

2013

Floating toward a Sky Near You: Unmanned Aircraft Systems and the Implications of the FAA Modernization and Reform Act of 2012

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Recommended Citation

Brandon Bellows, *Floating toward a Sky Near You: Unmanned Aircraft Systems and the Implications of the FAA Modernization and Reform Act of 2012*, 78 J. AIR L. & COM. 585 (2013)
<https://scholar.smu.edu/jalc/vol78/iss3/4>

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**FLOATING TOWARD A SKY NEAR YOU: UNMANNED
AIRCRAFT SYSTEMS AND THE IMPLICATIONS OF THE
FAA MODERNIZATION AND REFORM ACT OF 2012**

BRANDON BELLOW*

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* B.A. Political Science, Baylor University, 2007; J.D. Candidate, Southern Methodist University Dedman School of Law, 2014. This comment is dedicated to my wife, Sarah. Unyieldingly cheery and patient, she blesses me daily with support and encouragement. I also owe a special thanks to Baylor professors Dr. Thomas Myers and Dr. Jerold Waltman, and SMU Dedman School of Law Professor Beverly Dur  s for molding me into the student I am today. These incredible teachers equipped me with the skills necessary to succeed in and out of the classroom.

I. INTRODUCTION

THREE BROTHERS in their mid-thirties, visiting their family home for Christmas, decide to rekindle their childhood love of model airplanes by purchasing a \$100 do-it-yourself drone kit on the Internet. After the brothers assemble it, the model unmanned aircraft system (UAS)¹ takes flight over the house, much to the delight of the brothers and the neighborhood kids. The UAS comes equipped with a small camera capable of capturing high-quality images and a small clamp that allows it to carry light items into the air and drop them on command. Although the brothers are aware of the small local airport just three miles down the road, they are unaware that federal law regulates their use of this model UAS. When a concerned neighbor sees the floating UAS drop a water balloon near an unoccupied residence, she worries that someone might be “scouting it out” while the home is empty and calls the police department to alert it of the activity.

Within hours of the UAS’s first flight, the brothers are paid a visit from the local authorities, which is swiftly followed by a visit from federal authorities. Although they are able to keep the UAS, the brothers are issued a citation by the Federal Aviation Administration (FAA) for using it within five miles of an airport without contacting the local air traffic control operator and giving notice of their planned “recreational use.” Had they done so, the federal citation might have been avoided. But even if they had, flying the UAS over other private property might be problematic under local law, as it raises issues of trespass and potential violations of privacy. The brothers eventually learn that their UAS unintentionally caught footage of marijuana growing outdoors at the unoccupied house. They question whether they should turn the footage over to local officials, but because they are concerned that doing so will subject them to some type of liability, they opt not to. Instead, the UAS is placed in a closet, put out of sight to keep them all out of trouble.

As this fictional scenario suggests, the coming “era of the UAS” brings with it a bevy of complex issues involving privacy, safety, and compliance with possibly unheard-of regulations.

¹ See Chris Jenks, *Law from Above: Unmanned Aerial Systems, Use of Force, and the Law of Armed Conflict*, 85 N.D. L. REV. 649, 652–53 (2009). As Professor Jenks briefly summarizes, the terms “UAS,” “UAV,” and “drone” are used interchangeably, but usage typically depends on the branch or agency using the term. *Id.* at 652. In this comment, the term “UAS” is used exclusively, except in idiomatic expressions such as “drone journalism.”

Much of this complexity hinges on the FAA Modernization and Reform Act of 2012.² Under this new law, the FAA has been tasked with integrating all manner of UASs³ into the national airspace system (NAS).⁴ Often portrayed by the media as a military tool of war,⁵ UASs now come in all shapes and sizes⁶ and are used for a variety of tasks—both public and private.⁷ And the future diversity of use poses many difficult problems that are not limited to any one type of use. For instance, in Texas, a private small UAS (sUAS) took flight over a meatpacking business near the banks of the Trinity River; it captured disturbing images of pollution that were sent to local, state, and federal authorities, ultimately resulting in multiple search warrants.⁸ By Haystack Rock near Cannon Beach, Oregon, the Oregon Department of Fish and Wildlife sought to use UASs to spy on certain pesky avian residents.⁹ In South Carolina, an animal rights UAS was shot down after it was used to scatter a group of pigeon hunters gathered on private property.¹⁰ At the same time, some UAS

² FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 331–336 126 Stat. 11, 72–78 (to be codified at 49 U.S.C. § 40101).

³ The FAA uses the term “UAS” to include “entire system[s] [of] aircraft, data links, control station and other elements,” which range from “remotely piloted vehicles with limited capabilities to semi and fully autonomous systems.” FAA, U.S. DEP’T OF TRANSP., FAA AEROSPACE FORECAST FISCAL YEARS 2010–2030, at 48 (2010).

⁴ See Gary Klien, *Feds Cite Marin County Men over Drone Helicopter Flight at Alcatraz*, MERCURY NEWS (Sept. 25, 2012), http://www.mercurynews.com/california/ci_20975136/feds-cite-marin-county-men-over-drone-helicopter.

⁵ See, e.g., Michael Fabey, *Domestic UAS Use Raises Privacy Questions for Congress, Report Says*, AVIATION WK. (Sept. 11, 2012), http://www.aviationweek.com/Article.aspx?id=/Article-xml/asd_09_11_2012_p04-01-493913.xml.

⁶ See Gary Mortimer, *Drone Made of Lego Takes Flight*, sUAS NEWS (Dec. 19, 2012), <http://www.suasnews.com/2012/12/20276/drone-made-of-lego-takes-flight/>.

⁷ *Id.*; see also Richard Conniff, *Drones Are Ready for Takeoff*, SMITHSONIAN.COM (June 2011), <http://www.smithsonianmag.com/science-nature/Drones-are-Ready-for-Takeoff.html> (describing the wide variety of uses of UASs by public sector agencies).

⁸ Gary Mortimer, *Dallas Meat Packing Plant Investigated After Drone Images Reveal Pollution*, sUAS NEWS (Jan. 23, 2012), <http://www.suasnews.com/2012/01/11389/dallas-meat-packing-plant-investigated-after-drone-images-reveal-pollution/>.

⁹ See *Drones on Coast Scuttled for Lack of Permit*, OREGONLIVE (July 26, 2012), http://www.oregonlive.com/pacific-northwest-news/index.ssf/2012/07/drones_on_coast_scuttled_for_l.html.

¹⁰ John Keller, *FAA’s Impending Rule on Small UASs May Usher in a New Era of Civil Aerial Warfare*, MIL. & AEROSPACE ELECTRONICS (Mar. 14, 2012), <http://www.militaryaerospace.com/blogs/aerospace-defense-blog/2012/03/faa-s-impending-rule-on-small-uavs-may-usher-in-a-new-era-of-civil-aerial-warfare.html>.

proponents envision UASs aiding in disaster relief efforts, as well as search and rescue missions.¹¹ Potential future uses even verge on the wacky. In California, UASs may soon bring burritos to your doorstep.¹² As evidenced by these diverse situations, UASs no longer easily fit the “weapon of war” stereotype associated with them. They are now much more than flying weaponry. They come in shapes and sizes limited only by imagination.

With the help of nothing more than a little creativity, this forthcoming “era of the UAS” may revolutionize the way we use the skies. But a quick glance at the news suggests that the integration of UASs into the NAS is not an entirely welcomed development, as issues of surveillance and privacy abuse dominate the public perception of domestic UASs.¹³ Because entrance into the NAS comes with a seemingly endless variety of uses by government and non-government actors, the FAA faces a great number of challenges in setting up UAS guidelines. For example, the “pesky residents” that the Oregon Department of Fish and Wildlife sought to monitor were predatory birds that affected the local salmon population¹⁴—the control of which was clearly a government-oriented operation of a UAS that should be subject to strict regulation under the FAA Modernization and Reform Act of 2012.¹⁵ But the UAS examples from Dallas and South Carolina involved private uses of UASs.¹⁶ Using private UASs raises completely separate issues of privacy, safety, and legality, and demonstrates that new rules issued by the FAA under the FAA Modernization and Reform Act of 2012 must address a wide range of uses beyond those commonly contemplated. Regulating sUASs poses a particularly difficult challenge for the FAA, especially when the new law is parsed. The new 2012 law defines sUASs as “unmanned aircraft weighing less than 55

¹¹ Holly Finn, *Friendly Skies: Drones to the Rescue*, WALL ST. J. (Dec. 28, 2012), <http://online.wsj.com/article/SB10001424127887324461604578189331326932270.html#>.

¹² Jason Koebler, *Burrito Bomber Attacks Hunger with Drone-Delivered Mexican Food*, U.S. NEWS & WORLD REP. (Dec. 21, 2012), <http://www.usnews.com/news/articles/2012/12/21/burrito-bomber-starts-the-drone-delivered-mexican-food>.

¹³ Joan Lowy, *Protect Privacy from Drones at Home, Lawmakers Say*, YAHOO! (July 20, 2012), <http://finance.yahoo.com/news/protect-privacy-drones-home-lawmakers-164015329.html>.

¹⁴ *Drones on Coast Scuttled for Lack of Permit*, *supra* note 9.

¹⁵ See FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 332, 126 Stat. 11, 73–75 (to be codified at 49 U.S.C. § 40101).

¹⁶ Mortimer, *supra* note 8; Keller, *supra* note 10.

pounds.”¹⁷ This definition would presumably include private sUASs that float outside the more loosely regulated confines of “model aircraft” (herein termed “recreational UASs”) found in section 336 of the Act.¹⁸ The language of the Act raises serious questions about the FAA’s overregulation of recreational UASs and opens up the risk of constitutional violations by potentially slowing or stopping the use of UASs for citizen “drone journalism.”

