Maurer School of Law: Indiana University
Digital Repository @ Maurer Law

Indiana Journal of Global Legal Studies

Volume 25 | Issue 1 Article 20

2-14-2018

The Japanese Impact on Global Drone Policy and Law: Why a Laggard United States and Other Nations Should Look to Japan in the Context of Drone Usage

Kaitlin D. Sheets
Indiana University Maurer School of Law, kdsheets@indiana.edu

The Japanese Impact on Global Drone Policy and Law: Why a Laggard United States and Other Nations Should Look to Japan in the Context of Drone Usage

KAITLIN D. SHEETS*

ABSTRACT

The global Unmanned Aircraft System, or unmanned aerial systems (UAS) revolution is poised to have an impact across a broad range of industries from agriculture to filmmaking. The United States has taken a difficult and slower path to implementing UAS policy, with Congress essentially mandating the Federal Aviation Administration (FAA) to take action in 2015. The FAA's 624-page rulebook marks the first attempt of any comprehensive plan to regulate remote-controlled and commercial aircraft activity. Across the globe, Japan, a country with a proven track record in electronics and technology, is outpacing other countries in devising regulations that will increase UAS use to benefit the nation's citizens. This paper argues that Japan's historical experience with unmanned aviation vehicles (UAVS), beginning mainly in the 1980s in the agricultural sector, allowed the Japanese government to coalesce more quickly in revising their civil aviation law than most developed countries. This note examines Japan's influence on UAS policy with the formation of regulations and adoption of new technology. More specifically, it looks at the United States as a case study as evidence of Japan's influence on other developed nations.

INTRODUCTION

UAS, more commonly known as drones, are increasingly dominating the world landscape.[1] Globally, drone sales are projected to reach 9.4

* Executive Symposium Editor, *Indiana Journal of Global Legal Studies*, Volume 25; Juris Doctor Candidate, 2018, Indiana University Maurer School of Law; Bachelor of Arts, 2015, Denison University. I would like to thank Professor David P. Fidler for his guidance. I would also like to thank my parents and sister for their unwavering support.

Indiana Journal of Global Legal Studies Vol. 25 #1 (Spring 2018)

million units in 2016, with $3 billion in expected revenue.[2] North America, mainly the United States, led the global UAS market in 2013 with 61 percent of the market share, followed by the Asia-Pacific region with a 20 percent share.[3] Both commercial and civil UAS industries are gaining global traction and popularity with the general public, and as drones become more affordable and widely used, regulations and legislation will determine whether this innovative technology "flourishes or falters."[4]

For the global commercial and civilian UAS markets to continue growing, countries must create national and international regulatory frameworks to monitor this technology. Between 2007 and 2011, various first world countries, such as Canada, Australia, and the United Kingdom, took concrete steps to adopt regulations for civilian and commercial drone usage.[5] However, the United States, typically an innovative world leader, is lagging behind in issuing drone regulations, with the FAA.

One Asia-Pacific country has been regulating commercial and civil drones since the 1980s: the island nation of Japan. In Japan, rice farmers have utilized UAS to deliver fertilizer and dust crops for over twenty years.[6] By 1999, Japanese farmers were already operating more than 2,000 domestically produced UAS for "crop spraying, fertilizing, and seeding purposes."[7] Currently, drone technology has exploded within Japanese culture, and the government has taken steps to regulate both commercial and civilian drone usage.

This article addresses how Japan's historical experience with drone technology allowed it to create a civilian and commercial drone regulatory framework more quickly than other nations, including the United States. Part I explores the Japanese and American experiences with drone technology and related historical trends. Part II lays out the American and Japanese approaches to passing and implementing recent drone legislation. Part III compares major components of the FAA's Part 107 to the recent Japanese Diet amendments and suggests that the United States should adopt a similar legislative strategy to become an

---

1. *See* Elena Magriña, *The Global Race for Drone Regulation*, INLINE (June 27, 2014), http://inlinepolicy.com/2014/the-global-race-for-drone-regulation/.

2. *See id.*

3. INEA CONSULTING, GLOBAL COMMERCIAL AND CIVIL UAV MARKET GUIDE 2014-2015, at 7 (last modified Oct. 14, 2014), https://www.slideshare.net/terrai/global-commercialandciviluavmarketguide20142015.

4. *See* Magriña, *supra* note 1.

5. INEA CONSULTING, *supra* note 3, at 10.

6. KONSTANTINOS DALAMAGKIDIS ET AL., ON INTEGRATING UNMANNED AIRCRAFT SYSTEMS INTO THE NATIONAL AIRSPACE SYSTEM 74 (S.G. Tzafestas ed., 2d ed. 2011).

7. Brad Bolman, *A Prairie Drone Companion*, 16 CULTURE MACHINE 2 (2015).

equal player on the world stage. Part IV is a case study examining how the decades-old Japanese unmanned helicopter technology is making its way into American and New Zealand vineyards. This section argues that inaction by the FAA prevented this beneficial technology from reaching the United States in a timely fashion in contrast to other developed nations. Part V examines how the differences between Japan and other nation's UAS interest groups have impacted their attempts to create regulations that would allow for greater commercialization of drones. In short, looking to the United States as a case study, this article argues that the United States and other developed nations should look to Japan for guidance as UAS technology expands into the future.

I. THE JAPANESE AND AMERICAN DRONE EXPERIENCE

Japan's experience with unmanned aircraft stretches far into history. During World War II, the Japanese military launched assassin "balloon bombs": weapons that could float across the Pacific Ocean and ignite fires on America's Pacific coastline.[8] The Japanese military buoyed these explosive devices across the ocean by a jet stream.[9] Japanese war records indicate that the military launched over 9,000 balloons between November 1944 and April 1945.[10]

After the war, Japanese farmers began utilizing manned helicopters for chemical crop spraying in 1958. However, Japan's first experience with unmanned remote aircraft began in the 1980s within the agriculture sector. As rural farmers began utilizing unmanned helicopters to spray their rice crops, UAS found a permanent foothold among rice paddies in the Japanese countryside. [11]

In 1983, the Japanese Ministry of Agriculture, Forestry and Fisheries approached the manufacturing giant Yamaha Motor Company to develop unmanned helicopters for crop dusting purposes[12] because the Ministry was concerned with an aging work force that was unable to engage in heavy labor.[13] Additionally, the Ministry wanted Yamaha to design a larger unmanned crop duster that could hold more chemicals,

8. *See* Johnna Rizzo, *Japan's Secret WWII Weapon: Balloon Bombs*, NAT'L GEOGRAPHIC (May 27, 2013), http://news.nationalgeographic.com/news/2013/05/130527-map-video-balloon-bomb-wwii-japanese-air-current-jet-stream/.

9. *See id.*

10. *Id.*

11. *See* Bolman, *supra* note 7, at 2.

12. *See* Mike Hanlon, *Yamaha's RMAX - The Worlds Most Advanced Non-military UAV*, NEW ATLAS (June 4, 2004), https://newatlas.com/go/2440/.

