

Potential Impacts of the FAA Reauthorization Act of 2018 on the Commercial Unmanned Aircraft Industry

By

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The commercial unmanned aircraft industry exists in a rapidly evolving and uncertain environment, with a multitude of well-established, well-financed stakeholders in associated industries each vying to influence that environment. Although influence can come in many forms, Congress holds the ultimate power, and gives agencies like the Federal Aviation Administration (FAA) a recurring authorization to regulate air travel and associated research. On October 5, 2018, this authorization was extended until 2023.

As the Unmanned Aircraft Industry evolves, regulatory actions from Congress will significantly shape the ability to expand and integrate into the existing National Airspace System. The 2018 FAA Reauthorization Act will be the most impactful of legislative actions to date.

In a variety of draft forms since introduced by Senator Schuster in June of 2017, the FAA Reauthorization Act of 2018 grants an additional 5 years to the FAA, and with it a mul-

titude of new directives related to Unmanned Aircraft Systems (UASs). The House and Senate had versions under review for over a year, each with unique amendments that impact UAS operations and address many of the concerns of stakeholders, but not all of them will assist the industry in its efforts to integrate within the National Airspace System with manned traffic. Some like the Department of Homeland Security, local law enforcement agencies, and commercial passenger operators all have differing interests that may slow the growth and integration of UASs. With this final bill, the industry gets the opportunity to operate as it wishes in some areas, but loses some of the freedoms it once had (115th Congress, 2018).

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Introduction

This paper is the third in a series of three written to fulfill the requirements of the Doctorate in Business Administration at the University of South Florida. The first two papers analyzed the UAS industry and interviewed industry experts to identify the barriers to the expansion of the UAS industry. This paper discusses the FAA Reauthorization Act of 2018, which may significantly alter the industry environment as studied to this point.

The FAA, like all agencies within the United States Government, is authorized to exist and is given specific directives from Congress and the Office of the President. The FAA is typically renewed for a period of five years, giving them time to act on new directives and have a sense of stability. For the five years leading up to the FAA Modernization and Reform Act of 2012, the FAA had no long-term reauthorization, and had operated under “23 temporary funding measures to continue operations” (National Business Aviation Association, 2012). It was during this period that UASs were entering the commercial market, and operators perceived the lack of FAA acceptance as resistance rather than an uncertainty over the future direction that Congress may provide for them.

Here in 2018 we again faced the same dilemma. The FAA’s authorization under the Modernization and Reform Act of 2012 had already expired and the FAA operated on five extensions slated to end in the first week of October 2018. At InterDrone 2018, a commercial UAS conference and expo held in early September, several FAA representatives stated that they were waiting for Congress to finalize the new authorization bill before they acted in any way to increase UAS integration into the National Airspace System (NAS). This approach is in-line with the atmosphere of the period prior to the renewal in 2012. Even after passage, the FAA stated that they are “evaluating the impacts of this change in the law and how implementation will proceed” and directed operators to continue flying under the old rules until hearing further from them (FAA, 2018).

The FAA Reauthorization Act of 2018, introduced by Representative Shuster in 2017, significantly alters the directives of the FAA regarding UAS operations, eliminates the model aircraft exemptions in section 336, potentially levies fees to UAS users to pay for regulatory oversight costs, creates an Unmanned Aircraft Traffic Management System (UTM), and updates sections of Part 107 to allow UASs to carry cargo after meeting still to be defined safety requirements (115th U.S. Congress, 2018). With such major changes it is easy to see why there is again hesitancy to make any moves until a full analysis of the impacts occurs.

Opinion

In the first two papers that analyzed the UAS industry and interviewed industry experts to identify the barriers to the expansion of the UAS industry, initial indications leaned in the direction of the FAA as causal to the perceived slow growth of the UAS industry. This indication was found incorrect and the root stemmed from three factors: regulatory, safety, and public perception. Regardless, the FAA and the rulemaking process reflects the safety concerns of the public, and thus the FAA regulations are paramount in the development of the UAS industry and are also the most visible indicators of all three factors.

UASs were a discussion item at the FAA in 2008, but it was not until November of 2013 that they published their first Roadmap for Integration of Civil Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS), acknowledging that manned and unmanned aircraft must co-exist. This public acknowledgement appeared to many as long overdue, but when looked at more closely, the FAA was most likely impaired in their ability to act during this time as Congress was debating on the very existence of the FAA itself.