Part II of this comment first traces the evolution of the UAS from a military tool to a non-military domestic instrument, and then surveys current and future UAS use. UASs followed a rather utilitarian path in gaining their reputation as a war weapon, but that reputation is not fixed—the UAS is destined for ever-more-creative new uses. Part III reviews the current state of UAS law, focusing particularly on the FAA Modernization and Reform Act of 2012 and its provisions for UASs in the national airspace. This section briefly highlights state-level rumblings about UAS regulation and states’ efforts to remedy apparent deficiencies spotted in the forthcoming UAS regulatory scheme. Lastly, Part IV analyzes the developing FAA regulatory scheme for UASs and makes broad suggestions about certain topics. More technical issues such as pilot certification and airworthiness are beyond the scope of this comment and are not addressed. Instead, Part IV raises issues related to safety and privacy, and comments on current FAA approaches to these problematic areas. This section also focuses on recreational UASs that seem to fall between the regulatory cracks of the FAA Modernization and Reform Act of 2012, and it asks whether the uniform law is in fact the best solution to the difficulties posed by the FAA’s regulation of recreational UASs.

II. THE EVOLUTION OF THE UAS

The UAS likely entered the modern pop-culture lexicon due to highly popular military-based video games.¹⁹ Beyond pop culture, however, the rise in visibility of UASs has largely coincided with the post-9/11 War on Terror, which pushed the UAS into public consciousness as both a tool for surveillance and a con-

¹⁷ FAA Modernization and Reform Act of 2012 § 331(6).

¹⁸ *Id.* § 336.

¹⁹ See Claudine Beaumont, *Call of Duty: Modern Warfare 2: Why Video Games Can't Be Ignored*, THE TELEGRAPH (Nov. 13, 2009), <http://www.telegraph.co.uk/technology/video-games/6562828/Call-Of-Duty-Modern-Warfare-2-why-video-games-cant-be-ignored.html> (describing the popularity of such games).

troversial combat weapon.²⁰ Seared into public perception as a device used to watch and eliminate enemies from afar,²¹ the context surrounding UAS use in foreign theaters helped set the tone of current public debates concerning domestic UAS use and regulation, particularly as they relate to privacy concerns.²² Yet despite this recent and increased interest in UASs both at home and abroad, UASs are not entirely new actors. The UAS has old—even ancient—origins.²³

A. ANCIENT ORIGINS AND WARFARE

According to some commentators, the UAS's heritage stretches all the way back to fourth century B.C. Greece, when an engineer named Archytas devised a mechanical pigeon that was said to have flown upwards of 200 meters.²⁴ Contrary to what the popular conception of UASs might be now, it appears as though today's modern warfare tool was created "for science or spectacle" as much as it was for the battlefield.²⁵ As the centuries progressed, UASs acquired a military bent, even though their effectiveness on the war front was questionable.²⁶ In second century B.C. China, generals used kites to measure enemy distances,²⁷ and as recently as the 1800s, unmanned balloons and kites were crafted for warfare.²⁸ And even more recently, as the Germans began using unmanned "jet propelled flying bombs" to terrorize London during World War II,²⁹ the Japanese launched fire balloons up over the Pacific to take silent aim at

²⁰ See GEOFFREY S. CORN ET AL., *THE LAW OF ARMED CONFLICT: AN OPERATIONAL APPROACH* 29–30 (2012).

²¹ See Cora Currier, *How the Gov't Talks About a Drone Program It Won't Acknowledge Exists*, PROPUBLICA (Sept. 13, 2012), <http://www.propublica.org/article/how-the-govt-talks-about-a-drone-program-it-wont-acknowledge>.

²² See Andrew Cain, *GOP Delegate, ACLU to Push Legislation on Drones*, RICH. TIMES-DISPATCH (July 13, 2012), http://www.timesdispatch.com/news/gop-delegate-aclu-to-push-legislation-on-drones/article_6ca7ad96-bbfe-5b30-9876-fb6e59112fbd.html.

²³ See Brendan Gogarty & Meredith Hagger, *The Laws of Man over Vehicles Unmanned: The Legal Response to Robotic Revolution on Sea, Land and Air*, 19 J.L. INFO. & SCI. 73, 76 (2008).

²⁴ Brendan Gogarty & Isabel Robinson, *Unmanned Vehicles: A (Rebooted) History, Background and Current State of the Art*, 21 J.L. INFO. & SCI. 1, 3, n.5 (2011).

²⁵ *Id.* at 3.

²⁶ See Gogarty & Hagger, *supra* note 23, at 76–77.

²⁷ *Id.* at 76, n.6.

²⁸ *Id.* at 77, n.7.

²⁹ Stefan A. Kaiser, *Legal Aspects of Unmanned Aerial Vehicles*, 55 GERMAN J. AIR & SPACE L. 344, 344 (2006).

America's West Coast.³⁰ For some, the old-fashioned UASs worked just fine.

B. PATH TO MODERN MILITARY USE

Out of these rather unsophisticated origins, military use of UASs turned a corner around the time of World War I.³¹ Throughout the second decade of the twentieth century, the U.S. Navy enlisted aviation inventors Elmer and Lawrence Sperry, Glenn Hammond Curtiss,³² and Peter Hewitt to develop unmanned "aerial torpedoes" that "could [either] fly for preset distances [to slam into enemy ships once launched or] could be remotely controlled from another airplane."³³ Much of this early technology rested on breakthroughs in stabilization that allowed for the autopilot system as well as wireless remote control of a pilotless aircraft.³⁴ These efforts ultimately resulted in the Curtiss Sperry Aerial Torpedo,³⁵ which successfully flew a preplanned "target" route in 1918 and helped spur development of unmanned radio-controlled flying torpedoes in the 1920s.³⁶

By the time World War II began, unmanned aerial technology was a promising weapon to many countries worldwide.³⁷ While the United States unsuccessfully experimented with a system that utilized a hybrid manned/unmanned radio-controlled plane that remotely flew explosives toward a target after the pilot parachuted out of the plane,³⁸ Germany very successfully ex-

³⁰ David Kravets, *May 5, 1945: Japanese Balloon Bomb Kills 6 in Oregon*, WIRED (May 5, 2010), <http://www.wired.com/thisdayintech/2010/05/0505japanese-balloon-kills-oregon/>. Of the estimated 9,000 unmanned fire balloons steered towards the U.S. coast, just several hundred made it across the Pacific, with one causing the only stateside "combat" deaths of World War II. *Id.*

³¹ See Travis Dunlap, Comment, *We've Got Our Eyes on You: When Surveillance by Unmanned Aircraft Systems Constitutes a Fourth Amendment Search*, 51 S. TEX. L. REV. 173, 176-77 (2009).

³² *Id.* at 176 & n.11.

³³ Mark Edward Peterson, *The UAS and the Current and Future Regulatory Construct for Integration into the National Airspace System*, 71 J. AIR L. & COM. 521, 537 (2006).

³⁴ *Id.* at 537-38.

³⁵ *Id.* at 538-39; see also Dunlap, *supra* note 31, at 176.

³⁶ Peterson, *supra* note 33, at 540; Timothy M. Ravich, *The Integration of Unmanned Aerial Vehicles into the National Airspace*, 85 N.D. L. REV. 597, 601-02 (2009).

³⁷ See, e.g., Dunlap, *supra* note 31, at 177; Peterson, *supra* note 33, at 540-42; Ravich, *supra* note 36, at 601-02.

³⁸ Ravich, *supra* note 36, at 601-02.

ploited its unmanned "vengeance weapons," the V1 flying bomb and V2 rocket bomb, to wreak havoc on the European Allies.³⁹

Although these "target aim" uses might more appropriately fall under the category of "missile" rather than UAS,⁴⁰ these early advances in unmanned flights, combined with the onset of the Cold War, drove American interest in "surveillance and reconnaissance" UASs.⁴¹ This interest accelerated when a U.S. spy plane was shot down while flying over the USSR.⁴² The Vietnam War integrated the UAS into combat beyond the "flying bomb" that marked World War II use.⁴³ However, UAS missions were not purely dedicated to intelligence gathering; rather, they also included "psychological operations such as dropping leaflets, and even decoy operations."⁴⁴ Thus, even though it had lost usefulness as a "target" weapon, the UAS never lost its potential for use as an unconventional weapon.⁴⁵ Despite this potential, however, the end of the Vietnam conflict, plus a host of other political, technological, and institutional factors, slowed UAS development in the United States throughout the 1980s.⁴⁶

In the 1990s, pressed by Israel's successful use of UASs in combat against Syria in 1982, the U.S. Pentagon pushed for the development of UASs that could wage "asymmetrical warfare."⁴⁷ Within the decade, the General Atomics' Predator and the Northrop Grumman's Global Hawk had established themselves as the surveillance UASs of choice for the U.S. military.⁴⁸ Beginning in 2000, the Predator morphed from a purely surveillance vehicle into an unmanned aerial weapon, effectively ushering in

³⁹ Kaiser, *supra* note 29, at 344 n.3; see Dunlap, *supra* note 31, at 177; Peterson, *supra* note 33, at 541-42.

⁴⁰ Dunlap, *supra* note 31, at 176.

⁴¹ Peterson, *supra* note 33, at 543-45.

⁴² Adam N. Stulberg, *Managing the Unmanned Revolution in the U.S. Air Force*, 51 ORBIS 251, 253 (2007).

⁴³ See, e.g., Dunlap, *supra* note 31, 178-79 (describing the effectiveness of Air Force and Navy UASs in surveillance); Peterson, *supra* note 34, at 535, 543-45 (noting that UAS use included "electronic and communication intelligence collection").

⁴⁴ Peterson, *supra* note 33, at 544.

⁴⁵ *Id.*

⁴⁶ Stulberg, *supra* note 42, at 253. Several different barriers slowed UAS development and advancement, including "technological deficiencies, political ambivalence, inter-service rivalry, pilot resistance, arms-control constraints, and the development of stealthy manned weapons systems." *Id.*

⁴⁷ *Id.*

⁴⁸ See *id.*

the modern era of lethal UAS use by the United States.⁴⁹ Within years of turning lethal, “attack” UASs soon spread to the CIA; after 9/11, they became major players in armed conflicts around the globe—most notably in U.S.-led efforts in Afghanistan and Iraq, but also outside of U.S.-engaged combat zones.⁵⁰ UASs “are now ubiquitous on the modern day battlefield”⁵¹ and will likely be used in a variety of combat-oriented ways in the future, including as aerial combat and bomber UASs (called UAVCs) as well as for combat support.⁵²

C. DOMESTIC REPURPOSEMENT

A good deal of attention has been given to the potential use of UASs by law enforcement. As early as 2005, the U.S. Customs and Border Protection Agency began using UASs to patrol the U.S.–Mexico border.⁵³ With incredible clarity from nearly 20,000 feet in the air, Border Patrol UASs can spot human smugglers and drug runners and then point manned assets in their direction.⁵⁴ It is precisely this type of efficiency that makes UASs so attractive to law enforcement agencies across the country,⁵⁵ even though the use of UASs for law enforcement purposes has been criticized beyond the oft-mentioned privacy and surveillance concerns associated with it.⁵⁶

⁴⁹ See Mary Ellen O’Connell, *Seductive Drones: Learning from a Decade of Lethal Operations*, 21 J.L. INFO. & SCI. 116, 118 (2011).

