



Committee on Transportation and Infrastructure  
U.S. House of Representatives  
Washington DC 20515

Bill Shuster  
Chairman  
Mathew M. Sturges  
Staff Director

Peter A. DeFazio  
Ranking Member  
Katherine W. Dedrick  
Democratic Staff Director

November 27, 2017

**SUMMARY OF SUBJECT MATTER**

**TO:** Members, Subcommittee on Aviation  
**FROM:** Staff, Subcommittee on Aviation  
**RE:** Subcommittee Hearing on “Unmanned Aircraft Systems Integration: Emerging Uses in a Changing National Airspace”

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**PURPOSE**

The Subcommittee on Aviation will meet on Wednesday, November 29, 2017 at 10:00 a.m. in 2167 Rayburn House Office Building to consider technological, legal, and policy issues related to the use and integration of unmanned aircraft systems (UAS) in the national airspace system. The Subcommittee will receive testimony from the Federal Aviation Administration (FAA), a Professor of Aeronautics and Astronautics, Southern Company, AirMap and the Association for Unmanned Vehicle Systems International.

**BACKGROUND**

**Overview**

UAS have been a part of American aviation for nearly a century, primarily in military research, and operations.<sup>1</sup> The FAA first authorized UAS operations in U.S. airspace in 1990.<sup>2</sup> Most operations since that time have been confined to public uses, such as law enforcement and scientific research. However, commercial and other private uses of UAS have grown dramatically within the last several years. In 2017, the FAA estimates that approximately two million UAS are operated in the United States.<sup>3</sup>

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<sup>1</sup> John David Blom, *Unmanned Aerial Systems: A Historical Perspective*, Occasional Paper 37, pp 46. Combat Studies Institute Press, US Army Combined Arms Center. Available at: <http://usacac.army.mil/cac2/cgsc/carl/download/csipubs/OP37.pdf>

<sup>2</sup> Federal Aviation Administration. “Fact Sheet – Unmanned Aircraft Systems (UAS).” Feb. 15, 2015. Available at: [https://www.faa.gov/news/fact\\_sheets/news\\_story.cfm?newsId=18297](https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=18297)

<sup>3</sup> Federal Aviation Administration. “Unmanned Aircraft Systems.” Available at: [https://www.faa.gov/data\\_research/aviation/aerospace\\_forecasts/media/Unmanned\\_Aircraft\\_Systems.pdf](https://www.faa.gov/data_research/aviation/aerospace_forecasts/media/Unmanned_Aircraft_Systems.pdf)

## **UAS Capabilities and Applications**

Rapid advancements in technology have transformed UAS. Small unmanned aircraft are typically substantially less expensive, easier to acquire, and simpler to operate than manned aircraft.<sup>4</sup> In some cases, UAS offer capabilities that cannot be matched by manned aircraft, such as close inspections of oil rig flare stacks, bridges, and pipelines.

The number of potential applications for UAS continues to grow. Some companies use UAS as airborne cell phone towers that can ensure phone service after a natural disaster.<sup>5</sup> Others have plans for commercial delivery services with UAS. The long-term economic opportunities and impacts of UAS are expected to be substantial.<sup>6</sup> Emerging technologies, such as UAS traffic management (UTM), have the potential to advance UAS. Using similar technological concepts, some companies are developing highly-automated “flying cars” that would transport people over short distances.<sup>7</sup>

## **National Airspace System and Aviation Safety**

UAS operate at a variety of altitudes. Small UAS typically fly within a few hundred feet of ground level but may climb to over 10,000 feet above sea level.<sup>8</sup> Other UAS may remain aloft for days at altitudes between 60,000 and 90,000 feet above sea level, which is above the altitudes at which most manned aircraft operate.<sup>9</sup> Yet other categories will operate primarily in altitudes used by manned aircraft.

The growing numbers of UAS flown in the NAS, in particular small UAS, have given rise to concerns about potential risks to aviation safety. In testimony given before the Senate Committee on Commerce, Science, and Transportation, Earl Lawrence, the director of FAA’s UAS Integration Office, reported that manned aircraft pilots reported 1,800 sightings of UAS in 2016, an increase from 1,200 in the previous year.<sup>10</sup> Between January and March 2017, the FAA documented over 400 sightings of UAS, some of which required pilots to take evasive maneuvers to avoid a collision.<sup>11</sup>

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<sup>4</sup> “Small unmanned aircraft” are those weighing less than 55 pounds. Pub. L. 112-95, § 331, 126 Stat. 72.