13. *See* Akira Sato, *The RMAX Helicopter UAV*, YAMAHA MOTOR COMPANY (Sept. 3, 2003), http://www.dtic.mil/dtic/tr/fulltext/u2/a427393.pdf.

which would make farming more efficient by reducing unnecessary labor.[14]

Yamaha developed a number of prototype models, ending with the "RMAX Helicopter," the latest industrial agriculture UAS.[15] The model officially debuted for commercial purchase in 1997, and it became Yamaha's first unmanned helicopter with a control device built into the main body of the helicopter.[16] Engineers enabled the craft to carry a load capacity of thirty kilograms, made possible by the featured "liquid-cooled, 2-stroke 246cc (7.56 horsepower) engine."[17] Today, there are over 2,400 RMAX helicopters flying in Japanese airspace, and the total area of farmland sprayed by RMAX unmanned devices has reached over 310,000 hectares.[18] In fact, the use of these helicopters has become so widespread that chemical drones air-spray about one in three bowls of rice consumed in Japanese households.[19]

What sets Japan apart from many other countries, including the United States, is how drone technology is fully integrated within Japanese society and culture. Since the early 2000s, unmanned helicopter use in Japan expanded outside agriculture and became normalized within the Japanese way of life. For example, with Japan's frequent volcanic activity, drones are visibly active in detecting and mapping volcanic eruptions throughout the country. In April 2002, a Yamaha RMAX observed the eruption of Mount Usu in Hokkaido, Japan, making it the first successful helicopter operation performed out of the range of sight.[20] In addition to monitoring volcanic activity, drones have become a staple in many marketing campaigns; a recent advertisement by the Japanese tech company MicroAd used a fleet of remote controlled UAS to carry out a "ballet" performance in front of Fuji Mountain. The drones were fitted with over 16,500 LED lights that danced to traditional Japanese shamisen music.[21]

Additionally, drones became invaluable in dealing with humanitarian crises, most visibly in inspecting the crippled Fukushima

---

14. *See id.*

15. *Japan's Agricultural Drones*, THE FINANCIAL TIMES (July 1, 2015), http://video.ft.com/4331693096001/Japans-agricultural-drones/Companies.

16. *See* Sato, *supra* note 13, at 3.

17. *See id.*

18. *See* Sato, *supra* note 13, at 5.

19. *See* Hanlon, *supra* note 12.

20. *See id.*

21. *See Japanese Tech Company Creates Mesmerizing Drone Ballet Ad*, NEWS.COM.AU (May 2, 2016), http://www.news.com.au/technology/innovation/design/japanese-tech-company-creates-mesmerising-drone-ballet-ad/news-story/ca01905631d3edc5d06179fa577ecb40.

Daiichi Nuclear Power Plant reactors after the 2011 Tohoku tsunami.[22] The Fukushima plant operator used at least sixteen drones to explore the plant and measure radiation levels without threatening human safety.[23] Japan's Prime Minister Shinzo Abe has even announced plans to implement drone delivery to serve "rural and depopulated areas" by transporting emergency kits, defibrillators, and other medical supports by 2020.[24] According to the *Japan Times*, "The administration sees drone related services as a pillar to support elderly people and to deliver relief goods in disaster areas."[25]

Another critical factor in Japan's global drone dominance is that the current government under Prime Minister Shinzo Abe is extremely pro-drone. Abe refers to the drone industry as a significant part of the "Fourth Industrial Revolution."[26] He is actively promoting a campaign for vocational high schools to begin offering drone and robotics courses by 2017.[27] Most importantly, in recent years, Japan's government has heavily encouraged private sector commercial drone delivery services, which once again demonstrates a commitment to the drone industry. In January 2016, Japanese legislators announced plans to further amend current drone regulations to allow drones to transmit higher resolution video from more remote locations, with hopes that these changes will further "support the expansion of commercial drone applications."[28] The Ministry of Internal Affairs and Communications also plans to change current restrictions on radio transmission.[29] Currently, drones are operated by Wi-Fi, but overly used radio frequencies can make it difficult to transmit high-quality video.[30]

The Japanese government, to support the commercial drone industry, has passed recent laws to allow for special "de-regulation zones" for private companies and universities to test new UAS technology; the government is pushing for drone delivery to become a

---

22. Arthur Herman, *Japan's Drone Opportunity*, HUDSON INSTITUTE (June 10, 2015) http://www.hudson.org/research/11359-japan-s-drone-opportunity.

23. *See* Koji Sasahara, *New Drone to Autonomously Inspect Crippled Fukushima Reactors*, RT (June 11, 2015, 12:42 PM), https://www.rt.com/news/266533-japan-drones-measure-radiation/.

24. *See* Miriam McNabb, *Japan Plans Drone Delivery for the Olympics*, DRONELIFE (Aug. 22, 2016), http://dronelife.com/2016/08/22/japan-plans-drone-delivery-olympics/.

25. *See id.*

26. *Id.*

27. *See* McNabb, *supra* note 24.

28. *See* Miriam McNabb, *Japan Adjusts Drone Regulations to Support Industry*, DRONELIFE (Jan. 4, 2016), https://dronelife.com/2016/01/04/japan-adjusts-drone-regulations-to-support-industry/.

29. *Id.*

30. *Id.*

daily reality in Japan.[31] Potential drone delivery companies, including the popular American commerce company Amazon, rushed to these zones to test their drones' capabilities.[32] The most noted deregulation zone is in the Japanese city of Chiba. Here, the government ran successful tests with drones carrying bottles of milk and wine between different points in the city,[33] including "parks, businesses, and to residential buildings."[34] The government hopes to begin testing drone flights from Tokyo Bay to Chiba to develop an air traffic control system for drones.[35] Also on the commercial front, the Japanese e-commerce company Rakuten will launch the world's first commercial drone delivery service for Japanese golf courses.[36] In early May 2017, the Camel Golf Resort in the Chiba prefecture began using small, four-pound drones to carry drinks, fast food, and golf balls to golfers.[37]

The United States, on the other hand, has a far less extensive history with UAS than Japan. However, the United States has used military drones on the battlefield for decades and remains a world leader in "remote targeted killings."[38] Drones have been central to national security since World War I and dominate counter-terrorism efforts,[39] but outside the military realm, drones have been surprisingly absent.

During World War I, the first UAS took to the skies in various test flights, and soon thereafter, the military saw potential in the technology.[40] In 1917, Dr. Peter Cooper and Elmer A. Sperry invented the "automatic gyroscopic stabilizer" to keep an aircraft flying level.[41]

---

31. *See* Miriam McNabb, *Why Japan is Winning at Drones (It isn't Pokêmon GO)*, DRONELIFE (Aug. 12, 2016), https://dronelife.com/2016/08/12/japan-winning-drones-isnt-pokemon-go/.

32. *See* Miriam McNabb, *Japan Designates "Deregulation Zones" to Test Drones*, DRONELIFE (Dec. 16, 2015), https://dronelife.com/2015/12/16/japan-designates-deregulation-zones-to-test-drones/.

33. *See* Miram McNabb, *Companies Line Up for Drone Delivery in Japan*, DRONELIFE (Apr. 12, 2016), https://dronelife.com/2016/04/12/companies-line-drone-delivery-japan/.

34. *Id.*

35. *Id.*

36. *See Japan: Land of the Rising Drone – But Only for Golfers*, EURONEWS, Apr. 25, 2016, https://www.euronews.com/2016/04/25/japan-land-of-the-rising-drone-but-only-for-golfers.