⁵⁰ See *id.* at 119–20. While attack UAS usage in combat zones slowly increased under President Bush, this use rapidly increased and actually expanded in scope under President Obama beginning in 2009. See *id.* at 120–22. Combat UASs were used in Somalia beginning in 2006 under President Bush; more recently, President Obama dispatched combat UASs to Libya in 2011. *Id.* at 121–22. This use is controversial in the international community. See *id.* at 120–22.

⁵¹ Jenks, *supra* note 1, at 650.

⁵² See Kaiser, *supra* note 29, at 344–45, 344, n.5.

⁵³ William Booth, *More Predator Drones Fly U.S.-Mexico Border*, WASH. POST (Dec. 21, 2011), http://articles.washingtonpost.com/2011-12-21/world/35285176_1_drone-caucus-predator-drone-domestic-drones.

⁵⁴ Ed Lavandera, *Drones Silently Patrol U.S. Borders*, CNN (Mar. 12, 2010), http://articles.cnn.com/2010-03-12/us/border.drones_1_border-patrol-predator-unmanned-aircraft?_s=PM:US.

⁵⁵ See Dunlap, *supra* note 31, 180–81.

⁵⁶ See Andrew Becker & G.W. Schultz, *At U.S. Border, Expensive Drones Generate Lots of Buzz, Few Results*, CENTER FOR INVESTIGATIVE REPORTING (July 15, 2012), <http://cironline.org/reports/us-border-expensive-drones-generate-lots-buzz-few-results-3602>. Questions exist over whether law enforcement UASs like those used by the U.S. Border Patrol are cost-efficient enough to warrant continued and expanded use, particularly in light of the small amount of flight time they receive due to weather complications and flawed plans for strategic use. *Id.*

But it would be erroneous to assume that domestic UAS use rises to the level of aerial police surveillance in every case.⁵⁷ For example, the Washington State Department of Transportation has sought to use UASs to assist in state avalanche management activities.⁵⁸ From studies conducted by the University of Michigan involving solar power⁵⁹ to environmental research conducted by Texas State University and Texas A&M University,⁶⁰ institutions of higher learning across the country have turned to UASs for assistance in their research efforts. But if any one governmental agency must be credited with advancing domestic repurposement of UASs and demonstrating their wide potential for peaceful civilian use, a strong case could be made for the National Aeronautics and Space Administration (NASA).

Long before UASs were recognized as flying machines of war and the potential eyes of an abusive police state, NASA began planning to add civil UASs to its Environmental Research Aircraft and Sensor Technology (ERAST) project.⁶¹ ERAST, which began in the 1990s, aimed to add a new type of air support to NASA's Earth science missions.⁶² NASA started collecting a variety of UASs in the early 2000s;⁶³ the first in its collection was an "enlarged version" of General Atomics Aeronautical Systems Incorporated's (GA-ASI) reconnaissance "Predator B" UAS.⁶⁴ The projected uses for NASA UASs are far less flashy than the space missions typically associated with NASA, but the dynamic research capabilities provided by unmanned aircraft are just as ex-

⁵⁷ For example, the American Civil Liberties Union has a webpage set up to highlight the use of domestic UASs that almost exclusively focuses on the potential surveillance and tracking activities of law enforcement. *Domestic Drones*, ACLU, <http://www.aclu.org/blog/tag/domestic-drones> (last visited May 17, 2013).

⁵⁸ Jennifer Lynch, *Newly Released Drone Records Reveal Extensive Military Flights in US*, ELECTRONIC FRONTIER FOUND. (Dec. 5, 2012), <https://www EFF.ORG/deep-links/2012/12/newly-released-drone-records-reveal-extensive-military-flights-us>.

⁵⁹ *Id.*

⁶⁰ Asher Price, *High above Texas' Rivers, Drones Track Environmental Data*, AUSTIN AMERICAN-STATESMAN (June 18, 2012), <http://www.statesman.com/news/news/local/high-above-texas-rivers-drones-track-environment-1/nRpYc/>.

⁶¹ See ERAST—*Environmental Research Aircraft and Sensor Technology*, NASA (Dec. 2, 2009), <http://www.nasa.gov/centers/dryden/news/FactSheets/FS-020-DFRC.html>.

⁶² *Id.*

⁶³ *Id.*; see *About Us: A Civil Future for Unmanned Aircraft Systems*, NASA, http://www.aeronautics.nasa.gov/isrp/uas/uas_civilian.htm (last visited Jan. 2, 2013).

⁶⁴ *Altair/Predator B Fact Sheet*, NASA, <http://www.nasa.gov/centers/dryden/news/FactSheets/FS-073-DFRC.html> (last visited Jan. 2, 2013).

citing for scientists.⁶⁵ For example, NASA envisions using its “Ikhana”⁶⁶ and “Altair” Predator B UASs for various Earth science projects that range from “[v]olcanic observation over Hawaii [to] forest fire monitoring over the western states.”⁶⁷ In 2009, NASA launched its Characterization of Arctic Sea Ice Experiment (CASIE) UAS to begin tracking Arctic polar ice in ways not previously possible with manned aircraft, which pose environmental hazards and have more limited flight duration.⁶⁸ And the use of repurposed Northrup Grumman Global Hawks has provided an entirely new form of data sampling for NASA’s atmospheric science studies,⁶⁹ including flights above and sometimes into hurricanes building in the Atlantic.⁷⁰

As the preceding examples demonstrate, the same UAS that enables the Border Patrol to detect and locate drug smugglers can also assist in a variety of non-law-enforcement activities. UASs are also capable of mapping, inspection, wildlife census, first response, surveying, and support applications.⁷¹ And as UAS technology advances, it is clear that these uses will continue to diversify and multiply.

D. UASs FOR HIRE AND STUDY

Along with a plethora of civilian uses, UASs hold great commercial potential.⁷² To the Hollywood crowd, UASs offer a new

⁶⁵ See Mara Grunbaum, *Why NASA Is Flying Drones into Hurricanes*, POPULAR MECHANICS (Sept. 6, 2012), http://www.popularmechanics.com/science/environment/natural-disasters/why-nasa-is-flying-drones-into-hurricanes-12437824?click=main_sr (describing advantages provided by NASA UASs in advancing meteorological intel on hurricanes).

⁶⁶ *Ikhana/Predator B Fact Sheet*, NASA (Aug. 15, 2007), <http://www.nasa.gov/centers/dryden/news/FactSheets/FS-097-DFRC.html> (last visited Jan. 2, 2013). A newer, modified Predator B obtained from GA-ASI in 2006, Ikhana is “designed for long-endurance, high-altitude flight,” primarily for suborbital studies. *Id.*

⁶⁷ *Altair/Predator B Fact Sheet*, *supra* note 64.

⁶⁸ Ruth Dasso Marialre, *NASA’s Unmanned Aircraft ‘Fired Up’ for Arctic Sea Ice Expedition*, NASA (July 16, 2009), <http://www.nasa.gov/centers/ames/news/features/2009/casie.html>.

⁶⁹ Mike Carlowicz, *NASA’s Global Hawk Completes First Science Flight over the Pacific*, NASA (April 8, 2010), <http://www.nasa.gov/topics/earth/features/global-hawk.html>.

⁷⁰ Grunbaum, *supra* note 65.

⁷¹ See Frank Tobe, *Three Different Worlds; One Big Show*, EVERYTHING-ROBOTIC (Aug. 13, 2012, 2:33 PM), <http://www.everything-robotic.com/2012/08/three-different-worlds-one-big-show.html>.

⁷² See Patrick Hruby, *Out of “Hobby” Class, Drones Lifting off for Personal, Commercial Use*, WASH. TIMES (Mar. 14, 2012), <http://www.washingtontimes.com/news/2012/mar/14/out-of-hobby-class-drones-lifting-off-for-personal/?page=all>.

and less expensive way to capture the perfect aerial shot a director must have.⁷³ United Parcel Service and Federal Express may soon “speed deliver” items across the country in UASs caravan-style, with one manned plane followed by a line of UASs in tow.⁷⁴ For years, the energy sector has envisioned using UASs to assist in “oil, gas and mineral exploration as well as pipeline and facility monitoring.”⁷⁵ And while these anticipated commercial UASs might seem impressive, few seem ready to completely transform an industry the way “drone journalism” may.⁷⁶

Highly mobile, inexpensive, and relatively easy-to-operate, newsgathering UASs stand poised to revolutionize the media in much the same way the Internet has changed the print media—every person with a UAS can become a citizen-journalist capable of breaking or tracking a story.⁷⁷ But drone journalism is not merely reserved for the hobbyist with a knack for reporting.⁷⁸ Indeed, the prospect for remarkable change in journalism is so promising that the University of Nebraska-Lincoln established the trailblazing Drone Journalism Lab at its College of Journalism and Mass Communications in 2011; the Lab is used “to explore how drones could be used for reporting,”⁷⁹ which suggests that major commercial media may well turn to UASs to help gather the product that they in turn sell to the masses. Some

⁷³ Michael Morisy, *Lights, Drones, Action: Hollywood's High Flyers Hit Boston*, BOSTON.COM (Dec. 14, 2012, 6:29 PM), <http://www.boston.com/business/innovation/blogs/inside-the-hive/2012/12/13/lights-drones-action-hollywood-high-flyers-hit-boston/YfZuJFcViLhVHKIXmrdBJ/blog.html>.

⁷⁴ See Conniff, *supra* note 7.