<sup>5</sup> Nick Lavars, “Verizon trials drones as flying cell towers to plug holes in internet coverage”, *New Atlas*, Oct. 7, 2016. Available at: <https://newatlas.com/verizon-drones-internet-trials/45818/>

<sup>6</sup> Bill Canis, “Unmanned Aircraft Systems (UAS): Commercial Outlook for a New Industry”, *Congressional Research Service*, Sep. 9, 2015, R44192. Available at: <https://fas.org/sgp/crs/misc/R44192.pdf>

<sup>7</sup> <https://www.uber.com/elevate.pdf>

<sup>8</sup> Jay Bennett, “Drone Breaks Record (And the Law) By Allegedly Flying to 11,000 Feet”, *Popular Mechanics*, Mar. 9, 2016. Available at: <http://www.popularmechanics.com/flight/drones/a19854/drone-flown-11000-feet/>  
<http://www.popularmechanics.com/flight/drones/a19854/drone-flown-11000-feet/>

<sup>9</sup> Jonathan Vanian, “Facebook’s Huge Drone Flies Again (and Doesn’t Crash)”, *Fortune*, Jun. 29, 2017. Available at: <http://fortune.com/2017/06/29/facebook-drone-aquila-test-flight/>

<sup>10</sup> Statement of Earl Lawrence, Director, Unmanned Aircraft Systems Integration Office, *Before the Senate Committee on Commerce, Science, and Transportation on Unmanned Aircraft Systems: Innovation, Integration, Successes, and Challenges*, Mar. 15, 2017. Available at: [https://www.faa.gov/news/testimony/news\\_story.cfm?newsId=21494&omniRss=testimonyAoc&cid=105\\_Testimony](https://www.faa.gov/news/testimony/news_story.cfm?newsId=21494&omniRss=testimonyAoc&cid=105_Testimony)

<sup>11</sup> Federal Aviation Administration. “UAS Sightings Report: Reported UAS Sightings (January 2017 – March 2017).” Available at: [https://www.faa.gov/uas/resources/uas\\_sightings\\_report/](https://www.faa.gov/uas/resources/uas_sightings_report/)

In 2017, there have been two confirmed collisions of UAS with manned aircraft. In the first event, which occurred on September 21, 2017, a UAS struck a United States Army UH-60 helicopter flying over New York City. The collision occurred along the eastern shore of Staten Island and caused the helicopter a significant amount of damage to the rotor and airframe.<sup>12</sup> The UAS was operating in the area illegally, and it is the Committee's understanding that the UAS operator, a non-commercial operator, has been identified by law enforcement.

On October 12, 2017, a UAS crashed into an airliner in Canada during its final descent into Jean Lesage International Airport in Quebec City, Canada. The airliner was less than two miles from the airport when the UAS struck the aircraft. The airplane was able to safely land despite some airframe damage.

In addition, firefighting efforts have been seriously disrupted as aircraft tanker crews have been forced to cancel or postpone missions because of UAS sightings in proximity to forest fires.<sup>13</sup> In 2016, the U.S. Forest Service reported 40 unauthorized unmanned aircraft incursions above or near wildfires; 20 of these events caused the Forest Service to temporarily suspend aviation operations which hindered firefighting efforts.<sup>14</sup> In the majority of cases, authorities have been unable to ascertain the identity of the unmanned aircraft operators.

At the same time, UAS can improve or enhance aviation operations and safety when used properly. For example, UAS can substantially reduce the time required to perform runway inspections, thereby minimizing operational impacts at busy airports.<sup>15</sup> UAS can also be used to enhance safety inspections of manned aircraft in several ways.<sup>16</sup> First, they reduce the safety risk to personnel who sometimes must visually inspect components that are dozens of feet off of the ground. Second, UAS equipped with sensors can detect aircraft damage and discrepancies that might escape human eyes. Finally, they can complete a visual inspection of certain aircraft in 15 minutes whereas a human inspection may last two or more hours.

