



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

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**SUMMARY OF SUBJECT MATTER**

**TO:** Members, Subcommittee on Aviation  
**FROM:** Staff, Subcommittee on Aviation  
**RE:** Subcommittee Hearing on “Building a 21st Century Infrastructure for America:  
Enabling Innovation in the National Airspace”

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**PURPOSE**

The Subcommittee on Aviation will hold a series of hearings to receive testimony from representatives of different segments of new aviation technologies in order to help prepare for the Federal Aviation Administration (FAA) reauthorization bill. This memo will serve as the Summary of Subject Matter for these hearings.

The Subcommittee will meet for the fourth hearing on Tuesday, April 4, 2017, at 10:00 a.m. in 2167 Rayburn House Office Building. The Subcommittee will hear about new aviation and aerospace technologies, users, and business models; innovation and its role in building a 21<sup>st</sup> Century aviation transportation system; and any potential challenges operators may face when trying to integrate new technology into the National Airspace System (NAS). The Subcommittee will receive testimony from representatives of the FAA, Amazon Prime Air, FlyGLO, AirMap, Virgin Galactic, and VDOS.

**BACKGROUND**

**Federal Aviation Administration**

The primary mission of the FAA is ensuring aviation safety. The FAA has the responsibility to certify, monitor, and regulate the safety and operation of the civil aviation sector, including airlines, general aviation, unmanned aircraft systems (UAS), airports, commercial space transportation, repair stations, and aircraft manufacturers, as well as to establish licensing and training requirements for pilots and other aviation-related professionals. One of the most visible functions of the FAA is the operation of the air traffic control system. The FAA provides air traffic control services in the continental United States airspace and also vast areas of international airspace over the Gulf of Mexico, Atlantic Ocean, and Pacific Ocean.

On February 14, 2012, President Obama signed into law the *Federal Aviation Administration Modernization and Reform Act of 2012* (FMRA) (P.L. 112-95). This law includes significant changes to FAA programs and policies. It also provided nearly \$16 billion annually from fiscal year 2012 through fiscal year 2015 for FAA programs, projects, and operations.<sup>1</sup>

On July 15, 2016, President Obama signed into law the *FAA Extension, Safety, and Security Act of 2016* (P.L. 114-190). This law extends expiring authorities and taxes included in the FMRA through September 30, 2017. It also authorizes certain critical, time-sensitive safety reforms.

## **Civil Aviation**

The United States civil aviation industry is a major economic driver, contributing roughly \$1.6 trillion in total economic activity and supporting roughly 11 million jobs.<sup>2</sup> Our civil aviation system accounts for more than five percent of the U.S. Gross Domestic Product.<sup>3</sup> Air transportation accounts for a significant part by safely and efficiently moving passengers and cargo around the United States and connecting our country to the rest of the world.

This industry supports a diverse and essential aviation system comprised of commercial aviation, general aviation, unmanned aircraft, airports, commercial space transportation, and other users. Commercial and general aviation help transport millions of passengers and move billions in revenue ton-miles of freight safely and securely all across the country. Impacts are also seen state-by-state, where airports and air operators help connect large and small communities, create jobs, and increase economic output.<sup>4</sup>

## **Manufacturing**

Aviation manufacturing is the “seventh leading contributor to national productivity growth.”<sup>5</sup> The United States is the home of several major aviation manufacturers, including one of the two major global manufacturers of wide-body aircraft, and a number of the world’s major general aviation manufacturers for business jets.<sup>6</sup> While the Nation experienced a severe economic downturn in 2007, civil aviation manufacturing has recovered and has increased its production over the past several years. In 2014, civil aircraft manufacturing’s total output was roughly \$147.7 billion, an increase from 2012’s total output of \$122.7 billion. Further, in 2014,

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<sup>1</sup> The FAA’s authorities and taxes authorized in FMRA were extended through March 31, 2016 in P.L. 114-55, and again through July 15, 2016 in P.L. 114-141.

<sup>2</sup> Federal Aviation Administration. “The Economic Impact of Civil Aviation on the U.S. Economy.” November 2016. Pg. 3.