37. *See id.* at 2.

38. *See History of U.S. Drones*, WORDPRESS: UNDERSTANDING EMPIRE, https://understandingempire.wordpress.com/2-0-a-brief-history-of-u-s-drones/ (last visited Nov. 17, 2017).

39. *Id.*

40. *See generally* Lexi Krock, *Timeline of UAVs*, PBS, http://www.pbs.org/wgbh/nova/spiesfly/uavs.html (detailing the beginnings of aviation UAVs during the first world war).

41. *Id.*

Cooper and Perry used this breakthrough to create the first radio-controlled UAS, the N-9 trainer.[42]

In World War II, the U.S. Navy launched Operation Anvil, a military UAS program designed to target German Nazi bunkers using "refitted B-24 bombers to double capacity with explosives guided by remote control devices to crash selected targets in Germany and Nazi-controlled France."[43] After the war, efforts in expanding drone technology stalled until the 1950s with new developments in rocketry.[44] In the 1960s, UAS took a new role as stealth surveillance during the Vietnam War.[45] From this, the U.S. Air Force began its first stealth aircraft program for reconnaissance missions, but it was not until the 1990s that the U.S. Air Force began arming unmanned aircraft with missiles.[46] After the September 11 attacks, the CIA launched a military effort to arm UAS with weaponry.[47] The Predator drone aircraft program "was activated days after" the twin towers fell, with predators reaching Afghanistan by September 16, 2001.[48]

While the Japanese government began partnering with Yamaha to develop unmanned crop-spraying helicopters in the 1980s, this technology was nonexistent in U.S. farmland and remains absent today. For the past several decades, the United States has relied on manned agricultural aviation, commonly referred to as "crop dusting," to apply pesticides or fertilizer to large fields.[49] These small airplanes are manned by one skilled pilot and are regulated by the FAA.[50] It is clear that unmanned agricultural drones are more efficient, cost-effective, and safer than manned agriculture aviation, which is why the art of crop spraying is slowly dying as a profession.[51] These airplanes are extremely dangerous, expensive, and completely replaceable by drones.

---

42. *Id.*

43. *See* John Sifton, *A Brief History of Drones*, THE NATION 1, 6 (Feb. 7, 2012), https://www.thenation.com/article/brief-history-drones/.

44. *See id.* at 7.

45. *See generally* Krock, *supra* note 40 (UAVs left their role behind as past target drones to work in stealth surveillance in Vietnam).

46. *See id.*

47. *Id.*

48. *See History of U.S. Drones, supra* note 38.

49. *See* Brent McDonald, *For Crop-Dusters, Towers Post a Hidden and Growing Danger*, N.Y. TIMES (Oct. 2, 2014) http://www.nytimes.com/2014/10/03/us/for-crop-dusters-a-hidden-danger-in-the-fields.html.

50. *See generally* Mike Linn, *Crop-Dusters Flying off Into the Sunset*, USA TODAY (June 29, 2006) https://usatoday30.usatoday.com/news/nation/2006-06-29-crop-dusters_x.htm (planes are quickly moving in to replace grounded crop-dusters in the agriculture market).

51. *See* Jason Koebler, *Drones are About to Take Over One of the World's Most Dangerous Jobs*, MOTHERBOARD (May 16, 2014) http://motherboard.vice.com/read/drones-are-about-to-kill-a-profession.

For example, the National Transportation Safety Board reported seventy-eight crop duster crashes in 2013 alone.[52] Additionally, since 2003, at least three crop-duster pilots died after hitting meteorological evaluation towers.[53] Financially, crop dusting costs between fifteen dollars to twenty-five dollars per acre, depending on the type of pesticide or fertilizer.[54]

Recent advances in aviation technology in the 2000s have increased civilian drone usage. The United States has seen an increased desire for commercialization of drone usage in a range of sectors including mapping, communications, and transportation.[55] One aviation consulting firm, the Teal Group, estimated that "about two million" unmanned aerial vehicles would sell in the United States in 2016.[56] As the sales of these drones continue to rise, law enforcement agencies, regulators, and government officials have raised both safety and legal concerns.[57]

Despite the growing demand for UAS technology, the U.S. government has failed to prioritize the drone industry as the Japanese government has over the past several decades. Concerning drone commercialization efforts, many companies, including Amazon and Google, have expressed frustration with the law's inability to allow package delivery of items by drone.[58] According to a 2013 report published by the drone developer Flyver, the United States is lagging behind the rest of the world in terms of UAS commercialization efforts.[59] As of 2013, the FAA only granted two commercial drone licenses: one for British Petroleum Oil (BP) and the other for a group of six film companies based in Hollywood, California.[60] In general, commercial use of drones in the United States is "largely inaccessible to small and medium-sized business owners in the [United States] because of limiting legislation."[61]

---

52. *Id.*

53. *Id.*

54. *See* Matthew Wilde, *Dusting Crops a Boon, Necessity for Farmers*, CEDAR VALLEY BUS. MONTHLY (Aug.16, 2010) http://wcfcourier.com/business/local/dusting-crops-a-boon-necessity-for-farmers/article_a8b5380e-a64c-11df-9408-001cc4c002e0.html.

55. *See id.*

56. *See* Nick Wingfield, *A Field Guide to Civilian Drones*, N.Y. TIMES at 1 (Aug. 29, 2016) http://www.nytimes.com/interactive/2015/technology/guide-to-civilian-drones.html.

57. *See id.* at 3.

58. *See id.*

59. *See* INEA CONSULTING, *supra* note 3, at 13.

60. *Id.* at 13.

61. *Id.*

II. JAPANESE AND AMERICAN APPROACHES TO DRONE LEGISLATION

In the United States, the first sign of any action from Congress took place with the passing of the FAA Modernization and Reform Act of 2012.[62] The bill, signed by President Obama on February 15, 2012, sought to modernize U.S. aviation systems and set a goal to open the national airspace to unmanned drones by September 2015.[63] Within this act, Section 333 directed the Secretary of Transportation to determine whether UAS operations require airworthiness certificates to safely operate within the National Airspace System (NAS).[64] The legislation aimed to make the drone technology more prevalent in several areas, including "local police departments to farmers monitoring crops."[65]

Congress, however, barely took any steps to counter frustration from various industries advocating for concrete drone regulations after passing the 2012 bill. After its passage, various industries became concerned with the FAA's slow progress in passing comprehensive drone regulations after Congress's direction in the bill. For example, the most prevalent group to lobby Congress for drone technology legislation is the Motion Picture Association of America (MPAA). In 2013, the group continued to press the federal government to legalize UAS usage prior to the targeted September 2015 date set by the bill.[66] The lobbying campaign stems from the group's dissatisfaction with the legal confusion among filmmakers using UAS for aerial shots.[67] Despite efforts by groups like the MPAA to speed the implementation of a regulatory framework, progress remained slow until the FAA finally passed concrete legislation in August 2015, almost eleven months later than the proposed deadline.[68]

Japan's approach to passing legislation was significantly more reactive and quicker than efforts from the U.S. Congress. This speed can be credited to Japan's strong government promotion of drone

---

62. *See* Mike Mitchell, *President Obama Signs the FAA Modernization and Reform Act of 2012 (H.R. 658)*, AVSTOP.COM (Feb. 15, 2012), http://avstop.com/news_february_2012/president_obama_signs_the_faa_modernization_and_reform_act_of_2012_hr_658.htm.