⁷⁵ Joseph Barnard, *UASs Aid in Exploration, Production*, E&P (July 5, 2007), <http://www.epmag.com/archives/print/481.htm>.

⁷⁶ See Matt Waite, *Here Come Flying News Robots*, TYEE (July 23, 2012), <http://thetyee.ca/Mediacheck/2012/07/23/News-Drones/> (explaining the vast potential for inexpensive drone journalism in an era of cutbacks and reductions in the media business).

⁷⁷ See Sarah Carlson, *Drones: More than Mechanized Warfare*, INTERNATIONAL (Jan. 1, 2013), <http://www.theinternational.org/articles/290-drones-more-than-mechanized-warfare> (recalling the use of UASs during “Occupy Wall Street” protests to “capture the events from rare vantage points”).

⁷⁸ See Clay Dillow, *News Corp's "The Daily" Has Its Own News-Gathering Aerial Drone, Which Is Drawing FAA Inquiries*, POPULAR SCI. (Aug. 3, 2011), <http://www.popsci.com/technology/article/2011-08/news-corps-daily-has-news-gathering-drone-aircraft-drawing-faa-interest>.

⁷⁹ *About the Lab*, DRONE JOURNALISM LAB, <http://www.dronejournalismmlab.org/about> (last visited May 29, 2013). The Lab has already engaged in cutting-edge, investigative drone reporting in the past year, focusing on the record drought that ravaged Nebraska in 2012. See Matthew Waite, *How We Used a Drone to Cover Drought*, DRONE JOURNALISM LAB (Oct. 26, 2012, 3:52 PM), <http://www.dronejournalismmlab.org/post/34363827984/how-we-used-a-drone-to-cover-drought>.

analysts expect the commercial UAS market to double within the decade, and as the UAS industry expands, the demand for well-trained UAS managers is expected to grow with it.⁸⁰

In fact, one has to look no further than America's universities to see the impact that the burgeoning UAS market is having on students' career choices.⁸¹ In 2007, the University of North Dakota unveiled the first four-year degree with an emphasis in UAS operations, and other universities soon followed suit.⁸² According to some reports, the need for future commercial and civilian UAS operators is already so great that the United States is presently facing a shortage,⁸³ and students graduating with a degree in UAS piloting can expect to find not only work but also job security and high pay.⁸⁴ The emergence of the commercial UAS will undoubtedly continue to drive more students into the UAS educational field as the commercial and civilian markets open up and more UAS operators are needed.

E. A FUTURE FOR HOBBY UASs

As UASs have evolved from military weapons to civilian tools and commercial instruments, they have gained quite the following among amateurs.⁸⁵ Weighing less than one pound in some cases,⁸⁶ the recreational UAS can bear a striking resemblance to its military ancestors—shaped like a five-foot, miniature version of a stealth bomber—or can be cobbled together from Legos.⁸⁷

⁸⁰ See Mitch Joel, *The Booming Business of Drones*, HARV. BUS. REV. (Jan. 4, 2013), http://blogs.hbr.org/cs/2013/01/the_booming_business_of_drones.html.

⁸¹ Jon Marcus, *Drop the Pilot: Drone Courses Pursued in Search of Security*, TIMES HIGHER EDUC. (Jan. 5, 2012), <http://www.timeshighereducation.co.uk/story.asp?storycode=418563>. Several large state institutions, including the University of North Dakota, Kansas State University, and New Mexico State University, have begun to offer degrees and/or courses in UAV/UAS operations. *Id.*

⁸² *Id.*

⁸³ *Id.*

⁸⁴ Rick Montgomery, *Drones Move from the War Zone to the Heartland*, WICHITA EAGLE (July 1, 2012), <http://www.kansas.com/2012/07/01/2394586/drones-move-from-the-war-zone.html>.

⁸⁵ *Attack of the Drones: The Amateur Enthusiasts Crowding the Sky with Miniature Stealth Planes Like the CIA's*, DAILY MAIL (Apr. 1, 2012), <http://www.dailymail.co.uk/news/article-2123813/Attack-drones-The-amateur-enthusiasts-crowding-sky-miniature-stealth-planes-resembling-CIAs.html> (reporting on the rapidly growing, "global do-it-yourself drone subculture" and noting the establishment of web-based UAS communities such as DIYdrones.com).

⁸⁶ Joel Johnson, *Parrot AR Drone 2.0 Review: Your Own Private Predator*, GIZMODO (Aug. 8, 2012), <http://gizmodo.com/5931424/parrot-ar-drone-20-review-your-own-private-predator>.

⁸⁷ *Attack of the Drones*, *supra* note 85.

Just as hobbyists accelerated innovation during the computer movement of the 1980s, UAS enthusiasts are now helping to push UASs into the mainstream.⁸⁸ With a bit of creative genius, collaborative Internet-based community help, and an iPad, almost anyone can toss a sophisticated, camera-carrying UAS into the air that is capable of navigating itself with little human assistance.⁸⁹ If current estimates of recreational UAS use are correct, amateur users now fly far more UASs than do public entities, including the military.⁹⁰ Much the way the computer boom did, this backyard UAS boom offers limitless possibilities to change the face of everyday life in the future. As enthusiasts find new ways to drive down the costs of component parts, UASs are only bound to become more common. But the same combination of increasing popularity, ease of use, and affordability that is driving recreational UASs into the mainstream is also creating headaches for regulation under the new FAA Modernization and Reform Act of 2012 (FAA Modernization Act).

III. CURRENT LAW FOR UAS USE

On February 14, 2012, President Barack Obama signed H.R. 658 (more commonly called the FAA Modernization and Reform Act of 2012) into law.⁹¹ Debated for over a year before it was enacted in 2012,⁹² the FAA Modernization Act is both an appropriations law—extending funding for the FAA through the 2014 fiscal year—and a reform law designed to “streamline programs, create efficiencies, reduce waste, and improve aviation safety and capacity.”⁹³ Prior to the Act, Congress had been reauthorizing FAA funding on a “stopgap” basis since the last multi-year FAA reauthorization law expired in 2007.⁹⁴ This piecemeal approach to funding made it difficult to engage in

⁸⁸ See Chris Anderson, *How I Accidentally Kickstarted the Domestic Drone Boom*, WIRED (June 22, 2012), http://www.wired.com/dangerroom/2012/06/ff_drones/all/ (describing the author's role in founding DIYdrones.com and pushing recreational UAS use onto the public stage).

⁸⁹ See *id.*

⁹⁰ *Id.*

⁹¹ FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, §§ 331–336, 126 Stat. 11, 72–78 (to be codified at 49 U.S.C. § 40101).

⁹² Overview—H.R. 658 (112th Congress): FAA Modernization and Reform Act of 2012, GOVTRACK.US, <http://www.govtrack.us/congress/bills/112/hr658> (last visited May 29, 2013).

⁹³ FAA Modernization and Reform Act of 2012 §§ 331–336.

⁹⁴ 158 CONG. REC. H445–46 (daily ed. Feb. 3, 2012) (statement of Rep. Webster).

long-term planning in the aviation sector⁹⁵ and execute the direction set forth in 2003's Vision 100—Century of Aviation Reauthorization Act (Vision 100 Act), which laid out the future of the “Next Generation Air Transportation System” (NextGen) to manage the modern NAS.⁹⁶ UASs rapidly evolved during the time the Vision 100 Act was passed because the Act's NextGen focus merely recognized that UASs would need to be “accommodated” in the future NAS.⁹⁷ For this reason, along with the fact that Congress failed to reauthorize FAA funding in a more comprehensive fashion from 2007 to 2012,⁹⁸ Washington did not seriously propose a long-term vision for UASs until the FAA Modernization Act came to fruition.⁹⁹ The governing law for UASs, as it presently stands, thus comes from not one, but several sources.

A. THE FAA AND COA CONTROL OF UASs

The federal government has “exclusive sovereignty” over U.S. airspace,¹⁰⁰ and U.S. citizens have a “public right of transit” through that airspace.¹⁰¹ Due to concern that the NAS lacked a coordinated direction to prevent accidents, the FAA was created when President John F. Kennedy signed the Federal Aviation Act into law in 1958 to “provide for the safe and efficient use” of the NAS.¹⁰² The FAA Administrator has the authority to “develop plans and policy for the use of the navigable airspace,”¹⁰³ defined as the “airspace above the minimum altitudes of flight prescribed by regulations under [federal law].”¹⁰⁴ The FAA Administrator also has the capacity to “assign by regulation or order the use of airspace necessary to ensure the safety of aircraft and the efficient use of airspace.”¹⁰⁵ Throughout its history, the

⁹⁵ *Id.* at 445.

⁹⁶ See BART ELIAS, CONG. RES. SERV., R42718, PILOTLESS DRONES: BACKGROUND AND CONSIDERATIONS FOR CONGRESS REGARDING UNMANNED AIRCRAFT OPERATIONS IN THE NATIONAL AIRSPACE SYSTEM 4–5 (2012).

⁹⁷ *Id.* at 4.

⁹⁸ 158 CONG. REC. H445 (daily ed. Feb. 3, 2012) (statement of Rep. Webster).

⁹⁹ See FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, §§ 331–336, 126 Stat. 11, 72–78 (to be codified at 49 U.S.C. § 40101).

¹⁰⁰ 49 U.S.C. § 40103(a)(1) (2006).

¹⁰¹ *Id.* § 40103(a)(2).

¹⁰² *A Brief History of the FAA*, FAA, http://www.faa.gov/about/history/brief_history/ (last visited May 29, 2013).

¹⁰³ 49 U.S.C. § 40103(b).

¹⁰⁴ *Id.* § 40102(a)(32).

¹⁰⁵ *Id.* § 40103(b).