Established on August 23, 1958 when President Dwight D. Eisenhower signed the Federal Aviation Act, the FAA is typically renewed every five years (FAA, 2017a). From 2007 to 2012, the period when UASs first transitioned from military to commercial operations, the FAA had no long-term reauthorization, and operated under “23 temporary funding measures to continue operations” (National Business Aviation Association, 2012). Operators perceived the lack of FAA acceptance as resistance rather than an uncertainty over the future direction that Congress may provide for them. It is difficult to implement new complex processes in any organization, and even harder when continued existence is uncertain, but for outside stakeholders--it is nearly impossible to understand the internal challenges faced in this environment.

Here in 2018 we again faced the same dilemma. The FAA’s authorization under the Modernization and Reform Act of 2012 had expired, and FAA representatives stated that until Congress finalized the new authorization bill, they were unable to act to increase UAS integration into the NAS. As with the act in 2012, which attempted to significantly modernize the FAA, the 2018 act is attempting to address industry challenges specific to the growing UAS industry and integration into the National Airspace System (NAS).

The FAA Reauthorization Act of 2018, introduced by Representative Shuster in 2017 as H.R. 4, passed in the House of Representatives on April 27, 2018 and made little movement until late September of 2018.

Behind the scenes discussions occurred during this time, attempting to resolve differences in this and the Senate version known as S.1405, the Federal Aviation Administration Reauthorization Act of 2017. Ultimately, the resulting bill significantly alters the directives of the FAA, upends model aircraft exemptions in section 336, may result in fees to UAS users to pay for regulatory oversight costs, directs the creation of an Unmanned Aircraft Traffic Management System (UTM), and updates sections of Part 107 to allow UASs to carry cargo after meeting still to be defined safety requirements (115th U.S. Congress, 2018).

Covering the entire act in the span of this paper is impractical, so the focus is on the most impactful changes for both unmanned and manned aviation. Sections that deal with subjects such as the implementation of 24-hour Arctic surveillance areas for UASs, as they do not change the industry's ability to evolve, are not in the scope of this analysis.

In this spirit, this paper will look at the highlights of how the proposed and somewhat radical departure from airworthiness certifications for UASs, as well as other changes to traditional safety-based requirements specifically for UASs may impact the UAS industry. I will examine how changes to Part 336, which once allowed model aircraft owners to operate UASs without traditional FAA oversight, will change the UAS landscape. A look at other changes to allow law enforcement officials to track and intercept UASs is a must, as are the sections that direct the FAA to develop a certification process to allow package delivery, flight over people, and Beyond Line of Visual Sight Operations (BVLOS). Lastly, a brief look at the Unmanned Traffic Management (UTM) system, designed to create a system "separate but complementary to the FAA's Air Traffic Management (ATM) system" is necessary (FAA, 2017b).

Safety

Much of the FAA Reauthorization Act of 2018 deals with issues related to safety, but there are a few provisions that deal directly with the handling of safety by the FAA. The Senate's proposal to direct a risk-based assessment process that allows the FAA to grant operations to UASs made the final draft and allows the FAA to establish a process for UAS operators to self-certify their craft. There are caveats to this, as they must comply with "risk-based consensus safety standards related to the design, production, and modification of small unmanned aircraft systems," but it opens the door to manufacturers so that they may get a certified craft to market (115th U.S. Congress, 2018).

This goes against the strict airworthiness certification requirements for manned aircraft and may set a dangerous precedent. The checks and balances provided by rigorous testing of new aircraft by an out-

side regulatory agency such as the FAA are necessary to attain the levels of safety demanded by the general public. Even new aircraft built by Boeing, a company with decades of aircraft building experience, do not always meet FAA requirements. The latest Boeing aircraft, the 787 Dreamliner, underwent several modifications during the design process as directed by the FAA to ensure safety.

What is promising though, is that Congress went on to give some examples of acceptable technologies that must be considered when designing this process, and these examples align with the technologies being tested at UAS test sites and universities across the country. They also require an analysis of safety "in the event that a communications link between a small unmanned aircraft and its operator is lost or compromised," which is a recurring issue across both civilian and military systems (115th U.S. Congress, 2018). It appears that at least to some extent, Congress tried to open up the airspace, but at the same time wanted to provide checks and balances for the sake of safety.