<sup>3</sup> Federal Aviation Administration. “The Economic Impact of Civil Aviation on the U.S. Economy.” November 2016. Pg. 3. [https://www.faa.gov/air\\_traffic/publications/media/2016-economic-impact-report\\_FINAL.pdf](https://www.faa.gov/air_traffic/publications/media/2016-economic-impact-report_FINAL.pdf)

<sup>4</sup> Federal Aviation Administration. “General Aviation Airports Reports.” [http://www.faa.gov/airports/planning\\_capacity/ga\\_study/](http://www.faa.gov/airports/planning_capacity/ga_study/)

<sup>5</sup> Federal Aviation Administration. “The Economic Impact of Civil Aviation on the U.S. Economy.” November 2016. Pg. 3. [https://www.faa.gov/air\\_traffic/publications/media/2016-economic-impact-report\\_FINAL.pdf](https://www.faa.gov/air_traffic/publications/media/2016-economic-impact-report_FINAL.pdf)

<sup>6</sup> United States International Trade Commission. “Business Jet Aircraft Industry: Structure and Factors Affecting Competitiveness.” April 2012. [http://www.usitc.gov/press\\_room/news\\_release/2012/er0530kk2.htm](http://www.usitc.gov/press_room/news_release/2012/er0530kk2.htm)

general aviation manufacturing's total output was over \$29 billion, which was roughly a nine billion dollar increase from 2012.<sup>7</sup>

While American aviation manufacturing has continued to grow, the industry has also faced a number of global and domestic challenges. In the United States, the FAA is responsible for developing certification standards to ensure the safety of design and production of aircraft, aircraft components, and other avionics. To meet this responsibility, the FAA has a system of processes and compliance reviews that certify the design and production of aircraft and aircraft components to specific safety standards. However, these processes can often be lengthy and costly for aviation manufacturers.<sup>8</sup> FMRA directed the FAA to find ways to improve and streamline certification processes, reduce delays, and harmonize regulatory standards both domestically and internationally.<sup>9</sup> As a result of this mandate, working groups consisting of industry, FAA, and labor representatives made a number of recommendations to streamline aircraft certifications and address inconsistent regulatory interpretations across the Agency.

### Airports

The United States has over 19,400 airports providing important services to our aviation system, and in many communities, they are key economic drivers. The current National Plan of Integrated Airport Systems (NPIAS) identifies 3,332 commercial service and general aviation airports that are significant to national air transportation and thus eligible to receive federal grants under the Airport Improvement Program (AIP). It also includes estimates of the amount of funding needed to complete infrastructure development projects bringing these airports up to current design standards and adding capacity at congested airports.<sup>10</sup> The current NPIAS estimates there are \$32.5 billion in AIP-eligible projects between 2017 and 2021.

There are 382 airports in the NPIAS classified as primary airports because they support scheduled commercial air service at a certain volume, and 2,950 non-primary airports supporting low-level commercial service and general aviation operations.<sup>11</sup>

### Airport Revenue

To finance daily operations, airports generate and rely on both aeronautical and non-aeronautical revenue. The primary sources of aeronautical (or airside) revenue are various fees paid by airlines and other airport users for the lease of terminal space, landing fees, and use of other airport facilities, such as jet bridges. Non-aeronautical (or landside) revenue sources include airport terminal concessions, parking, rental car operations, and rental fees.

### Airport Capital

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<sup>7</sup> Federal Aviation Administration. "The Economic Impact of Civil Aviation on the U.S. Economy." November 2016, p. 28.

<sup>8</sup> 14 C.F.R Parts 21, 23, and 25.

<sup>9</sup> Sections 312 and 313 of the *FAA Modernization and Reform Act of 2012*. (P.L. 112-95.)

<sup>10</sup> Federal Aviation Administration. "National Plan of Integrated Airport Systems (NPIAS)" [http://www.faa.gov/airports/planning\\_capacity/npias/](http://www.faa.gov/airports/planning_capacity/npias/)

<sup>11</sup> *Id.* at 4.

