alternative approaches in its effort to regulate drones, the United States might be in a better position to secure another foothold at the forefront of economic development. The integration of drones into the national airspace is projected to attract jobs and economic opportunity.[107] The AUVSI Economic Impact Report details the expected economic effects of drone technology

101. Mike Snider & Bart Jansen, *Amazon Among Companies Asking FAA to Expand Drone Rules*, USA TODAY (Apr. 27, 2015), http://www.usatoday.com/story/tech/2015/04/27/amazon-drones-faa/26448759/.
102. *Id.*
103. *See* Huerta v. Pirker, N.T.S.B. Order No. EA-5730 (2014).
104. Mariella Moon, *Amazon Can Finally Test Its Delivery Drones in the US*, ENGADGET (Apr. 10, 2015), http://www.engadget.com/2015/04/10/amazon-drone-testing-faa-us/.
105. *Id.*
106. *Id.*
107. JENKINS & VASIGH, *supra* note 25, at 20.

in the United States.[108] The report concluded that beginning in 2015, the first three years of integrating drones into the national airspace would likely have a $13.6 billion economic impact.[109] The economic impact of drones is expected to increase through 2025, totaling $82.1 billion in economic benefit.[110] The report indicates that the integration of drones will generate over 34,000 manufacturing jobs and over 70,000 new jobs in the first three years, and the next seven years will total to a combined 103,766 new job opportunities.[111]

The fact that drones hold vast potential for economic growth in the United States is not surprising. The concern is how much is slipping through the cracks while the FAA fumbles with a scheme of regulations. The Economic Impact Report estimates, "every year that integration is delayed, the United States loses more than $10 billion in potential economic impact."[112] The FAA's concerns with integrating drone technology, including safety and privacy, and the loss figure presented by the Economic Impact Report represent the cost portion of the cost-benefit analysis. The Economic Impact Report's projections for economic impact represent the benefit portion of the cost-benefit analysis. Evaluating the less restrictive approaches of other countries can help weigh the cost of safety and privacy in this analysis, and the Economic Impact Report is straightforward about the expected benefits and losses.

The benefits of a drone-friendly regulatory approach go beyond economics. Aside from the billions of dollars that drone technology can inject into the American economy once it is integrated, the environment can hope to benefit as well. One example is the more efficient drone delivery of fertilizer and pesticides that can cut costs and curb the environmental impact of inefficient spraying techniques.[113] Other benefits include the enhancement of public safety services. Additionally, the United States will experience indirect economic impacts that help justify a new approach.[114]

The costs of a drone-friendly regulatory approach are notable. However, with the value of the economic opportunities at stake, and the current state of the world economy, opposing a more drone-friendly regulatory approach does not seem sensible. The costs associated with a market-friendly approach are primarily safety and privacy. The safety concern here is that dangerous, reckless operation will ensue if the FAA were to hastily assemble a set of regulations in an effort to stimulate the drone market in the United States. Irrespective of whether the FAA takes years to plan out every safety feature of the regulatory structure and "gets everything right," a new issue will always arise that invites re-evaluation and modification. The inherent imperfections of any new regulatory scheme for an emerging technology

108. *Id.* (analyzing different factors to project economic impact for a 10 year range).
109. *Id.* at 2.
110. *Id.*
111. *Id.*
112. *Id.* (the report breaks that value down into the amount of loss the United States experiences each day integration is delayed, finding a daily loss of $27.6 million in potential economic impact).
113. JENKINS & VASIGH, *supra* note 25.
114. *Id.* at 10 (describing indirect impacts as those effects on the businesses that provide ancillary services to drone manufacturers, to include: "Ancillary business expansion due to the UAS firm; New capital investment in response to the UAS firm, and Supplies and equipment that may be purchased because of the new business opportunities created by the UAS manufacturing facility").

weigh against the concerns posed by those supporting the FAA's current approach in the name of safety. The FAA has tools at its disposal that are capable of responding to changes as they arise.[115] Administrative directives would easily allow the FAA to tweak and correct those issues.

The privacy concern here is that drones will allow new ways to breach property interests; such concerns are not without merit.[116] However, property law and privacy matters should be left to the individual states. In fact, states have met such concerns with a positive response, and many state property and privacy laws already provide protection against the ways a drone could be used to violate those rights.[117] Consequently, privacy concerns should not prevent the FAA from creating a final set of rules.

CONCLUSION

The FAA's lethargic reaction to drone technology can fairly be held responsible for creating a major loss of economic opportunity.[118] Nonetheless, drone technology continues to push for a chance to thrive.[119] Only recently has the FAA reacted positively to the widespread desire for utilizing commercial drone applications.[120] Once the FAA produces a final set of rules for drones, there will be time to smooth out any remaining kinks. The dilemma now is that drone technology is at a critical stage, waiting to bolster the American economy and bestow its many benefits. The FAA's recognition for the need to support expansion of drone technology in the United States is imperative to economic growth, but the recent trend for approval of more exemptions is a good start.

Ultimately, the FAA should have already presented a regulatory scheme for agricultural drone applications. Not to say there is no merit to the FAA's cautious approach, but to say that the unique features of agricultural drone applications make that industry an exception where such caution is less justified. Therefore, the FAA should go ahead and authorize the use of drones for agricultural purposes and reserve the burdensome certification process for other uses. The FAA should limit the requirements for someone to operate a drone for agricultural use to something similar for traditional aircraft. To have drone technology take flight in the United States, on a large scale, even if only for agricultural use, would be a substantial boost for the American economy. Additionally, through part of that regulatory framework, the FAA could monitor these "agricultural use only" drones to collect data that could enhance drone regulations, make the FAA more confident in its regulatory role, and thereby hasten its promulgation of rules.

115. *See Temporary Flight Restriction Notices*, FED. AVIATION ADMIN., http://tfr.faa.gov/tfr2/list.html (last visited Mar. 3, 2016).
116. *See* Michael Marois, *Creeps Embrace a New Tool: Peeping Drones*, BLOOMBERG BUS. (May 5, 2015), http://www.bloomberg.com/news/articles/2015-05-05/creeps-embrace-a-new-tool-peeping-drones (discussing privacy concerns associated with drones); Katie Kim, *Downed Drone Spooks Neighbors*, NBC CHI. (Apr. 13, 2015), http://www.nbcchicago.com/news/local/old-town-chicago-drone-299640321.html.
117. *Id.*
118. JENKINS & VASIGH, *supra* note 25.
119. Snider & Jansen, *supra* note 101.
120. Goglia, *supra* note 100.