## **Legislation and Executive Actions**

### *FAA Modernization and Reform Act of 2012*

The *FAA Modernization and Reform Act of 2012* (FMRA; P.L. 112-095) included a subtitle to promote the safe integration of UAS into our national airspace. Among other things, provisions include the designation of six test ranges throughout the United States by the FAA in

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<sup>12</sup> "Drone Hits Army Helicopter Flying Over Staten Island", *CBS New York*, Sept. 22, 2017. Available at: <http://newyork.cbslocal.com/2017/09/22/drone-hits-army-helicopter/>

<sup>13</sup> United States Forest Service. "If You Fly, We Can't." Available at: <https://www.fs.fed.us/managing-land/fire/aviation/unmanned-aircraft-systems-uas/if-you-fly-we-cant>

<sup>14</sup> *Id.*

<sup>15</sup> Sam Whitehead, "How an Atlanta airport is using drones to help with runway maintenance", *Marketplace*, May 31, 2017. Available at: <https://www.marketplace.org/2017/05/31/business/how-atlanta-airport-using-drones-help-with-runway-maintenance>

<sup>16</sup> Jonathan Vanian, "Airbus is Using Drones to Inspect Airplanes", *Fortune*, Jul. 15, 2016. Available at: <http://fortune.com/2016/07/15/airbus-intel-drones-airplane-inspection/>

furtherance of UAS integration.<sup>17</sup> The FMRA also required the issuance of an integration plan, regulations, and established a process for the Secretary of Transportation to authorize certain UAS flights within six months of enactment.<sup>18</sup> Finally, the FMRA contained provisions related to the operation of UAS by government agencies and model aircraft operated in accordance with certain guidelines.

### *FAA Extension, Safety, and Security Act of 2016*

The *FAA Extension, Safety, and Security Act of 2016* (Extension Act; P.L. 114-190) contained several provisions related to UAS.<sup>19</sup> One of the provisions addressed is the remote identification of UAS, which has become an increasingly important capability for purposes of safety and law enforcement.<sup>20</sup> The Extension Act also established a process to allow operators of certain facilities to petition for UAS flight restrictions in proximity to such facilities.<sup>21</sup> It also required the FAA to create guidance and regulations to expedite authorization of UAS flights in response to certain public emergencies.<sup>22</sup> Lastly, the Extension Act requires a UTM research and pilot program.<sup>23</sup>

### *National Defense Authorization Act of 2018*

The *National Defense Authorization Act of 2018* (NDAA 2018; H.R. 2810) would restore the FAA's small UAS registration requirement. NDAA 2018 is pending. A U.S. Appellate Court previously overturned the FAA's small UAS registration program. Knowing who owns a UAS is critical for accountability when something goes wrong. With the NDAA, Congress has clarified its position on the need to identify and track all UAS operations in the NAS.

## **Executive Branch Actions**

### *Rulemakings and Advisory Committees*

The FAA has taken a number of actions related to UAS integration. On June 28, 2016, the FAA issued a final rule (Part 107) related to certification and operation of small UAS.<sup>24</sup> This rule of general applicability addresses areas including airman certification, operating rules, and weather minima. Part 107 includes a waiver process allowing the FAA to authorize, on a case-by-case basis, certain operations that are otherwise prohibited, such as night flying. The FAA also convened an Aviation Rulemaking Committee in 2016 to provide recommendations for

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<sup>17</sup> *FAA Modernization and Reform Act of 2012*. Pub. L. 112-95 (Feb. 14, 2012), § 332. The test ranges are based in New York, Virginia, Texas, Alaska, North Dakota, and Nevada.

<sup>18</sup> *Id.* & section 333

<sup>19</sup> *FAA Extension, Safety, and Security Act of 2016*. Pub. L. 114-190 (Jul. 15, 2016)

<sup>20</sup> *Id.* § 2202.

<sup>21</sup> *Id.* § 2209.

<sup>22</sup> *Id.* § 2207.

<sup>23</sup> *Id.* § 2208.

<sup>24</sup> "Operation and Certification of Small Unmanned Aircraft Systems", 81 *Fed. Reg.* 42,064 (Jun. 28, 2016); 14 C.F.R. Part 107

standards for the flight of UAS over people who are not involved in the flight of the aircraft.<sup>25</sup> Those rules remain pending.

The FAA is a participant in the public-private “Know Before You Fly” campaign to educate users of UAS about aviation safety and regulation.<sup>26</sup> The FAA also developed a smartphone application known as B4UFLY to aid UAS operators with airspace information.<sup>27</sup> It established a Drone Advisory Committee (DAC) in 2016 to gather input from stakeholders on key issue areas.<sup>28</sup> The DAC is divided into “Task Groups” that addressed matters including the roles of different levels of government, airspace access, and funding for activities and services necessary for safe UAS integration.<sup>29</sup> The DAC most recently met on November 8, 2017.