To finance capital needs, airports use a combination of federal grants, federally-authorized local airport charges, state and local grants, and airport revenues.<sup>12</sup> The primary Federal grant program funding for airport development and planning is the AIP. AIP funds are primarily used for improvements related to enhancing airport safety, capacity, security, and environmental concerns. Airport sponsors can also use AIP funds, in most cases, on airfield capital improvements or repairs and, in some specific situations, for terminals and hangars. The AIP is currently authorized at \$3.35 billion.

Because the AIP does not cover all airport capital needs, Congress has authorized airports to collect a fee on passengers called the passenger facility charge (PFC). A PFC is approved by the federal government, collected by the airlines, and paid directly to the airport without going through the federal Treasury. The PFC is intended to supplement, not replace, AIP funds. Airports can use PFCs to build critical infrastructure projects at their facilities. However, unlike AIP funds, airports can use PFC revenue for gates, airline ticket areas, and debt service on bonds that airports issue to finance airport infrastructure projects. In 2016, the FAA estimated that airports collected approximately \$3.1 billion from PFCs.

## **Civil Aviation Operators**

### *Airlines and Charters*

The air transportation industry includes major airlines, regional airlines, all-cargo airlines, and charter operators that serve the widely varying needs of American consumers and businesses.

In 2015, approximately 2 million passengers flew on domestic and international flights operated by U.S. airlines each day.<sup>13</sup> Foreign carriers serving the United States carried additional passengers to and from the United States. The transportation of air freight is also substantial: in 2014, over 64 billion ton-miles of freight passed through U.S. airports.<sup>14</sup> Charter operators are a diverse group of approximately 2,000 companies operating over 10,000 aircraft of various sizes and types serving the largest cities and also rural communities lacking scheduled service.<sup>15</sup> In addition to direct economic impacts, air transportation enables substantial economic activity outside of the transportation sector.

In recent years, the U.S. airline industry has shown sustained profitability. However, this stability comes after decades of financial volatility that resulted in mergers and acquisitions, the disappearance of some airlines, and the emergence of others. Major U.S. passenger airlines often partner with other airlines to complement their services. Domestically, they partner with regional airlines operating smaller aircraft to fly routes or during times-of-day that cannot be

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<sup>12</sup> Tang, Rachel Y., Kirk, Robert S., “Financing Airports Improvements”, Congressional Research Service. December 4, 2013.

<sup>13</sup> Bureau of Transportation Statistics. “2015 U.S.-Based Airline Traffic Data.”  
[https://www.rita.dot.gov/bts/press\\_releases/bts018\\_16](https://www.rita.dot.gov/bts/press_releases/bts018_16)

<sup>14</sup> Federal Aviation Administration. “The Economic Impact of Civil Aviation on the U.S. Economy.” Pg. 4.  
[https://www.faa.gov/air\\_traffic/publications/media/2016-economic-impact-report\\_FINAL.pdf](https://www.faa.gov/air_traffic/publications/media/2016-economic-impact-report_FINAL.pdf)

<sup>15</sup> Study of Operators Regulated Under Part 135, April 2016. Available at:  
[http://nata.aero/data/files/gia/4656\\_001.pdf](http://nata.aero/data/files/gia/4656_001.pdf) (p. ES-2)

economically served with other, larger aircraft. Internationally, they also form alliances with foreign airlines to mutually expand their reach of their global networks. U.S. all-cargo airlines are part of larger integrated logistics companies that operate hubs around the U.S. and the globe.

The FAA conducts comprehensive safety oversight of the airline industry. In 1978, the *Airline Deregulation Act of 1978 (ADA)* eliminated most economic regulation of the industry in favor of allowing market forces to determine domestic airfares, routes, and levels of service. The legislation included the Essential Air Service program to protect air service in smaller communities. Since enactment of the ADA, airfares have fallen dramatically in real terms.<sup>16</sup> In 1992, the United States entered into its first “Open Skies” agreement which eliminated most governmental limits on international services. Since that time, the United States has entered Open Skies agreements with 100 countries around the world.<sup>17</sup>

### General Aviation

The general aviation segment consists of flight activity for personal and business use. This activity includes recreational aviation, flight training, and other private uses. Aircraft used in general aviation range from helicopters and piston-engine aircraft to large transport aircraft capable of intercontinental flight.