FAA has often had to react to technological changes rather than plan for them in advance;¹⁰⁶ however, because the FAA paid attention to UAS technology as it evolved, it was somewhat ready to handle UAS entry into the NAS.¹⁰⁷

In 2005, the FAA issued notice that due to a “dramatically” increasing demand for UAS use by both public and private actors,¹⁰⁸ it would begin to require operators of non-recreational UASs to obtain clearance from the FAA¹⁰⁹ before the UASs could enter the NAS.¹¹⁰ As might be expected, current FAA policy divides UASs that require NAS consent into two categories: public and civil.¹¹¹ A “public” UAS is “one that is intrinsically governmental in nature”¹¹²—meaning one that is owned and operated by a governmental entity or that is “exclusively leased for at least 90 continuous days” by a governmental entity.¹¹³ Users of public UASs must apply for a “certificate of waiver or authorization” (COA) to use the NAS.¹¹⁴ When a public UAS operator seeks to use the UAS “wholly within an active Restricted, Prohibited or Warning Area airspace,” a COA is unnecessary.¹¹⁵ The operator does, however, need permission from the entity controlling that airspace to operate the UAS in the secured area.¹¹⁶

“Civil” UASs, on the other hand, are all other non-recreational UASs that are not public UASs.¹¹⁷ Civil UAS operators

¹⁰⁶ See *A Brief History of the FAA*, *supra* note 102.

¹⁰⁷ See ELIAS, *supra* note 96, at 5.

¹⁰⁸ FAA, MEMORANDUM: UNMANNED AIRCRAFT SYSTEMS OPERATIONS IN THE U.S. NATIONAL AIRSPACE SYSTEM, AFS-400 UAS POLICY 05-01 (Sept. 16, 2005).

¹⁰⁹ See *Unmanned Aircraft (UAS): Questions and Answers*, FAA, http://www.faa.gov/about/initiatives/uas/uas_faq/ (last visited May 29, 2013) (clarifying the privileges of recreational UAS use).

¹¹⁰ MEMORANDUM: UNMANNED AIRCRAFT SYSTEMS OPERATIONS IN THE U.S. NATIONAL AIRSPACE SYSTEM, *supra* note 108.

¹¹¹ FAA, INTERIM OPERATIONAL APPROVAL GUIDANCE 08-01: UNMANNED AIRCRAFT SYSTEMS OPERATIONS IN THE U.S. NATIONAL AIRSPACE SYSTEM 5 (2008) [hereinafter INTERIM GUIDE].

¹¹² *Id.* The guide deems “federal, state, and local agencies” as “public.” *Id.*

¹¹³ See 49 U.S.C. § 40102(a)(41) (2006).

¹¹⁴ INTERIM GUIDE, *supra* note 111, at 5.

¹¹⁵ *Id.*

¹¹⁶ See *id.* at 6.

¹¹⁷ See 49 U.S.C. § 40102(a)(16–17). The Interim Guide fails to state what constitutes a “civil” UAS other than to note that neither the Guide nor “the processes prescribed . . . apply to hobbyists and amateur” UAS operators when their UASs are used for “sport and recreation.” See INTERIM GUIDE, *supra* note 111, at 5. Although these definitions appear to present problems of definitional line blurring, provisions under the new FAA Modernization Act resolve this discrepancy,

have a right to the NAS.¹¹⁸ However, to use a civil UAS in the NAS, the civil operator must obtain a “special airworthiness certificate,” which is often categorized as “experimental.”¹¹⁹ To secure this certificate, operators must ensure their UASs conform to the same airworthiness standards that other aircraft must meet.¹²⁰ Although experimental certificates generally have a longer shelf life than public COAs, they are harder to secure because they are only extended to those engaged in UAS production.¹²¹ The practical effect of this categorization is the grounding of any UASs that might be used for commercial purposes.¹²² At present, this is the only method by which a civil UAS can obtain NAS entry.¹²³ In the event that a UAS can double as either a public UAS or a civil UAS, the operator must designate the UAS as one or the other before flying a planned route.¹²⁴ This is likely due to the disparate treatment that public and civil UASs receive in both scope of use and duration of flight.¹²⁵

Unlike public and civil UASs, recreational UASs are exempt from the FAA NAS approval process.¹²⁶ Instead, the FAA currently directs recreational UAS users to follow its Model Aircraft Operating Standards found in Advisory Circular 91-57 (AC 91-57).¹²⁷ Issued in 1981, AC 91-57 set *voluntary* operating procedures for flying model aircraft.¹²⁸ To encourage safe use during recreational or “sport” flights, the FAA stated that hobby aircraft should not be flown more than 400 feet above ground level.¹²⁹ AC 91-57 further stated that model operators should: (1) give

in part defining model UASs as “aircraft . . . flown *strictly* for hobby or recreational use.” See FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 336(a)(1), 126 Stat. 11, 77 (emphasis added).

¹¹⁸ See 49 U.S.C. § 40103(a)(2) (“A citizen of the United States has a public right of transit through the navigable airspace.”).

¹¹⁹ INTERIM GUIDE, *supra* note 111, at 6.

¹²⁰ Unmanned Aircraft Operations in the National Airspace System, 72 Fed. Reg. 6689, 6689-90 (Feb. 13, 2007).

¹²¹ See ELIAS, *supra* note 96, at 6.

¹²² See *id.* (explaining that special airworthiness certificates “offer the only legal route for private entities to operate unmanned aircraft for commercial purposes”).

¹²³ See *id.*

¹²⁴ INTERIM GUIDE, *supra* note 111, at 6.

¹²⁵ See *id.*; see also ELIAS, *supra* note 96, at 6 (noting tight restrictions on COAs for public UASs).

¹²⁶ See *Unmanned Aircraft (UAS): Questions and Answers*, *supra* note 109.

¹²⁷ INTERIM GUIDE, *supra* note 111, at 5.

¹²⁸ FAA, U.S. DEP’T OF TRANSP., ADVISORY CIRCULAR 91-57: MODEL AIRCRAFT OPERATING STANDARDS (1981).

¹²⁹ *Id.*

notice to the proper air traffic authorities when flying within three miles of an airport; (2) yield the right-of-way to manned planes as necessary; and (3) attempt to fly in less populated areas.¹³⁰

Recreational UASs should be used, according to the FAA, “within visual line-of-sight,”¹³¹ meaning that the UAS should be directly viewable “with human eyesight” while in the air.¹³² Under current FAA rules, recreational UASs cannot be used for business purposes.¹³³ Despite these guidelines and the rules proscribing commercial use of UASs,¹³⁴ the FAA has expressed concern that some operators are in fact using AC 91-57 to accommodate for-hire use of sUASs; the FAA is therefore looking into how to curb this type of operation.¹³⁵ The confusion that exists over the permissibility of this operation is indicative of both how outdated the regulations are and why new guidance is needed in this area.

B. A NEW ERA FOR UASs: THE FAA MODERNIZATION AND REFORM ACT OF 2012

In passing the FAA Modernization Act, Congress effectively ushered in the “era of the UAS.” As the first long-term FAA appropriations law enacted since 2003, the Act addresses UAS entry into the NAS in a way previous FAA reauthorization acts did not.¹³⁶ Recognizing the untapped revenue available in the emergent UAS market,¹³⁷ Congress laid the groundwork for accelerated UAS entry into the NAS by including provisions in the Act that direct the U.S. Department of Transportation (DOT) to make way for full integration of civil UASs by the end of Septem-

¹³⁰ *Id.*

¹³¹ Unmanned Aircraft Operations in the National Airspace System, 72 Fed. Reg. 6689, 6690 (Feb. 13, 2007).

¹³² INTERIM GUIDE, *supra* note 111, at 4.

¹³³ *See id.* at 5 (stating that the COA/Special Certificate process does not apply to recreational UASs used for “sport and recreation”); *see also Unmanned Aircraft (UAS): Questions and Answers*, *supra* note 109 (clarifying that recreational UASs are not to be used for business purposes).

¹³⁴ INTERIM GUIDE, *supra* note 111, at 6.

¹³⁵ *See, e.g.*, Small Unmanned Aircraft System Aviation Rulemaking Committee, FAA Order No. 1110.150 (Apr. 10, 2008); ELIAS, *supra* note 96, at 2.

¹³⁶ *See* ELIAS, *supra* note 96, at 4–5.

¹³⁷ *See, e.g.*, FAA, U.S. DEP’T OF TRANSP., FAA AEROSPACE FORECAST FISCAL YEARS 2010-2030, at 48 (2010); FAA, U.S. DEP’T OF TRANSP., FAA AEROSPACE FORECAST FISCAL YEARS 2012-2032, at 57 (2012).

ber 2015¹³⁸ and of public UASs by the end of December 2015.¹³⁹ The urgency of developing a comprehensive integration plan is clear from the benchmark deadlines set in the Act.¹⁴⁰

The FAA Modernization Act's discussion of UASs can be divided into three component parts, each addressing categories already established by the FAA: public UAS operation, civil UAS operation, and recreational UAS operation.¹⁴¹ Because the regulations surrounding public UASs were already quite developed by the FAA prior to the FAA Modernization Act's passage,¹⁴² the new law focuses on streamlining and simplifying the burden posed by the public UAS authorization process.¹⁴³ Most notably, Congress instructed the DOT to cut down on the length of time for COA issuance, requiring a decision within sixty business days of application.¹⁴⁴ This adjustment requires "expedited appeal" in the event an application is rejected.¹⁴⁵ The FAA Modernization Act addresses foreseeable problematic use by urging the DOT to warn public entities of their responsibilities when flying a UAS without an FAA airworthiness certificate.¹⁴⁶ The FAA Modernization Act also extends public UAS use to low altitudes, so long as the UAS is lightweight (less than 4.4 pounds) and is operated in uncontrolled airspace in daylight and within line of sight.¹⁴⁷

For civil UAS integration, the FAA Modernization Act contains a laundry list of directives. The progress of integration rests on FAA rulemaking—rulemaking for which the DOT's comprehensive integration plan must offer guidance.¹⁴⁸ The plan must contain recommendations on operating/certification standards, "sense and avoid capability" requirements, and pilot/operator registration and licensing.¹⁴⁹ Within a year and a half of the plan's submission, the FAA must issue a notice of proposed rules

¹³⁸ See FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 332, 126 Stat. 11, 73 (to be codified at 49 U.S.C. § 40101).

¹³⁹ *Id.* § 334(b).

¹⁴⁰ See *id.* §§ 332(a)(1), 334(a) (requiring the DOT to develop the integration plan for civil UASs and guidance on public UASs operation within 270 days of the Act's ratification).

¹⁴¹ See *id.* §§ 332, 334, 336.

¹⁴² See INTERIM GUIDE, *supra* note 111, at 4–6.