63. *See id.* at 1.

64. United States Department of Transportation, Federal Aviation Administration, Section 333, February 10, 2017, 3:32:21 PM EST.

65. *See* Neil Conan, *Drones Moving from War Zones to the Home Front*, NAT'L PUB. RADIO (Apr. 17, 2012), http://www.npr.org/2012/04/17/150817060/drones-move-from-war-zones-to-the-home-front.

66. *See* Neal Ungerleider, *MPAA Lobbying for Drones in Movie Industry*, FAST COMPANY (Jan. 25, 2013), https://www.fastcompany.com/3005100/mpaa-lobbying-drones-movie-industry.

67. *See id.*

68. *See id.*

technology, longtime familiarity with unmanned devices, and foundation of government-established UAS regulations in place since the 1980s. Historically, the Japanese Ministry of Agriculture, Forestry and Fisheries (MAFF) set guidelines for pesticide-spraying agricultural drones.[69] Japanese UAS regulation has expanded to the Ministry of Land, Infrastructure, Transport and Tourism (MILT). This agency was given supervisory power over the Japanese aviation market under the Civil Aeronautics Act.[70]

Prior to 2015, the Civil Aeronautics Act did not mention UAS technology whatsoever, deferring to the MAFF to regulate drone technology. However, a historic and potentially devastating incident involving drones instantaneously bridged the gap between bureaucratic regulation and legislation from Japan's Parliament, known as the Diet. On April 22, 2015, Japanese officials found a small drone carrying traces of radioactive material on Japanese Prime Minister Shinzo Abe's residence.[71] According to Japanese police, the twenty-inch, four-propeller drone was equipped with "a small camera, smoke flares, and a plastic bottle containing small traces of a radioactive material believed to be cesium, a common by-product of nuclear reactors."[72] The man operating the drone received two years' imprisonment for the criminal act of "forcible obstruction of business."[73] This incident ignited fear within the Japanese government of remote-control drone like devices being used to commit terrorist attacks on Japanese soil, especially with the 2020 Tokyo Olympics only a few years away.[74]

Prior to this incident, the MAFF regulations only prohibited small drones near airports or in the flight path of planes.[75] In addition, there

---

69. *See* The Japan News, *Drones Expected to Boost Agriculture in Japan*, THE NATION: THAILAND PORTAL (Oct. 31, 2017), http://www.nationmultimedia.com/detail/asean-plus/30330465.

70. *See* Koukuu Hou [Civil Aeronautics Act], Act No. 231 of 1952, www.cas.go.jp/jp/seisaku/hourei/data/caa.pdf (Japan).

71. *See* Junko Ogura, *Arrest After Drone with Radioactive Material Lands on Japan PM's Rooftop*, CNN (Apr. 24, 2015), http://www.cnn.com/2015/04/24/asia/japan-prime-minister-radioaction-drone-arrest/index.html.

72. *See id.*

73. *See* LIBRARY OF CONG., REGULATION OF DRONES: JAPAN (2016), https://www.loc.gov/law/help/regulation-of-drones/japan.php#Overview.

74. *See* Doug Bolton, *Man Arrested for Landing 'Radioactive' Drone on Japanese Prime Minister's Roof*, INDEPENDENT (Apr. 25, 2015), http://www.independent.co.uk/news/world/asia/man-arrested-for-landing-radioactive-drone-on-japanese-prime-ministers-roof-10203517.html.

75. *See* Sneha Shankar, *Japan Arrests Yasuo Yamamoto For Landing Radioactive Sand-Lanced Drone on Shinzo Abe's Office Roof*, INT'L BUS. TIMES (Apr. 25, 2015), http://www.ibtimes.com/japan-arrests-yasuo-yamamoto-landing-radioactive-sand-laced-drone-shinzo-abes-office-1896688.

were no flight restrictions for most of the city of Tokyo, including the Prime Minister's residence and government buildings.[76] Two months later, in June 2015, the Diet met to tighten drone restrictions.[77] The current ruling Liberal Democratic Party (LDP) submitted two bills in response to the drone incident.[78] The first bill regulated flights of UAS over certain areas in Tokyo, government facilities, and near nuclear plants. The second bill, submitted by the Cabinet in July 2015, formally amended the Civil Aeronautics Act. The Diet quickly passed both bills.

There are several possible explanations to determine why Congress fell behind Japan in its ability to quickly create and implement UAS regulations. One potential theory, submitted by business press and technology websites slamming the FAA's tardy regulations, blames the classic "incompetent federal bureaucracy getting in the way of economic progress."[79] Adam Thierer, a fellow at the libertarian Mercatus Center at George Mason University, posits, "[t]he FAA is adopting a hyper-precautionary principle position that is holding back innovation."[80]

An opposing view is that right-leaning think tanks and corporate-lobbying communities heavily influence the rulemaking process by relentlessly projecting messages that any form of regulation suffocates the economy.[81] Additionally, with the increasingly growing call for transparency in government agencies, lawmakers and administrators in both parties have spent the last three decades "wrapping the FAA and other regulatory agencies in ever more procedural red tape."[82] Finally, Congress increased inefficiencies by cutting funding for government agencies and burdening them with confusing mandates.[83]

However, a provocative view proposed by Ichiro Kato, Dean of the Graduate School of Science and Engineering at Waseda University, describes a different explanation for the easier acceptance of a robotic drone culture in Japan:

Japan's current robot technology is not very different from that of the

> U.S. but its historical *experience* with robots diverges substantially and explains [Japan's] lead in the industry. Machines arrived at the precise moment that

76. *See* LIBRARY OF CONG., *supra* note 73.
77. *See id.*
78. *See id.*
79. *See* Konstanin Kakaes, *Why is America Losing the Commercial Drone Wars?*, WASH. MONTHLY (June–Aug. 2015).
80. *See id.*
81. *See id.*
82. *See id.*
83. *See id.*

> preexisting class hierarches were being demolished, allowing for a democratic introduction of robots. The 'West,' in contrast, embraced machinery at a time when class stratification was dramatic – producing, at one extreme . . . a deep-seated fear of machines in the subconsciousness of Western society.[84]

Essentially, Kato explains that a fear of machine technology slowed American progress with drones. This theory posits that Americans are frightened of a changing world and are hesitant to fully embrace advancements in foreign technology.

Japan's enduring history with drone technology began in the 1980s with agriculture, despite various theories explaining the start of Japan's robotic culture. After the radioactive drone incident, the Japanese government recognized the growing need for drone regulations and prioritized legislation and passed the amendments in a matter of months. The United States, on the other hand, lacked this sense of urgency. Although it is impossible for the United States to recreate Japanese drone history, the United States should model Japan's reactive approach to the current needs of the drone industry and pass more legislation as needed, instead of waiting for an order from Congress.