According to the FAA, “...the long term outlook for general aviation is favorable, led by gains in turbine aircraft activity. While steady growth in both GDP and corporate profits results in continued growth of the turbine and rotorcraft fleets, the largest segment of the fleet—fixed wing piston aircraft—continues to shrink over the forecast.”<sup>18</sup> In addition, FAA forecasts that “...the number of active general aviation pilots (excluding ATPs) is projected to decrease about 5,000 (down 0.1 percent yearly)...” between 2016 - 2036.<sup>19</sup>

### **New Aviation Technologies and New Operators**

#### *Air Traffic Control Modernization or “NextGen”*

In order to meet anticipated growth in air traffic, Congress directed FAA to undertake a series of initiatives to revamp the Nation’s Air Traffic Control System known as “NextGen”. The goal of NextGen is to transition from ground-based navigation and surveillance systems to a satellite-based system in order to increase the efficiency, capacity, and flexibility of our airspace. Specifically, NextGen initiatives should reduce the required separation between aircraft, result in more efficient routes, and decrease congestion. Together, these initiatives should provide a better experience for the travelling public.<sup>20</sup> NextGen consists of specific programs to realize these benefits, including Automatic Dependent Surveillance-Broadcast (ADS-B), System-Wide

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<sup>16</sup> Thompson, Derek. “How Airline Ticket Prices Fell 50% in 30 Years (and Why Nobody Noticed).” *The Atlantic*. Feb. 23, 2013. <http://www.theatlantic.com/business/archive/2013/02/how-airline-ticket-prices-fell-50-in-30-years-and-why-nobody-noticed/273506/>

<sup>17</sup> U.S. Department of State. “Open Skies Agreements.” <https://www.state.gov/e/eb/tr/ata/>

<sup>18</sup> FAA Aerospace Forecast, 2016-2036, p. 2.

<sup>19</sup> *Id.* at 25.

<sup>20</sup> GAO “*Next Generation Air Transportation System: Information on Expenditures, Schedule, and Cost Estimates, Fiscal Years 2004-2030*,” November 17, 2016, p. 1.

Information Management (SWIM), and Data Communications (Data Comm). The goal at the inception of NextGen was to achieve transformation of our National Airspace System (NAS) by 2025.<sup>21</sup>

According to a Government Accountability Office (GAO) report, FAA has spent approximately \$7.4 billion on programs identified as NextGen.<sup>22</sup> In order to ensure timely completion, FMRA established a Chief NextGen Officer within the FAA to oversee the implementation and management of NextGen and created NextGen metrics. However, the NextGen programs have been consistently fraught with delays and cost-overruns. According to a November 2016 GAO report, six NextGen activities with completion dates in 2025 have been delayed to 2030.<sup>23</sup> According to Inspector General of the Department of Transportation (DOT IG) Calvin Scovel during the February 5, 2014 hearing entitled “*The FAA Modernization and Reform Act of 2012: Two Years Later*”, the total expenditures of NextGen look to be two to three times greater than the initial \$40 billion estimate.<sup>24</sup>

### Remote Air Traffic Control Towers

Technology could enable some airports to provide air traffic services remotely. Remote air traffic control towers include cameras, microphones, meteorological sensors, and other monitoring equipment installed at the airport. Controllers are located at facilities that receive real-time data and video from these sensors and equipment. A controller at the remote location operates traffic at the airport the same way he or she would in a normal tower. This technology was tested at Leesburg Airport in Virginia in 2015. This technology could provide air traffic services to airports located in rural and remote areas, thereby greatly improving safety and increasing access to the NAS.