¹⁴³ See FAA Modernization and Reform Act of 2012 § 334.

¹⁴⁴ *Id.* § 334(a)(1), (c)(2).

¹⁴⁵ *Id.* § 334(c)(2)(A)(iii).

¹⁴⁶ *Id.* § 334(a)(4).

¹⁴⁷ *Id.* § 334(c)(2)(C).

¹⁴⁸ See *id.* § 332(a)(1), (2).

¹⁴⁹ See *id.* § 332(a)(2).

for civil UAS operation in the NAS.¹⁵⁰ The FAA then has roughly another year and a half to issue and implement the new rules.¹⁵¹ The new rules must include a final rule for sUASs that would otherwise qualify as model aircraft but for their commercial orientation.¹⁵² The FAA Modernization Act states that the DOT's comprehensive plan must anticipate the creation of an NAS designation for "cooperative" manned and UAS flights, which, along with the integration of civil UASs, must be mixed in with the FAA's yearly NextGen report.¹⁵³ The FAA Modernization Act also establishes a UAS test-range program; because this is the first step toward civil and public UAS integration, the program is attracting a lot of attention.¹⁵⁴ The FAA believes that the test-site program will "assist in the effort to safely and efficiently integrate UAS into the NAS"¹⁵⁵ and aid in developing "detection techniques" for sUASs.¹⁵⁶ But whether the DOT can meet its deadlines is already questionable.¹⁵⁷

The FAA Modernization Act addresses recreational UAS operation in a way previous FAA reauthorization law had not. It contains special rules dedicated solely to "model aircraft,"¹⁵⁸ which it defines as any "unmanned aircraft" that is "capable of sustained flight[,] flown within visual line of sight . . . and . . . flown for hobby or recreational purposes."¹⁵⁹ Subject to few exceptions, the FAA is barred from regulating model UASs that meet all the criteria required for exemption.¹⁶⁰ To qualify as a UAS outside of the FAA's reach, the aircraft must be "flown strictly for hobby or recreational use" and must be "operated in accordance with a community-based set of safety guidelines and within the programming of a nationwide community-based or-

¹⁵⁰ *Id.* § 332(b).

¹⁵¹ *Id.* § 332(b)(2).

¹⁵² *Id.* § 332(b)(1).

¹⁵³ *Id.* § 332(a)(2).

¹⁵⁴ *Id.* § 332(c).

¹⁵⁵ See Unmanned Aircraft System Test Sites, 77 Fed. Reg. 14,319, 14,319 (proposed Mar. 9, 2012) (to be codified at 14 C.F.R. pt. 91).

¹⁵⁶ FAA Modernization and Reform Act of 2012 § 332(c)(5)(B).

¹⁵⁷ See Stephen Pope, *FAA Slows Pace of UAS Integration*, FLYING (Nov. 21, 2012), <http://www.flyingmag.com/news/faa-slows-pace-uav-integration?cmpid=ews112212&spPodID=030&spMailingID=11512815&spUserID=NDc4NjIyNDMxMwS2&spJobID=207576130&spReportId=MjA3NTc2MTMwS0> (noting the FAA's decision to indefinitely postpone site selection so it may study UAS privacy and safety issues).

¹⁵⁸ FAA Modernization and Reform Act of 2012 § 336.

¹⁵⁹ *Id.* § 336(c).

¹⁶⁰ *Id.* § 336(a).

ganization.”¹⁶¹ Moreover, the recreational UAS cannot weigh more than fifty-five pounds.¹⁶² All recreational UASs must yield the right-of-way to and avoid interference with manned planes.¹⁶³ Lastly, if the recreational UAS is flown within five miles of an airport, the UAS operator must give proper, prior notice to the appropriate air control personnel—including the control tower, where applicable.¹⁶⁴ The FAA Modernization Act goes on to state that notwithstanding the exemption, the FAA retains the power “to pursue enforcement action” against recreational UAS users “who endanger the safety of the [NAS].”¹⁶⁵

C. ON THE HORIZON: FUTURE STATE UAS REGULATIONS

Not long after the passage of the FAA Modernization Act, Congress made various efforts to limit how UASs could be used in the NAS.¹⁶⁶ Attempts to lay the ground rules for UASs soon spread to the individual states, many of which have wasted no

¹⁶¹ *Id.* § 336(a)(1)–(2).

¹⁶² *Id.* § 336(a)(3). The inclusion of a weight limitation in the recreational exemption effectively makes all recreational UASs, by definition, sUASs. *See id.* § 331(6). It should be noted that a recreational UAS may go above this weight limitation and stay within the exception to regulation only if it is “certified through a design, construction, inspection, flight test, and operational safety program administered by a community-based organization.” *Id.* § 336(a)(3). The FAA Modernization Act gives no hints regarding what type of recreational use this might encompass. *Id.*

¹⁶³ *Id.* § 336(a)(4).

¹⁶⁴ *Id.* § 336(a)(5).

¹⁶⁵ *Id.* § 336(b).

¹⁶⁶ *See, e.g.*, No Armed Drones Act of 2012, H.R. 5950, 112th Cong. (2012) (seeking to amend the FAA Modernization Act to bar use of weaponized UASs in the NAS); Preserving Freedom from Unwanted Surveillance Act, S. 3287, 112th Cong. (2012) (attempting to prevent entities receiving any funding from the federal government from utilizing UASs “to gather evidence or other information pertaining to criminal conduct or conduct in violation of a statute or regulation except to the extent authorized in a warrant that satisfies the requirements of the Fourth Amendment”); Drone Aircraft Privacy and Transparency Act of 2012, H.R. 6676, 112th Cong. (2012) (pushing to amend the FAA Modernization Act to prevent flight authorization for UASs unless the operator seeking NAS entry includes a “data collection statement” with its application specifying who will use the UAS, for how long, for what purpose, and what potential privacy issues will arise); Preserving American Privacy Act of 2012, H.R. 6199, 112th Cong. (2012) (moving to limit federal law enforcement use of UASs, bar UAS-obtained evidence in administrative hearings, and proscribe authorization of UAS requests by private citizens to nonconsensual surveillance of other private citizens or private property).

time in devising UAS regulation schemes of their own.¹⁶⁷ Across the country, proposed state regulations differ in their focus and concern, some with an eye toward restricting all use and some aimed at restricting public use.

In California, for instance, Senator Alex Padilla introduced a bill aimed at establishing “appropriate standards for the use of [all UASs]” in California¹⁶⁸ out of concern for potential civil liberties violations from “surreptitious surveillance activities.”¹⁶⁹ In New Jersey, Assemblymen Robert Schroeder and Declan O’Scanlon cited “[t]he right of privacy” in one of the most far-reaching UAS bills introduced to date.¹⁷⁰ Aside from requiring that law enforcement obtain a search warrant prior to using a UAS and mandating that public entities give public notice of any UAS purchase, the bill would outright ban private UAS ownership statewide.¹⁷¹ On the other hand, in Florida, Senator Joe Negron introduced a bill designed to completely bar state law enforcement agencies from using UASs in evidence collection.¹⁷² The bill further deems UAS-collected evidence inadmissible in court and creates a civil remedy for violations of the prohibition.¹⁷³ And in Missouri, Representative Casey Guernsey introduced a bill aimed at preventing any person or entity, private or public, from using UASs to “gather evidence or other information pertaining to criminal conduct or conduct in violation of a statute or regulation except to the extent authorized in a warrant.”¹⁷⁴ Violations of the regulation would expose persons to civil liability.¹⁷⁵ The bill’s language suggests that using private

¹⁶⁷ See Jason Koebler, *Virginia to Mull Strictest Drone Law in U.S.*, U.S. NEWS & WORLD REP. (Aug. 9, 2012), http://www.usnews.com/news/articles/2012/08/09/virginia-to-mull-strictest-drone-law-in-us_print.html.

¹⁶⁸ S.B. 15, 2012 Leg., Reg. Sess. (Cal. 2012).

¹⁶⁹ See Press Release, Sen. Alex Padilla, Senator Padilla Introduces Bill to Regulate Drones in California (Dec. 3, 2012). Citing similar concerns, some local governments in California have even gone so far as to debate whether all non-recreational UASs should be banned within city limits. See Doug Oakley, *Berkeley Shoots Down Plan to Ban Surveillance Drones*, CONTRA COSTA TIMES (Dec. 19, 2012), http://www.contracostatimes.com/my-town/ci_22223955/berkeley-shoots-down-plan-ban-surveillance-drones.

¹⁷⁰ Assemb. 3157, 215th Leg., Reg. Sess. (N.J. 2012).

¹⁷¹ See *id.* (“Any person who purchases, owns, or possesses [a UAS as defined by this bill] is guilty of a disorderly persons offense.”).

¹⁷² Freedom from Unwarranted Surveillance Act, S.B. 92, 2013 Leg., Reg. Sess. (Fla. 2013).

¹⁷³ *Id.*

¹⁷⁴ Preserving Freedom from Unwarranted Surveillance Act, H.B. 46, 97th Gen. Assemb. (Mo. 2012).

¹⁷⁵ *Id.*

UASs to spot and alert law enforcement of unknown illegal activity is implicated in the proposed law.¹⁷⁶

IV. IMPLICATIONS FOR UAS OWNERSHIP AND USE UNDER THE FAA MODERNIZATION ACT

The new “era of the UAS” is teeming with creative potential. It is also fraught with difficulty and challenge in managing the expansion of UAS use beyond the traditional military-associated background from which it evolved. Without venturing into more technical considerations of airworthiness standards, pilot certifications, or the like, the remainder of this comment focuses on broader issues posed by the FAA Modernization Act’s provisions for UAS and NAS regulations.