III. THE RECENT DIET AMENDMENTS' INFLUENCE ON FAA'S PART 107

On June 21, 2016, the FAA released what is known as Part 107, which are FAA's rules regulating the commercial operation of drones weighing less than fifty-five pounds.[85] These regulations, delivered almost eleven months later than the original September 2015 deadline mandated by Congress, attempted to "[clarify] what is acceptable commercial usage of small unmanned aerial vehicles (UASs)."[86] Prior to these new rules, drone operators had to apply for waivers from the FAA, an extremely time-consuming and expensive process.[87]

---

84. *See* Bolman, *supra* note 7, at 3.

85. Mark J. Connot & Jason J. Zummo, *Drones, Part 107, and Pending Section 333 Exemptions*, FOXROTHSCHILD.COM (July 5, 2016), https://ontheradar.foxrothschild.com/2016/07/articles/drone-regulations-and-policy/drones-part-107-and-pending-section-333-exemptions/.

86. *Id.*

87. *See* Nyshka Chandran, *FAA's New Drone Laws Go into Effect Monday, Allowing U.S. Companies to Innovate*, CNBC (Aug. 29, 2016, 2:03 AM) http://www.cnbc.com/2016/08/29/faas-new-drone-laws-go-into-effect-monday-allowing-us-companies-to-innovate.html.

There are many similarities and differences between Japan's September 11, 2015, amendment to the Civil Aeronautics Act, and the FAA's Part 107, which demonstrates that the United States might have followed Japan's lead with these rules. It is interesting to note that the FAA passed the Part 107 guidelines in August 2015, almost eleven months after the Japanese Diet passed the first and second amendment. There are several guidelines that advocate the same general concepts, and some in which each country decided to take a different approach.

First, components within the definition of UAS within both sets of regulations are similar. For example, both regulations set the maximum side of civilian drone systems as about the same weight. Section 107.3 defines an unmanned aircraft as weighing "less than 55 pounds on takeoff," while the Japanese equivalent definition section considers UASs that are lighter than 200 grams, which after conversion, is equivalent to forty-four pounds.[88]

There is also a common theme in regulating civilian drone use around airports. In Part 107, the regulations stipulate that if a UAS is flown within five miles of an airport, the operator must provide the airport operator with prior notice, and does not have to contact the government for approval to fly in this zone.[89] In contrast, the Japanese regulations require MLIT permission for flight over any areas surrounding an airport and ban flight in air traffic areas above 150 meters.[90]

Another common theme is the conditions for UAS flights. Both countries address a pilot's ability to operate a UAS during night hours, due to a concern of "reduced visibility"[91] Within section 107.29, "Daylight Operation," pilots are prohibited from flying drones at night.[92] This provision parallels the Japanese provision that "UAS flights may be made only between dawn and dusk."[93] However, there is an exception to the Part 107 Daylight operation provision; a pilot *can* operate a drone during this period, as long as the craft has lights "visible for at least 3 statute miles."[94] The Japanese provision has no such exception.

---

88. MINISTRY OF LAND, INFRASTRUCTURE, TRANSPORT AND TOURISM, SAFETY RULES ON UNMANNED AIRCRAFT (UA) http://www.mlit.go.jp/en/koku/uas.html.

89. Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. 42063, 42209 (June 28, 2016) (to be codified at 14 CFR pt. 21, 43, 61 et al).

90. *Id.*

91. Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. 42063, 42102.

92. *See id.* at 42110.

93. LIBRARY OF CONGRESS, *supra* note 73.

94. Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. 42063, 42210.

Although pushback on the UAS ban on night flight from Japanese constituencies was essentially nonexistent, many commentators on the Part 107 portion objected to this proposal. The Japanese Diet seemed unconcerned about gathering public opinion on the new regulations. Despite the FAA's inability to pass timely UAS regulations, the agency did welcome commentary from outside research institutions, companies, and interests groups. Drone data software companies including Skycatch, Clayco, AECOM, and DPR Construction proposed that the nighttime flight prohibition be "entirely eliminated from the final rule."[95] These groups proposed that nighttime flight may be safer because "there is less air traffic and there are fewer people on the ground."[96] Furthermore, groups such as the National Ski Areas Association said that UASs equipped with proper lighting could have safe flights.[97]

Another major theme of both regulations was stressing the importance of keeping the UAS within the line of sight. The Japanese amendment states that the "operator must monitor the UAS and its surroundings with his/her own eyes at all times."[98] Similarly, in § 107.31, the rules stipulate that the

> person manipulating the aircraft must be able to see the unmanned aircraft throughout the entire flight in order to: (1) Know the unmanned aircraft's location; (2) Determine the unmanned aircraft's attitude, altitude, and direction of flight; (3) Observe the airspace for other air traffic or hazards; and (4) Determine that the unmanned aircraft does not endanger the life or property of another.[99]

Neither country was prepared to venture into the realm of out-of-sight drone technologies, even if the craft is equipped with lights. This possibly reflects the general fear that the world is still unprepared for pushing the boundaries of drone technology.

These regulations also express concerns over UAS operation near human beings. § 107.31 prohibits drone flight over a person unless the human is "(a) [d]irectly participating in the operation of the small UAS,

---

95. *Id.* at 42102.

96. *Id.*

97. *See* Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. 42063, 42103.

98. LIBRARY OF CONGRESS, *supra* note 73.

99. Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. 42063, 42210.

or (2) located under a covered structure or inside a stationary vehicle that can provide reasonable protection."[100] The Japanese rules express a similar concern for keeping drones away from humans but have a slight variation. The Japanese rules state that there must always be a "30 meter operating distance between UASs and persons or properties on the ground/water surface."[101] These rules appear stricter, in that the UAS cannot be within the thirty-meter radius of another human, even if they are under a covered structure.

Another interesting component of each is the designation of various airspaces. Both regulations divide the airspace into different sections (A, B, C, D, etc.), but unlike the FAA regulations, the Japanese rules create their own airspace categories specifically for drone usage. Part 107 keeps the same airspace designations articulated in the United States airspace system's classification scheme.[102]

Section 107.41 explains that a pilot cannot operate a UAS within "Class B, Class C or Class D airspace or within the lateral boundaries of the surface area of Class E airspace . . . unless that person has prior authorization from Air Traffic Control (ATC)."[103] For a pilot to fly a UAS within this airspace, he or she must acquire special permission by the FAA. In contrast, the Japanese rules divide UAS airspace into 4 categories: (A) Airspace around Airports; (B) Airspace above 150 meters; (C) Airspace above Densely Inhabited Districts and Uninhabited Airspace other than (A), (B), and (C).[104]

Similar to the Part 107.41 provision, to operate a Japanese UAS within Part (A), (B), or (C) airspace, the pilot must receive permission from the MAFF.[105] However, there are interesting points to consider within this provision. The first is that the Japanese regulations designate "Densely Inhabited Districts (DID)," areas defined and published by the Ministry of Internal Affairs and Communications.[106] The provisions specifically designate various regional areas within category (C). This demonstrates the government's concern with UAS technology creating issues within heavily populated areas. These

100. *Id.* at 42211.

101. MINISTRY OF LAND, INFRASTRUCTURE, TRANSPORT AND TOURISM, *supra* note 88.

102. *See generally* DEP'T OF TRANSP., U.S. FED. AVIATION ADMIN., INSTRUMENT FLYING HANDBOOK, https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/media/FAA-H-8083-15B.pdf (providing instructions for flight instructors and pilots for preparing for instrument rating tests).

103. Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. 42063, 42211.