As shown in previous papers, the two leading UAS manufacturers are from China and Europe. If they are allowed to self-certify aircraft, it is unlikely that their processes would meet the current strict requirements of the FAA. In theory the process appears more efficient and is in-line with what the industry desires, but it does not meet the needs of safety or public opinion. This provision is likely to face slow implementation as the issues are addressed and could potentially lead to unsafe UAS operations.

Part 336

Part 336 of the Federal Regulations is an already existing set of rules (previous to Part 107) that specifically addresses operations for model aircraft. These aircraft, regardless of their configuration, were exempt from FAA regulation and control under most circumstances, leaving a major gap in their ability to manage UAS operations. When Part 107 was introduced, it streamlined the requirements for commercial operation of UASs and made access to the airspace easier to define, but still neglected to include UASs operated under model aircraft regulations. This loophole is a problem that had to be fixed, and the new act does just that despite model aircraft operator's objections.

The Act allows for the FAA to continue allowing Part 336 operations as they feel are safe, and it adds pilot certification standards and testing for model aircraft operators. It also restricts model aircraft in controlled airspace by requiring them to obtain approval "from the Administrator or designee before operating" and "all airspace restrictions and prohibitions" must be followed (115th U.S. Congress, 2018). These are major moves that will help the FAA gain control of their airspace and will assist with the cre-

ation of a true UTM system. This gets the industry closer to reliable detect, track, and avoidance for all aircraft operating in the NAS, which is a necessary step to allow the UAS industry to reach its full potential. It will on the flip-side, significantly constrain model aircraft operators in ways they have never had to contend with and deals a major blow to their gains from the 2012 Reauthorization Act.

Tracking and Interception

Title 18 U.S.C., FCC regulations, and other laws prohibit most law enforcement and public agencies from detecting, tracking, and interfering in any way with aircraft. This applies to UASs since aircraft are defined as “a device that is used or intended to be used for flight in the air” (FAA, n.d.). This then makes it complex for law enforcement agencies as it is technically illegal to do much regarding flights of UASs that may endanger public safety or infringe upon privacy. Although it may appear simple to just allow such actions, the very attempt to stop a UAS may induce risk to those below. With nefarious actors learning to use UASs for their purposes, it is clear that something needs to be done to allow law enforcement to act, but the clarity does not extend beyond that.

Congress has decided with this Act to direct the FAA to develop plans to test and certify counter UAS solutions to protect “people, facilities, or assets” such as airports and critical airspace (115th U.S. Congress, 2018). It directs the Attorney General and Secretary to test potential technologies that can “detect, identify, monitor, and track” unmanned systems with the ability to either warn the operator, disrupt control, seize the system, or otherwise destroy it with reasonable force (115th U.S. Congress, 2018). They were careful to insist that any method used was “in a manner consistent with the First and Fourth Amendments to the Constitution,” which was a major sticking point for many individuals.

One disappointing change from the draft versions is the portion that insisted that the FAA coordinate with the DoD while researching these solutions. The military has extensive experience downrange with detecting and intercepting nefarious UAS operators, and they can lend that experience to testing and fielding the best solutions. As seen with the interviews conducted in my previous research, the incursion of a UAS into the airspace of a manned aircraft is among the highest concerns of any UAS professional and finding ways to avoid a major aviation accident caused by either a nefarious or unknowing operator is critical (Spencer, 2018). It is a mistake to leave the organization with the most UAS experience out of the loop in such a critical task, and it is my hope that the FAA does not overlook the DoD.

Package Delivery, Flight over People, and BVLOS (Beyond Visual Line of Sight Operations)

Among the most commonly requested operations by UAS operators is package delivery, flight over people, and beyond visual line of sight operations. These are strictly prohibited under Part 107 operations without a waiver, and waivers are difficult to get approved. The onus of proof that the need for such an operation outweighs the risks associated with it are born only by the operator, and they must show how every possible risk management measure has been taken. Incidents involving collisions with UASs operating outside of these limitations, such as the collision with a UAS and a military helicopter in New York, highlight the importance of conducting operations like this safely. In the instance of the helicopter collision, the aircraft fortunately landed safely, but it could have been much worse.