### FAA Low Altitude Authorization and Notification Capability

In late 2017, the FAA announced the prototype evaluation of the Low Altitude Authorization and Notification Capability (LAANC).<sup>30</sup> LAANC provides real-time automated notification and authorization to UAS operators. Because the existing air traffic control system is designed to primarily meet the needs of manned aviation, it proved unwieldy, untimely, and labor intensive for UAS operators as well as air traffic control personnel. The FAA has indicated that LAANC will provide operators with necessary information in a matter of seconds rather than days. The FAA will not provide LAANC services to users. Instead, LAANC will be initially be provided by two UAS Service Suppliers (USS) under FAA oversight. The FAA expects more USS to join the program as it expands.

### UAS Pilot Program

In a Presidential Memoranda dated October 25, 2017, President Donald J. Trump announced a policy to promote the safe operation of UAS and enable technological development in various economic sectors.<sup>31</sup> The Memoranda also directed Secretary of Transportation to establish pilot program to evaluate, among other things, various models of state, local, and tribal government in the “development and enforcement of federal regulations. . . .”<sup>32</sup> The Secretary is soliciting applications from state, local, and tribal governments to participate in this program in

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<sup>25</sup> Federal Aviation Administration. “ARC Recommendations Final Report”, *Micro Unmanned Aircraft Systems Aviation Rulemaking Committee (ARC)*, Apr. 1, 2016. Available at:

[https://www.faa.gov/uas/resources/uas\\_regulations\\_policy/media/Micro-UAS-ARC-FINAL-Report.pdf](https://www.faa.gov/uas/resources/uas_regulations_policy/media/Micro-UAS-ARC-FINAL-Report.pdf)

<sup>26</sup> Know Before You Fly: <http://knowbeforeyoufly.org/>

<sup>27</sup> Federal Aviation Administration. “B4UFLY Mobile App.” Available at:

[https://www.faa.gov/uas/where\\_to\\_fly/b4ufly/](https://www.faa.gov/uas/where_to_fly/b4ufly/)

<sup>28</sup> Federal Aviation Administration. “Press Release – Drone Advisory Committee to Hold Inaugural Meeting.” Aug. 31, 2016. Available at: [https://www.faa.gov/news/press\\_releases/news\\_story.cfm?newsId=20754](https://www.faa.gov/news/press_releases/news_story.cfm?newsId=20754)

<sup>29</sup> Radio Technical Commission for Aeronautics: <https://www.rtca.org/content/drone-advisory-committee>

<sup>30</sup> Federal Aviation Administration. “FAA UAS Data Exchange.” Available at:

[https://www.faa.gov/uas/programs\\_partnerships/uas\\_data\\_exchange/](https://www.faa.gov/uas/programs_partnerships/uas_data_exchange/)

<sup>31</sup> The White House. “Presidential Memorandum for the Secretary of Transportation.” Oct. 25, 2017. Available at:

<https://www.whitehouse.gov/the-press-office/2017/10/25/presidential-memorandum-secretary-transportation>

<sup>32</sup> *Id.*

partnership with private sector UAS operators.<sup>33</sup> In the *Federal Register* notice, the Secretary cites a number of private and public use cases that might be demonstrated in the pilot program.

### **WITNESS LIST**

#### **Panel I**

Dr. Juan J. Alonso  
Professor of Aeronautics and Astronautics

Mr. William O. “Billy” Ball  
Executive Vice President and Chief Transmission Officer  
Southern Company

Mr. William Goodwin  
General Counsel  
AirMap

Mr. Brian Wynne  
President and Chief Executive Officer  
The Association for Unmanned Vehicle Systems International

#### **Panel II**

Mr. Daniel K. Elwell  
Deputy Administrator  
Federal Aviation Administration  
(*Accompanied by:* Mr. Earl Lawrence  
Director, Unmanned Aircraft Systems Integration Office, FAA)

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<sup>33</sup> “Unmanned Aircraft Systems Integration Pilot Program— Announcement of Establishment of Program and Request for Applications”, 82 *Fed. Reg.* 51,903 (Nov. 8, 2017)