104. MINISTRY OF LAND, INFRASTRUCTURE, TRANSPORT AND TOURISM, *supra* note 88.

105. *See id.*

106. *Id.*

designated areas reflect Japan's concern with negative drone interaction, perhaps stemming from the incident of the radioactive drone flying onto the Prime Minister's home. Part 107 has no such provision, and simply prohibits operations of UASs in restricted areas.

Now that both countries finally passed comprehensive drone regulations, the United States' window of opportunity to learn from Japan seems narrowed. However, the ever-expanding drone industry is just beginning to impact the world. As society begins to normalize drones in both the civilian and commercial sector, new laws will be necessary for safe usage of this technology. When these needs arise, the United States should model the speed and responsiveness that the Japanese government took in passing its legislation to address the drone community's needs. This is especially apparent in the context of commercial drone usage since Part 107 and the Diet amendments mainly target civilian drones. The Japanese government and the Diet took specific actions to set the stage for nationwide commercial drone usage by companies. These actions include proposed legislation to allow drones to transmit higher-resolution video from more remote locations and changing vocational school curriculums to promote drone education. The United States has yet to take similar concrete legislative steps.

IV. JAPANESE AGRICULTURE DRONES: AN EXAMPLE OF SAFE COMMERCIAL DRONES USE AND REGULATION

Japan has led the world in safe and efficient drone use since the 1980s, and the United States should follow Japan's lead when regulating future drone technology within the agricultural sector. Japanese farmers have been employing unmanned aerial technology for nearly two decades.[107] In total, 40 percent of the rice fields in Japan are sprayed with unmanned helicopters.[108] Agricultural drones, like those used in Japanese rice paddies, are in their infancy in the United States. Automated UAS usage in crop management and pesticide spraying will play a critical role in the future of farming. According to the latest Bank of America Merrill Lynch Global Research Report, the agricultural robot market is expected to grow to $16.3 billion by 2020.[109]

---

107. Mike Karst, *UAVs in Agriculture: Rules of the Sky*, ENTIRA (Dec. 12, 2013), http://entira.net/news-insights/entira-insights/uavs-in-agriculture-rules-of-the-sky/.

108. *See id.*

109. *See* Sally French, *How Drones Will Drastically Transform U.S. Agriculture, in One Chart*, MARKETWATCH (Nov. 17, 2015, 9:00 AM), http://www.marketwatch.com/story/how-drones-will-drastically-transform-us-agriculture-in-one-chart-2015-11-17.

New Zealand has followed Japan's lead in fully integrating Japanese UAV technology into their agriculture industries.[110] Several New Zealand companies including Aeronavics, Hawkeye UAV, and Skycam UAV NZ are entering the drone market.[111] New Zealand beef and sheep farmer Neil Gardyne says drone integration is an "agricultural game changer." He uses drones for various tasks including monitoring his livestock. Since investing in drones, he has halved the number of sheep deaths on his farm.[112] These drones give farmers like Gardyne the ability to monitor activity in their farms including ground moisture, pasture rate growth, and nutrient levels in crops.[113] Other New Zealand farmers are increasingly using this technology to check fences and water systems on their property.[114]

On August 1, 2015, New Zealand amended their Civil Aviation Rules on unmanned aerial vehicles, adding comprehensive rules to regulate model aircraft under twenty-five kilograms (about fifty-five pounds).[115] These regulations allowed companies to begin introducing commercial drones into the New Zealand markets.[116] These regulations have allowed companies like Yamaha to introduce RMAX helicopters into the New Zealand agricultural industries. In September 2015, the New Zealand Civil Aviation Authority certified the first Yamaha model for commercial use in New Zealand.[117] Government officials, like Transport Minister Simon Bridges, are actively promoting agricultural drone usage and believe the recent changes to aviation laws are "a great example of how new aviation rules can allow for commercial use of drones."[118]

In the United States, however, unmanned agricultural drone technology is lagging for several reasons, including falling farm incomes, a single growing system, and an aging farming population.[119]

---

110. *See* Josh Drummond, *Agriculture's Game of Drones*, THE NEW ZEALAND HERALD (Apr. 23, 2015, 5:00 AM), http://m.nzherald.co.nz/wairarapa-times-age/rural/news/article.cfm?c_id=1503409&objectid=11437374.

111. *See id.*

112. *See id.*

113. *Id.*

114. *See id.*

115. LIBRARY OF CONG., REGULATION OF DRONES: NEW ZEALAND, (2016), https://www.loc.gov/law/help/regulation-of-drones/new-zealand.php.

116. *See id.*

117. Daniel Faitaua, *$120k Drone to Transform New Zealand Agriculture Industry, 1 NEWS NOW*, TVNZ (Sept. 2, 2015), https://www.tvnz.co.nz/one-news/new-zealand/-120k-drone-to-transform-new-zealand-agriculture-industry-q08855.

118. *See id.*

119. *See* Valery Komissarov, *Drones in Agriculture: Are They Really Taking Over?*, FUTURISM (June 21, 2016), http://futurism.com/drones-in-agriculture-are-they-really-taking-over/.

Another critical explanation is reliance on the traditional crop spraying methods by manned agricultural aircraft. Despite the dangers posed by these small planes, this industry has a powerful lobbying presence in Washington, which has allowed the group to voice strong antidrone rhetoric. The National Agricultural Aviation Administration spent roughly $106,000 lobbying against drones in Congress last year.[120]

However, the main reason for the slow progress stems from the decades-long lack of regulation for commercial UAS use.[121] Currently, UAS use by commercial farmers is prohibited under FAA regulations.[122] UAS advocates fear that these restrictions will continue to cause the United States to fall behind other countries that can "openly test and use the technology, and ultimately caus[e] the U.S. to lose its edge and industry potential."[123] This is incredibly unfortunate; agriculture may be the easiest sector to begin testing drone technology, considering the need and that the UASs would be flown over unpopulated areas. Farmers across the country continue to express frustrations about feeling the competition from other countries that can freely use UAS technology.[124] Idaho farmer Robert Blair claims that "Uruguay, Argentina, Brazil, and Australia . . . are some of our biggest competitors on the agriculture side and now we are playing catch up to them because the government on all levels doesn't want to open up regulations [for drones]."[125]

In Japan today, over 2,000 unmanned agriculture helicopters are in service.[126] Arguably, this technology has been so successful because the Japanese government set standards for agricultural use quickly after the technology's creation. For agricultural unmanned helicopter use, the Japan Agricultural Aviation Association, underneath the MAFF, set safety standards for operating unmanned helicopters for chemical spraying.[127] Japan can be seen as a model for the successful use of unmanned aircraft because the MAFF "commissioned the technology rather than inhibiting the commercialization of drones by imposing specific regulations and an operator licensing system to operate the

120. *See* Koebler, *supra* note 51.
121. *See id.*
122. *Id.*
123. Miranda Green, *Unmanned Drones May Have Their Greatest Impact on Agriculture*, THE DAILY BEAST (Mar. 26, 2013), http://www.thedailybeast.com/articles/2013/03/26/unmanned-drones-may-have-their-greatest-impact-on-agriculture.html.
124. *See id.*
125. *See id.*
126. *See* Bolman, *supra* note 7, at 2.
127. *See id.*

drones safely."[128] In addition, these regulations include the following specifications and have remained unchanged over the past three decades: no crew on the helicopter, a low speed of twenty kilometers per hour, a maximum altitude of three-to-five meters, and preflight inspection.[129] These rules, although simple, established basic uniform guidelines that allowed farmers to use this technology on their farms with ease. In almost twenty years of Yamaha's RMAX operations, there has never been a reported injury.[130]