Section 348 requires that a certification process be established by the FAA to allow for these types of operations, so that they are normal rather than abnormal, as well as safe. The verbiage used is similar to that of manned aircraft certifications, reflecting a cautious yet forward-looking perspective that balances the needs of the industry with that of public safety. Although it does not state what is required to be certified as “safe,” it opens the discussion to a permanent solution for professional UAS operators to attain such a certification.

Technology may be the answer, as there are a multitude of vendors attempting to create various detect and avoid systems that are small enough to fit in a UAS without adding significant weight. The issue becomes interoperability with existing systems, particularly those in manned aircraft. The most widely used detect and avoid technology was developed by NASA is called TCAS, or Traffic Collision Avoidance System. This system tracks other aircraft in proximity to each other and provides verbal and visual directions to avoid a collision. Although great for manned traffic, the parameters of detection and the actions directed by this system are incompatible with UAS altitudes and operating capabilities. The brute inclusion of this system without adaptation in UASs will provide erroneous warnings to pilots and cause countless unnecessary “emergency” avoidance maneuvers. Any technology solution considered must be completely tested and vetted prior to certification and installation. The Act does well to cover this, as it requires risk/performance-based requirements to be considered when developing the certification process.

Unmanned Traffic Management (UTM) System

The NAS is controlled by Air Traffic Controllers, in a system known as the Air Traffic Management (ATM) system. A similar system that is proposed and being studied as of January of 2017 is the UTM, designed to be “separate but complimentary” (FAA,

2017b). The Act states that the FAA and NASA “shall develop a plan to allow for the implementation of unmanned aircraft systems traffic management” that will “ensure the safety and security of all aircraft” (115th U.S. Congress, 2018). The implementation of such a system is already underway and authorized in previous legislation, but this Act takes it a step further to address payload and passenger operations above 400 feet above ground level. Companies like Uber and Amazon particularly will find this positive as they attempt to expand into unmanned passenger operations and package delivery.

Realizing a UTM is an extremely important step toward full integration and is a mandatory precursor. These UTM provisions are a welcome note for the UAS industry and do nothing but to push the NAS toward full integration as desired, but do so at a pace slower than the industry expectations. After an initial pilot program, the FAA has one year to complete a plan toward integration, which once the process is complete, could take the entirety of the new authorization. Other areas of UTM realization also only direct the FAA to say if integration is safe or not and does not direct implementation at any level once the analysis is complete, so the industry should not celebrate just yet.

Conclusions

Congress passed the 2018 FAA Reauthorization Act, and the President enacted the 2018 FAA Reauthorization Act despite forecasts that it would not occur prior to the election in November 2018. This shows that the FAA and UASs are a priority for the Hill, despite politically charged debates on Supreme Court Nominees and other issues grabbing the national spotlight. The message is mixed though, as the wording in many sections mandates things that the industry highly desires while giving the FAA the ability to drag their feet in these very issues and thereby delay implementation.

This is a peak into which interests have the greatest influence on lawmakers in the current political environment and gives us a hint that integration of UASs is coming, although not as quickly as operators would like it to occur. What is clear is that the three factors: regulatory, safety, and public opinion are fully represented in the ongoing Reauthorizations Act debates. The issues plainly address these factors and move the UAS industry closer to full integration once passed, but does so at a measured pace rather than the sprint desired by the UAS industry.

As a commercially rated pilot with over 3,500 hours of flight time in complex jet aircraft—who has dodged UASs on multiple occasions after they intruded on the airspace I was operating in—the slower and more cautious approach is welcome. The safety culture of the FAA is a direct reflection on the desires of the American people, and the threshold

of safety that they demand for aviation. In particular, the blanket injection of UASs into the NAS via manufacturer self-certification (skipping the traditional certification and testing processes demanded by the people for manned aviation) is irresponsible and goes against the current mandate from congress, vis-à-vis, the American voter. Once UASs subject themselves to the same, scientifically based testing and certification requirements that manned aircraft must pass, they may then be safe for operations above people, BVLOS, and while carrying cargo that may shift during flight.

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Review

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