### Unmanned Aircraft Systems

UAS, or drones, are an important innovation in aviation technology. There is significant demand for UAS in the United States. From 2005-2014, the number of countries using UAS for commercial and military purposes nearly doubled.<sup>25</sup> Since the early 1990s, UAS have operated in the national airspace mostly in support of governmental functions, such as military and border security operations.<sup>26</sup> In recent years, the private sector has developed a sweeping range of uses for UAS including aerial photography, surveying, agriculture, communications, environmental monitoring, and infrastructure inspection.<sup>27</sup> Certain companies have announced plans for small package delivery using UAS.

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<sup>21</sup> *Id.* at 3

<sup>22</sup> *Id.* at 2

<sup>23</sup> *Id.* at 2

<sup>24</sup> GAO “*The FAA Modernization and Reform Act of 2012: Two Years Later*” Hearing before the Subcommittee on Aviation – Hearing Transcript, February 5, 2014, p. 22.

<sup>25</sup> GAO “*Key Issues: Unmanned Aerial Systems (Drones)*,” February 1, 2016  
[http://www.gao.gov/key\\_issues/unmanned\\_aerial\\_systems/issue\\_summary](http://www.gao.gov/key_issues/unmanned_aerial_systems/issue_summary)

<sup>26</sup> Federal Aviation Administration, “Integration of Civil Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) Roadmap” [https://www.faa.gov/uas/media/UAS\\_Roadmap\\_2013.pdf](https://www.faa.gov/uas/media/UAS_Roadmap_2013.pdf) (p. 4)

<sup>27</sup> *Id.* at 6

The emergence of UAS offers substantial opportunities and also raises important policy issues such as airspace rules, privacy concerns, and aviation safety. Since 2014, the FAA has promulgated regulations authorizing use of small UAS on a routine basis, requiring registration of certain UAS, and has also authorized use of certain advanced technologies through waivers and other regulatory means.

### Commercial Space Transportation

For decades, private industry, with the support of National Aeronautics and Space Administration (NASA) and the FAA, have worked to develop new and innovative methods to transport passengers and cargo safely and efficiently into space. Under the *Commercial Space Launch Act of 1984* and subsequent amendments, the Secretary of Transportation has the responsibility and authority to facilitate, regulate, and promote the commercial space transportation industry. This responsibility has been assigned to the FAA's Office of Commercial Space Transportation (AST). According to the FAA, the AST's mission "is to ensure protection of the public, property, and the national security and foreign policy interests of the United States during commercial launch or reentry activities, and to encourage, facilitate, and promote U.S. commercial space transportation."

AST issues launch and reentry licenses for commercial space launches, permits for experimental launches, and launch site licenses for commercial spaceports. AST licensed 11 commercial launches, permitted four experimental launches, and supervised 10 active spaceport licenses in 2016. As the pace and complexity of commercial space transportation operations continues to increase, AST's role in regulating and facilitating the industry will continue to evolve.

### Other issues.

In addition to the issues discussed above, the hearings may also touch on the following subjects:

- *Safety Oversight*: The U.S. commercial aviation system has an impressive safety record, but accidents, including the crash of Colgan Flight 3407, the disappearance of Indonesia AirAsia Flight 8501 and the intentional crashing of Germanwings Flight 9525, are stark reminders to be ever vigilant. Aviation safety is reliant on excellent training, the sharing of safety critical data and information, and strong oversight.
- *Essential Air Service (EAS) program*: The EAS program was created in 1978 to ensure continuity of air service to small communities following enactment of the ADA. The program provides subsidies to airlines to provide service to small communities where there are not enough passengers to operate profitably. Recent Congresses have enacted reforms limiting program participation and subsidy levels.
- *FAA Contract Tower Program*: Federal contractors provide air traffic control services at visual flight rule airports. FAA oversees the safe operation of these towers. As of February 2016, there are 252 contract towers in the NAS.

- *Cybersecurity*: As aviation has evolved and newer technologies have been adopted and integrated cybersecurity concerns have arisen. In July 2016, the President signed into law the *FAA Extension, Safety and Security Act of 2016* that directed the FAA to implement a strategic framework for cybersecurity.

**WITNESS LIST**

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