The agricultural industry in the United States could have entered the growing agricultural drone sector much sooner had the FAA passed basic requirements similar to the MAFF standards. One trade that has continually pushed for uniform commercial drone requirements is the California wine industry. With the UAS's agility and speed, wine producers can use drones to spot diseased crops and drop a more "targeted load of pesticide than a traditional airplane could."[131] Dr. Ken Giles, a professor in the University of California, Davis's biological and agricultural engineering department, led the first project conducting a demonstration that used drones to spray pesticides at the Oakville Vineyard in Napa Valley with the Yamaha Motor Company.[132] Yamaha aims to introduce the unmanned piloted RMAX helicopter designed for agricultural spraying in the United States. The RMAX provides a "unique and effective solution for spray applications, particularly for grape growers with vineyards on slopes or difficult terrain."[133] In October 2014, Yamaha and Giles conducted a demonstration of the RMAX helicopter in conjunction with the Association for Unmanned Vehicle Systems International, a trade group that supports the defense,

---

128. LAMBÈR ROYAKKERS & RINIE VAN EST, JUST ORDINARY ROBOTS: AUTOMATION FROM LOVE TO WAR 143 (2016).

129. *See* Akira Sato, *Civil UAV Applications in Japan and Related Safety & Certification*, YAMAHA MOTOR CO., LTD., (Sept. 2, 2003), http://www.dtic.mil/dtic/tr/fulltext/u2/a427349.pdf.

130. John Goglia, *FAA Finally Approves Yamaha AG Drone, Reveals How Shockingly Behind U.S. Civil Drone Industry Is*, FORBES (May 12, 2015), http://www.forbes.com/sites/johngoglia/2015/05/12/faa-finally-approves-yamaha-ag-drone-reveals-how-shockingly-behind-us-civil-drone-industry-is/#61244ffa50cd.

131. Christian Sanz, *Drones Are Here: How Will Your Industry Take to the Skies*, COMMERICAL UAV NEWS (Apr. 7, 2016), http://www.expouav.com/news/latest/drones-are-here-how-will-your-industry-take-to-the-skies/.

132. Bill Swindell, *Drones Could Become Familiar Sight over Wine Country Vineyards*, THE PRESS DEMOCRAT (Oct. 15, 2014), http://www.pressdemocrat.com/business/2980362-181/drones-could-become-familiar-sight?artslide=0.

133. Caroline Rees, *Yamaha RMAX Unmanned Helicopter Performs First U.S. Commercial Agricultural Flight*, UNMANNED SYSTEMS TECHNOLOGY (May 20, 2016), http://www.unmannedsystemstechnology.com/2016/05/yamaha-rmax-unmanned-helicopter-performs-first-u-s-commercial-agricultural-flight/.

civil, and commercial sectors.[134] Yamaha is desperately attempting to demonstrate to America that unmanned helicopters can "save money, time and be more efficient than the traditional method of spraying by either tractor, plane or by hand."[135]

However, for Yamaha to introduce its RMAX helicopter to wine producers, the FAA needs to set regulations for use of commercialized drones over fifty-five pounds, seeing that the RMAX units weigh close to 141 pounds and have a load capacity of approximately 690 pounds.[136] Gretchen West, the executive vice president of the Association for Unmanned Vehicle Systems International (AUVSI), explains that:

> There aren't many limits on recreational uses of UASs, meaning a farmer can fly it over his own operation and take pictures and video of anything he wants while adhering to the standards set forth by the Academy of Model Aeronautics (AMA). What he can't do is outsource the equipment for use on other farm operations, or have crop scouts or insurance companies to do the work for him. But as commercial restrictions start to loosen up, organizations will undoubtedly be clamoring to create business plans that integrate UASs.[137]

Fortunately, the FAA is slowly recognizing the positive impact that Japanese unmanned helicopter technology could have within the U.S. agricultural sector and is taking concrete steps to facilitate the introduction of these unmanned helicopters. Although the FAA has yet to create regulations specific to agricultural drones like the Japanese MAFF, in December 2015, the FAA granted Yamaha a Part 137 Agricultural Aircraft Operations Certification in the form of a section 333 exemption, the first for an unmanned agricultural aerial system.[138] The RMAX is the largest civilian drone granted an exception to date in the United States.[139] Yamaha spent several years working with the FAA to receive this commercial certification and recently opened a new office at the Napa County Airport to support RMAX commercial spray services for grape growers located in Napa and Sonoma Counties.[140]

---

134. Swindell, *supra* note 132.

135. *Id.*

136. Robin Martin, *Super-drone Sprayer Comes with Risks*, RNZ (Oct. 1, 2015), http://www.radionz.co.nz/news/rural/285808/super-drone-sprayer-comes-with-risks.

137. Karst, *supra* note 107.

138. *See* Rees, *supra* note 133.

139. Goglia, *supra* note 130.

140. Rees, *supra* note 133.

Currently, RMAX is the only licensed unmanned aerial system in Napa Valley. Despite this progress, this approval is a shocking reminder of how far behind the United States is from Japan and other countries who have been using and regulating this same technology for decades.[141] Yamaha has been exporting RMAX helicopters internationally since 1997 to countries all over the globe, including New Zealand, Australia, and South Korea.[142] Overall, there are over 2,600 RMAX UAS in use worldwide.[143]

In addition, although Yamaha received this exemption, the company will not be able to provide its potential full range of agricultural services in other countries, such as chemical spraying, until the FAA gives further approval.[144] In contrast, Japan's long history with utilizing and regulating agricultural drone technology has given the country an edge over the United States. It is puzzling why the FAA would not attempt to adopt similar basic guidelines that model the standards passed by the Japanese MAFF for the pesticide-spraying RMAX helicopters that are making their way into the California wine markets. The FAA is still concerned with protecting the manned aviation industry from collapse, since the presence of drones would signal a loss in pilot jobs.[145] This dilemma is potentially explained by the United States' unfamiliarity or fear of drone culture, paired with uncertainty of how UASs would change the agricultural landscape. Japan's decade-long history with unmanned helicopter technology has essentially normalized drones within the agricultural sector. The United States has no such relationship with these machines, and it appears that the FAA has made little effort to build one.

Looking to the future, the FAA should follow Japan and New Zealand's lead by reducing the United States' dependency on manned aircraft aviation and promote unmanned helicopter usage. This would be possible by passing basic licensing standards for unmanned agricultural helicopters, which have been implemented by the MAFF in Japan since the 1980s. Although the future loss of manned agricultural aircraft pilot jobs may be inevitable, drone technology is a safer, cheaper, and more effective method to spray pesticides on fields.

141. Goglia, *supra* note 130.
142. *See id.*
143. *See id.*
144. *See id.*
145. *See* Koebler, *supra* note 51.

V. IMPACT OF INTEREST GROUPS ON DRONE REGULATIONS

Japan has a few incredibly organized and influential interest groups that work closely with the Japanese Ministry of Agriculture, Forestry, and Fisheries to ensure that the commercial and civilian UAS sectors have proper rules and regulations.