A. A RIGHT TO THE NAS?

As noted above, there exists a “public right of transit” through the NAS.¹⁷⁷ Any final rules the FAA promulgates for UASs must start with consideration of this point of law. As the sovereign of the NAS, the federal government has the responsibility to ensure that access to the NAS is made available to all *private* entities that wish to have access to it, within the boundaries of the goal that is at the heart of FAA policy—safe and efficient NAS use.¹⁷⁸ With FAA projections that commercial UASs will become a “significant component” of U.S. commercial aviation,¹⁷⁹ it is imperative that regulations start with entry and access as a default standard for commercial UASs. Moreover, the FAA should take steps to preempt state and local government attempts to ban private UAS ownership. If private ownership coincides with commercial use—as may be the case for privately owned sUASs used for aerial photography or the like—the federal government should move to protect guaranteed access to the NAS that might be squelched by far-reaching state or local law.¹⁸⁰ By contrast, the FAA must leave the default NAS-entry-and-access question *for state and local UASs* to state and local governments. If these entities see fit to restrict their own access, this decision cannot be disturbed. Unlike previous local government attempts

¹⁷⁶ *Id.*

¹⁷⁷ 49 U.S.C. § 40103(a)(2) (2006).

¹⁷⁸ *Id.* § 40103(a)–(b).

¹⁷⁹ See FAA AEROSPACE FORECAST FISCAL YEARS 2012-2032, *supra* note 137, at 57 (projecting that upwards of 10,000 commercial UASs will be airborne by 2017).

¹⁸⁰ See Assemb. 3157, 215th Leg., Reg. Sess. (N.J. 2012).

to regulate *commercial* access to the NAS—attempts that have been limited by the U.S. Supreme Court¹⁸¹—local governments should have exclusive authority over whether they will allow themselves to access the NAS. This distinction turns not on a right of access, but on federalism.¹⁸²

Allowing the states to choose whether they will access the NAS with public UASs best promotes local policy values and protects state governments from a federal system that can easily project special-interest preferences onto the states.¹⁸³ If the people of Florida see fit to enact legislation that prevents all police use of UASs in law enforcement,¹⁸⁴ the federal government must find this permissible. The same is true if the people of Berkeley opt to ban all public UASs out of concern that they might be used to “spy” on local residents.¹⁸⁵ These choices reflect a desire by local governments to limit their own use of UASs. Whether through incentives or pulling purse strings, the federal government must stay away from actions that might conflict with these choices. Federalism demands it.

B. SECURITY RISKS

Several provisions in the FAA Modernization Act indirectly address security risks for all forms of UASs—public, private, and recreational¹⁸⁶—and for good reason. In 2011, Iran claimed that it “spoofed”—tapped into the GPS navigational system and hijacked—a CIA stealth UAS flying through its airspace and forced it to land inside the country.¹⁸⁷ Although some American officials disputed the claim, other commentators have noted

¹⁸¹ See Michael J. Holland, *Federalism in the Twenty-First Century: Preemption in the Field of Air*, 78 DEF. COUNS. J. 11, 12–13 (2011) (commenting on a 1973 U.S. Supreme Court decision striking down a Burbank, California ordinance that prevented nighttime takeoffs and landings by jets at the local airport).

¹⁸² See GEOFFREY R. STONE ET AL., CONSTITUTIONAL LAW 169–72 (6th ed. 2009) (listing, among other values, efficiency, promotion of individual choice, policy experimentation, and promotion of democracy).

¹⁸³ *Id.* at 170–72.

¹⁸⁴ See Freedom from Unwarranted Surveillance Act, S.B. 92, 2013 Leg., Reg. Sess. (Fla. 2013).

¹⁸⁵ See Oakley, *supra* note 169.

¹⁸⁶ See FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, §§ 332(a)(2)(B), 332(a)(2)(H), 333(b)(1), 334(a)(2), 336(a)(2), 126 Stat. 11, 73–74, 76–77 (to be codified at 49 U.S.C. § 40101).

¹⁸⁷ Scott Peterson & Payam Faramarzi, *Iran Hijacked US Drone, Says Iranian Engineer*, CHRISTIAN SCI. MONITOR (Dec. 15, 2011), <http://www.csmonitor.com/World/Middle-East/2011/1215/Exclusive-Iran-hijacked-US-drone-says-Iranian-engineer-Video>.

that the GPS guidance system that allows a UAS to fly free is highly susceptible to attack.¹⁸⁸ But it is not just the large UASs that cause worry. In June 2012, University of Texas researchers spoofed a lightweight, recreation-oriented UAS at White Sands Missile Range.¹⁸⁹ And unlike the Iranians, the UT researchers tried to drive the UAS into the ground—turning it into an aerial missile of sorts.¹⁹⁰ The picture here is quite clear: before the FAA unleashes the UAS revolution above the American homeland, it must address this technology gap.

Technical specifications aside, it is clear that the FAA (and, if necessary, other appropriate federal agencies) should move to address several items. First and foremost, the FAA should address GPS structural issues. Some experts have described the current GPS security infrastructure as akin to a computer system without firewalls.¹⁹¹ Spoofing of sUASs¹⁹²—specifically recreational sUASs—may not seem like a large problem due to the low monetary value of sUASs and the low damage rate posed by sUASs, but the potential for petty “drone-jacking” cannot be ignored, especially since GPS-attacking technology is relatively cheap.¹⁹³

More disconcerting, however, is the security risk posed by public and commercial UASs. Rather than simply spoofing and landing a UAS as the Iranians did,¹⁹⁴ those with nefarious purposes could turn large-scale UASs into projectile weapons against the American people or attempt to weaponize UASs and open fire on the public.¹⁹⁵ So long as GPS guidance systems remain susceptible, UASs cannot be considered “secured.” Along with addressing GPS infrastructure, the FAA should also mandate that all UASs, including recreational UASs, come equipped

¹⁸⁸ *Id.*

¹⁸⁹ Lorenzo Franceschi-Bicchierai, *Drone Hijacking? That's Just the Start of GPS Troubles*, WIRE (July 6, 2012), <http://www.wired.com/dangerroom/2012/07/drone-hijacking/all/>.

¹⁹⁰ *Id.*

¹⁹¹ *Id.*

¹⁹² See FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 331(6), 126 Stat. 11, 72 (2012) (defining sUAS as “an unmanned aircraft weighing less than 55 pounds”).

¹⁹³ See Franceschi-Bicchierai, *supra* note 189 (commenting on inexpensive and easily obtainable GPS jamming devices).

¹⁹⁴ See Peterson & Faramarzi, *supra* note 187.

¹⁹⁵ Aside from state security concerns, there may not be a better reason for Congress to debate the prohibition of weaponized UASs in the NAS than the spoofing of weaponized UASs. See No Armed Drones Act of 2012, H.R. 5950, 112th Cong. (2012).

with an impregnable fail-safe device that prevents attempted high-speed collisions. Even if a pilot loses control or has it taken away by someone else, UASs should be built to detect speed and direction changes connected to crash attempts and should be capable of governing themselves in those dire situations.

C. PRIVACY CONCERNS AND SELF-HELP

UAS security risks do not garner the public and lawmaking attention that UAS privacy concerns do, a distinction showcased by the litany of federal legislation aimed at addressing potential threats to citizen privacy by UASs under the FAA Modernization Act regime.¹⁹⁶ It perhaps comes as a surprise then that the FAA Modernization Act has nothing to say about privacy standards and UASs in the NAS.¹⁹⁷ Given that the FAA's mission focuses on *safety and efficiency*¹⁹⁸ and that the FAA Modernization Act's provisions for UASs focus primarily on *safety*,¹⁹⁹ questions arise concerning the FAA's capacity to set rules related to UAS *operation and privacy*. The FAA's task of issuing rules for UAS operation and privacy becomes considerably more complex when one ventures beyond the regularly cited public-private surveillance themes that play out in the media²⁰⁰ to issues of private-private surveillance.²⁰¹ Indeed, as some commentators have observed, as much as we worry about "big brother" invading our privacy, we have to worry equally about family, friends, and—most especially—individual strangers using advanced technology like

¹⁹⁶ See, e.g., Preserving Freedom from Unwanted Surveillance Act, S. 3287, 112th Cong. (2012); Drone Aircraft Privacy and Transparency Act of 2012, H.R. 6676, 112th Cong. (2012); Preserving American Privacy Act of 2012, H.R. 6199, 112th Cong. (2012).

¹⁹⁷ See FAA Modernization and Reform Act of 2012 §§ 331–336. The word "privacy" does not appear at all in these sections, leaving a gap for the FAA to fill with no congressional guidance. *Id.*

¹⁹⁸ *Mission*, FAA, <http://www.faa.gov/about/mission/> (last visited Jan. 17, 2013).

¹⁹⁹ See, e.g., FAA Modernization and Reform Act of 2012 § 332(a)(1) (directing the FAA to "develop a comprehensive plan to safely accelerate [civil UASs] into the [NAS]"); *id.* § 335 (requiring the FAA to conduct "safety studies necessary to support the integration of [UASs] into the [NAS]"); *id.* § 336(a) (waiving FAA regulations for recreational UASs where such UASs are operated under "safety guidelines").

²⁰⁰ See Lowy, *supra* note 13.

²⁰¹ See Matthew Schroyer, *Activists' Drone Shot out of the Sky for the Fourth Time*, SUAS NEWS (Nov. 19, 2012), <http://www.suasnews.com/2012/11/19719/activists-drone-shot-out-of-the-sky-for-fourth-time/>.

UASs to watch what we do.²⁰² The decision by some to resort to self-help to preserve privacy has the potential to exacerbate this issue.²⁰³ The FAA must either initiate privacy standards for all UASs under its “safety and efficiency” regulations or work to help individual states set uniform expectations regarding UAS operations and privacy.

At present, the FAA’s response to privacy concerns appears bifurcated. First, the FAA has recently noted that all “UAS operators are subject to requirements independent of the FAA’s authorities, including restrictions arising under [f]ederal, [s]tate, or local laws that protect individual privacy.”²⁰⁴ Thus, rather than add regulations, the FAA appears content to simply weave UASs into the existing structure for privacy law. Second, the FAA is shedding light on UAS use in the NAS by making UAS-use information available on its website and complying with Freedom of Information Act requests.²⁰⁵ In making this information available, the FAA appears to be leaving true action to the political sphere—allowing knowledge about use to foster the debate about privacy. But aside from these actions, it is difficult to guess how the FAA will study and adjust to privacy concerns, especially in light of its decision to halt its test-range program.²⁰⁶

D. “FUZZY” USES AND CONCERNS OF OVERREGULATION

Although the FAA Modernization Act attempts to draw clear lines between types of UAS use,²⁰⁷ not all UASs easily fit into one category or another. For this reason, the most troubling aspect of the FAA Modernization Act’s provisions for UASs is their potential to overregulate certain types of use that the government should, in fact, encourage. Take, for example, the case of drone journalism.²⁰⁸ At its core, drone journalism is simply a new form of reporting, offering to the UAS operator a completely new way

²⁰² Gary T. Marx, *Forget Big Brother and Big Corporation: What About the Personal Uses of Surveillance Technology as Seen in Cases Such as Tom I. Voire?*, 2 J. LEGAL TECH. RISK MGMT. 24, 24 (2007).