During the last decade, "unmanned systems in Japan [expanded] into new applications beyond agriculture."[146] These areas include natural disaster research, aerial seeding for forestation, and observation of geological features and landslides.[147] Recognizing the need to standardize drone use in these new sectors, four major Japanese manufacturers, Fuji Heavy Industries Ltd., Kawada Industries, Inc., Yamaha Motor Co., Ltd., and Yanmar Agricultural Equipment Co., established a consortium, the Japan UAV Association (JUAV).[148]

The JUAV represents the industries that develop, manufacture, and operate UASs in Japan.[149] The JUAV's main mission is to "establish safety standards and guidance for unmanned systems . . . and to contribute to the development of the UAS market in Japan."[150] The organization has been active in developing safety standards and operator certification programs for unmanned aircraft users.[151] Even though the Japanese Agricultural Aviation Association and the MAFF set standards surrounding the use of unmanned helicopter applications, prior to the passing of the July 2015 amendment to the Civil Aeronautics Act, there were no common rules governing applications outside of agriculture.[152] Since forming the consortium in 2002, the JUAV has an established board of directors and twenty regular corporate members, including Japanese technology giants Mitsubishi Heavy Industries, Ltd. and Kawasaki Heavy Industries, Ltd.[153] In 2004, the consortium released low altitude safety guidelines for unmanned helicopters in commercial use over unpopulated areas.[154]

The self-imposed safety standards are published on the JUAV website and must be obeyed by all JUAV members.[155] The safety

146. *See* Dalamagkidis, *supra* note 6, at 74.

147. *See* Japan UAV Association, *About Japan Industrial Unmanned Aerial Manufacturers Association*, (June 1, 2017), http://www.juav.org/about/index.html.

148. *See id.*

149. *See id.*

150. *See id.*

151. *See id.*

152. *See id.*

153. *See id.*

154. *See id.*

155. *See* JAPAN UAV ASSOCIATION, SAFETY STANDARDS FOR COMMERCIAL-USE, UNMANNED ROTARY-WING AIRCRAFT IN UNINHABITED AREAS 3 (2005).

standards were initially available for Yamaha RMAX helicopters, but the standards have since been revised to include all autonomous helicopters.[156] According to the JUAV website, the safety standards are directed to regulate the uninhabited airspace and currently apply to rotary-wing and fixed-wing aircraft.[157] These specific requirements, officially published in 2005, consist of a twenty-five page document available on the JUAV website. The main categories of the regulations include "Design Standards," "Maintenance and Inspection Standards," "Operator Qualification Standards," "Aircraft Handling Standards," and "Customer Control Standards."[158] Currently, the JUAV is coordinating with the Japanese Aerospace Exploration Agency (JAXA) to produce new safety standards to monitor experimental UAS activities.[159]

The United States, as an example, has no such consortium creating and monitoring drone technology use. While the JUAV has been setting industry standards in Japan for the past fifteen years, American companies sat in waiting for Congress and the FAA to act. With hundreds of thousands of recreational drones now in use in the United States, companies like Amazon, GoPro, and Google are set on using drones to deliver packages.[160] However, most of these companies hire individual law firms or advocacy groups to influence legislators and government agencies; there is no set coalition comparable to the Japanese JUAV. Without a structured coalition like the JUAV, the UAS commercialization movement is struggling to gain traction with Congress, especially with the presence of vocal opponents advocating that the machines pose "significant safety and privacy risks."[161] For example, the Air Line Pilots Association (ALPA) has been strongly pushing lawmakers to require registration at retail or online stores to even purchase a drone.[162] Meanwhile, companies like GoPro and DJI are attempting to lobby against more rules like these.[163] Ryan Calo, an assistant professor of law at the University of Washington, explains that "[T]here is so much interest and money in drones, everyone wants to get their way."[164]

The most prevalent nonprofit UAS group in the United States is the Association for Unmanned Vehicle Systems International (AUVSI), an

156. *See* Dalamagkidis, *supra* note 6, at 74.
157. *See* SAFETY STANDARDS FOR COMMERCIAL-USE, *supra* note 155.
158. *See id.* at 2.
159. *See* Dalamagkidis, *supra* note 6, at 74.
160. *See* Cecilia Kang, *Drone Lobbying Heats Up on Capitol Hill*, N.Y. TIMES (Jan. 24, 2016), http://bits.blogs.nytimes.com/2016/01/24/drone-lobbying-turns-to-captiol-hill/.
161. *See id.*
162. *See id.*
163. *See id.*
164. *Id.*

international organization dedicated to "promoting and supporting the unmanned systems and robotics industry through communication, education, and leadership."[165] The group consists of individual and corporate members, and the total member population is around 7,500.[166] The AUVSI hosts an annual Unmanned Systems North America forum as an attempt to unite the North American systems and robotics community.[167] Additionally, the AUSVI supports the AUVSI foundation, a charitable organization designed to support the educational future of UAS technology by developing educational programs for young students.[168] However, the AUSVI is a massive international organization that lacks the organization and single country membership aspect of the JUAV.

American UAS manufactures would benefit from a group similar to the JUAV, and would not only have a stronger voice against anticommercialization opponents, but could attempt to recommend uniform guidelines to the FAA, similar to the JUAV's relationship with the MAFF. There are around eighty-nine U.S. manufacturers of UAS systems, including Boeing, Lockheed Martin, Parrot SA, and Sikorsky Aircraft.[169] With these manufacturers, Amazon is working on a delivery drone to send packages in thirty minutes or less, and Facebook has a goal to expand Internet service around the world with solar-powered UAS.[170] Despite these innovative goals, neither of these initiatives would be permitted under current FAA regulations, which "require UASs to fly within the operator's line of sight at altitudes below 400 feet."[171] If these eighty-nine manufactures could organize in a way similar to the JUAV, they would strongly appeal Congress and express the dire need for the FAA to issue new regulations that would allow for greater drone commercialization.

CONCLUSION

There appears to be a significant lag in acceptance of UAS technology and regulations by the United States government compared to other world nations. Japan's long history and experience with drone

165. *See* Association for Unmanned Vehicle Systems International, WHO IS AUVSI?, http://www.auvsi.org/home.

166. *See id.*

167. *See id.*

168. *See* Robonation, AUVSI, http://www.robonation.org/auvsi.

169. *See* Bill Canis, Unmanned Aircraft Systems (UAS): Commercial Outlook for a New Industry, Congressional Research Service 2 (Sept. 9, 2015) https://www.fas.org/sgp/crs/misc/R44192.pdf.

170. *Id.*

171. *Id.* at 8.

technology has paved the way for faster and more comprehensive UAS regulations, not only from nonprofit groups like the JUAV, but also from the government itself. Although the United States lacks the history of accepting civilian drone technology at an earlier date, recent progress demonstrates that the United States has the potential to recover from its disappointing position behind other countries, like Japan and New Zealand. If the United States could mimic the speed of the Japanese reactive UAS legislation and outwardly ensure the support of the drone industry by reducing the country's dependency on outdated technology, the United States could become a UAS global player in the next decade.