²⁰³ See Schroyer, *supra* note 201.

²⁰⁴ Letter from Michael P. Huerta, Acting Adm’r of the FAA, to the Hon. Edward J. Markey, House of Representatives 4 (Sept. 21, 2012).

²⁰⁵ *Id.* at 2–3.

²⁰⁶ See Pope, *supra* note 157.

²⁰⁷ See FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, §§ 332, 334, 336, 126 Stat. 11, 73, 76, 77 (to be codified at 49 U.S.C. § 40101) (provisions covering civil, public, and recreational UAS use).

²⁰⁸ See Waite, *Here Come Flying News Robots*, *supra* note 76 (describing dynamics of drone journalism).

to discover, investigate, and track a story.²⁰⁹ This new press medium does not belong solely to the commercial sector, and almost anyone with a UAS can engage in drone journalism.²¹⁰ In fact, one can easily imagine the private use of UASs to investigate public matters (such as drought conditions, as has previously been done),²¹¹ followed by online posting or blog reporting of an individual's findings.

But under the FAA Modernization Act, this type of use appears problematic. If this reporting activity falls outside of the tight parameters for unregulated recreational use under section 336,²¹² the user has to fall in line with other civil users and request permission to engage in drone journalism,²¹³ throwing unpaid civilian drone journalism into jeopardy. This type of "fuzzy" use—that which can easily qualify as recreational or hobby-based and is not readily susceptible to civil categorization—runs the risk of falling between the cracks of the FAA Modernization Act's language. Given the United States' long history of promoting a free and open press²¹⁴ and that the values embedded in the First Amendment's Free Speech and Free Press Clauses do not waver even as technology advances,²¹⁵ one would hope that amateur drone journalism would escape overregulation. Nevertheless, the language of the FAA Modernization Act itself at least threatens otherwise. Rather than unintentionally moving it into a regulated category, the FAA should expansively read this type of use into the word "recreational" found in section 336(a)(1). This would separate it from the commercial use that section 332 aims to regulate and would avoid causing any constitutional free speech or free press problems that might pop up from restricted use.

E. AN OPENING FOR UNIFORM LAW IN RECREATIONAL USE?

Unlike public and non-recreational private UAS operation, section 336 of the FAA Modernization Act quarantines an entire

²⁰⁹ *Id.*

²¹⁰ *Id.*

²¹¹ See Waite, *How We Used a Drone to Cover Drought*, *supra* note 79.

²¹² FAA Modernization and Reform Act of 2012 § 336(a)(1) (stating that the model UAS must be "flown strictly for hobby or recreation").

²¹³ *Id.* § 332.

²¹⁴ See U.S. CONST. amend I.

²¹⁵ See *Brown v. Entm't Merch. Ass'n*, 131 S. Ct. 2729, 2733 (2011) (upholding invalidation of California law aimed at proscribing certain video games from being sold to minors).

sector of UAS use and excludes it from FAA regulation, so long as the tight parameters of the exception are met.²¹⁶ Practically speaking, then, recreational UAS operations are unregulated—a gap that is currently inviting trouble for some recreational users.²¹⁷ The remainder of this section will consider whether the FAA should develop a collaborative uniform law to fill the gap between where it can regulate (the NAS) and where it cannot; doing so could encourage states to protect recreational use, influence the direction state law moves in recreational UAS regulation, and establish a degree of continuity across the country in UAS regulations.

A uniform law, as collaboratively drafted by the FAA, stakeholders, and the states, offers many benefits to recreational UAS operation. First, the FAA stands alone among government agencies—federal and state—in its understanding of the intricacies of aviation management and how to best approach the day-to-day challenges posed by recreational use of the sky.²¹⁸ Leaving policy crafting to the states alone may have the unintended effect of robbing them of needed perspective in an ever-changing field. Rather than leave it to the states to fill the gap, the FAA should work collectively with the states to set stable, predictable rules of recreational and model UAS use. Second, by engaging the states collaboratively with its expertise, the FAA stands a strong chance of influencing the laws states choose to enact. To buttress this particular point, one has to look no further than the Model Civil Aviation Safety Act (Model Act), which the FAA crafted for foreign countries looking to implement civil aviation laws and integrate regulations into the international framework.²¹⁹ In the Model Act, the FAA not only helps define the legal and structural parameters needed for efficient use of airspace, but also offers a wide range of suggestions based on the “lessons learned” from its International Aviation Safety Assessments Program.²²⁰ The fact that an FAA-driven model law like this exists means the FAA is at least capable of drawing up a

²¹⁶ See FAA Modernization and Reform Act of 2012 § 336 (discussing the “Special Rule for Model Aircraft”).

²¹⁷ See Keller, *supra* note 10 (describing resorts to self-help in retaliation for using a recreational UAS to monitor a hunting party).

²¹⁸ See Jarret Jackson, *The Unique Role of Government in the Aviation Industry*, 14 GEO. PUB. POL’Y REV. 43, 43–44 (2009).

²¹⁹ See FAA, MODEL CIVIL AVIATION SAFETY ACT (version 2.6, 2011).

²²⁰ *Model Civil Aviation Regulations (MCARs) Version 2.5*, FAA, http://www.faa.gov/about/initiatives/iasa/model_aviation/ (last visited Jan. 17, 2013).

uniform law for the states. As it did with the Model Act, the FAA could help influence the direction of state law regulating recreational UASs based on its experience studying full-scale UASs.

Third, a uniform law for recreational UASs could establish a sort of “bill of rights” for amateur UAS operators. Recently, Congress passed and the President signed into law the Pilot’s Bill of Rights,²²¹ which aims to improve the availability of FAA information to aircraft pilots and offers them greater procedural protections in FAA enforcement actions.²²² Since the FAA has deemed recreational UASs off-limits for FAA regulation, the uniform law could work much the same way and guarantee that recreational UASs can be used in certain areas and at certain times. By being incorporated into the uniform law, this recreational UAS “bill of rights” would ensure that no matter where a recreational pilot goes, he or she can be assured of the allowance of UAS use, giving recreational users a degree of confidence. Lastly, implementation of a uniform law for recreational UASs would help enhance U.S. federalism.²²³ By leaving recreational UASs free of the more burdensome regulations set to fall on public and commercial UASs, the FAA Modernization Act left an opening for the states to tailor a collaboratively designed, uniform law in ways that local populations prefer. This may incidentally create better-written, more responsive UAS laws at the state level.²²⁴

V. CONCLUSION

UASs have come a long way. From their first flights in ancient days as forms of amusement and experiment²²⁵ to their modern association with war,²²⁶ UASs have long inspired the imagination. Now the UAS stands to revolutionize the very way we conduct day-to-day business,²²⁷ the way we learn more about the planet we inhabit,²²⁸ and the way we enjoy our leisure.²²⁹ How-

²²¹ Pilot’s Bill of Rights, Pub. L. No. 112-153, 126 Stat. 1159 (2012).

²²² See Press Release, Sen. Jim Inhofe, Inhofe’s Pilot’s Bill of Rights Becomes Law (Aug. 3, 2012).

²²³ See Alvin C. Harrell, *Commentary: The Case for Nonuniformity in State Law*, 51 CONSUMER FIN. L.Q. REP. 294, 313–14 (1997) (noting that uniform laws “facilitate . . . the freedom of persons to locate where their interests dictate [and] preserve the viability of the federal system”).

²²⁴ See *id.* at 314.

²²⁵ See Gogarty & Hagger, *supra* note 23, at 76–77.

²²⁶ See Currier, *supra* note 21.

²²⁷ See Hruby, *supra* note 72.

²²⁸ See Grunbaum, *supra* note 65.

²²⁹ See Hruby, *supra* note 72.

ever, this leap in technology does not arrive without provoking both fear and concern²³⁰ and certainly has not arrived without posing challenges for its safe and efficient integration into the NAS. As the FAA begins to implement UASs into the NAS under the instruction of the FAA Modernization Act,²³¹ several issues must be addressed. Before it can even begin to address privacy concerns, the FAA must take action to improve the GPS infrastructure that guides UASs. Without secured GPS navigational abilities, UASs are susceptible to spoofing and being turned into projectile weapons. The FAA should also require that all UASs come equipped with some sort of anti-drone-jacking technology. Even if a UAS can be spoofed, it should be able to detect imminent crashes and govern itself in dire situations. The FAA must also rule on privacy standards. Whether it continues its policy of transparency and deference to current privacy laws will likely depend on how effective these methods are at ensuring citizen privacy. At a minimum, the FAA should address attempts to engage in self-help to “rectify” perceived intrusions.

Finally, flying a UAS is a privilege, and entry into the NAS is a right. The FAA should work to ensure several additional goals alongside setting security and privacy standards. In keeping with the right to enter the NAS, the FAA should take steps to prevent overregulation of UASs by the FAA itself and by the individual states. First, the FAA must be mindful of “fuzzy” UAS uses, lest it unduly burden permissible uses. Moreover, the FAA should consider working collaboratively with the states and UAS stakeholders to create a uniform law that would fill a gap in UAS regulation, both to protect recreational UAS use and to ensure predictability in regulation across the country.

Whether the coming “era of the UAS” is anxiety-ridden, intrusive, and overbearing, or hope-inspiring, helpful, and forward-moving, largely turns on how the FAA approaches these issues. While it is questionable whether UASs will ever be completely problem-free, they hold exciting potential. With the integration of UASs into the NAS, we can look forward to a future where UASs play a daily role in our lives.

²³⁰ See O’Connell, *supra* note 49, at 118.

²³¹ FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 332, 126 Stat. 11, 73 (to be codified at 49 U.S.C. § 40101).

