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Federal Civil Aviation Programs: Background and Issues for Congress

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Federal Civil Aviation Programs: Background and Issues for Congress

SUMMARY

Civil aviation programs address air traffic control and aviation safety, funding for air traffic control facilities and equipment, grants for airports under the Airport Improvement Program (AIP), and civil aviation research. These programs are administered by the Department of Transportation (DOT) and the Federal Aviation Administration (FAA) and are funded primarily through the Airport and Airway Trust Fund (AATF). The FAA Reauthorization Act of 2024 (P.L. 118-63) authorizes AATF taxes and revenue collections and civil aviation program expenditures through FY2028. Total funding authorizations for FAA are set at roughly $21 billion for FY2025, rising to roughly $22 billion in FY2028. Revenue sources for the AATF include passenger ticket taxes, segment fees, air cargo fees, and fuel taxes paid by commercial and general aviation aircraft.

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AIP provides federal grants for airport development, usually limited to grants for capital improvements directly related to aircraft operations, particularly improvements addressing safety, capacity, and environmental concerns. The FAA Reauthorization Act of 2024 authorizes $4.0 billion annually for AIP from FY2025 through FY2028. The Infrastructure Investment and Jobs Act (IIJA; P.L. 117-58), enacted on November 15, 2021, had appropriated an additional $25 billion from the U.S. Treasury General Fund over a five-year period (FY2022-FY2026), including $15 billion for airport infrastructure projects that increase safety and expand capacity, $5 billion for FAA air traffic control facilities, and $5 billion for airport terminals.

FAA has about 45,000 employees—more than 31,000 are responsible for providing air traffic services, and about 8,000 are responsible for regulating and overseeing aviation safety. A number of high-profile incidents over the past few years and challenges to FAA's methods for determining adequate staffing levels have brought attention to air traffic controller staffing. P.L. 118-63 directs FAA to update its staffing model and maximize hiring to meet available training capacity at the FAA Academy. FAA has taken steps to expand controller hiring and training, including approving programs at certain colleges and universities that allow newly hired controllers to bypass FAA Academy training. P.L. 118-63 also authorizes grant programs to foster the future aviation workforce, including airline pilots, aviation maintenance workers, and the aircraft manufacturing technical workforce. FAA's comprehensive modernization initiative for air traffic control and navigation known as NextGen is set to sunset at the end of calendar year 2025 after more than 20 years of development. In its place, FAA has been directed to establish a new Airspace Modernization Office to assume responsibility for overseeing research and development related to national airspace system modernization. In May 2025, DOT unveiled a modernization plan to upgrade and replace aging air traffic control infrastructure. In the 119th Congress, P.L. 119-21, the FY2025 reconciliation law commonly known as the One Big Beautiful Bill Act, provided $12.52 billion in additional funds for the acquisition, construction, sustainment, and improvement of facilities and equipment necessary to improve and maintain aviation safety. The funding is set to remain available through FY2029.

Congress also faces a number of issues regarding aviation safety. FAA oversees civil aviation safety, including certification of aircraft and aircraft components; regulation and oversight of airlines and other aircraft operators, such as drones and other emerging technologies; and initiatives to reduce safety risks associated with airport operations. Ongoing safety challenges of specific interest to Congress include airspace and runway safety, airline pilot training and qualifications, and implementation of formal safety programs across all sectors of civil aviation. Additionally, Congress may examine the steps FAA is taking to address mandated changes in the regulation and oversight of aircraft certification, aviation cybersecurity, and air tour and helicopter safety. Congress has also directed FAA to work toward integrating drone operations in the national airspace, including beyond visual line-of-sight operations. These operations could include the delivery of goods and a variety of other operations, as well as possible future urban air taxi operations in electric-powered vertical takeoff and landing air vehicles.

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Introduction

Federal Aviation Administration (FAA) civil aviation programs are funded under four broad budget accounts: operations and maintenance (such as air traffic control and aviation safety functions); facilities and equipment (such as control towers and navigation beacons); grants for airports under the Airport Improvement Program (AIP); and civil aviation research conducted or sponsored by FAA. Additionally, some aviation programs are administered by the Department of Transportation (DOT) Office of the Secretary, including the Essential Air Service (EAS) program, which subsidizes airline service to certain small or isolated communities. Civil aviation programs are funded primarily through the Airport and Airway Trust Fund (AATF) and, in part, through U.S. Treasury General Fund contributions. The FAA Reauthorization Act of 2024 (P.L. 118-63) authorizes AATF taxes and revenue collections and civil aviation program expenditures through FY2028.

The Coronavirus Aid, Relief, and Economic Security Act (CARES Act; P.L. 116-136) provided loans, loan guarantees, and payroll support programs, as well as emergency program funding, to help the aviation sector during the COVID-19 pandemic. Additional funding to the aviation sector was provided in the Consolidated Appropriations Act, 2021 (P.L. 116-260), and in the American Rescue Plan Act of 2021 (P.L. 117-2). The Infrastructure Investment and Jobs Act (IIJA; P.L. 117-58) appropriated an additional $25 billion for airport and air traffic control projects through FY2026. In the 119th Congress P.L. 119-21, the FY2025 reconciliation law commonly known as the One Big Beautiful Bill Act, provided an additional $12.52 billion for the acquisition, construction, sustainment, and improvement of facilities and equipment necessary to improve or maintain aviation safety. The funding is set to be available to be expended through the end of FY2029.

FAA is facing a range of civil aviation issues, including those related to

- addressing the adequacy of air traffic controller staffing following a number of high-profile incidents and accidents over the past few years;
- implementing a modernization plan to upgrade and replace aging air traffic control infrastructure;
- implementing formal safety programs across all sectors of civil aviation;
- addressing mandated changes in the regulation and oversight of aircraft certification, aviation cybersecurity, and air tour and helicopter safety; and
- integrating drone operations in the national airspace, including beyond visual line-of-sight (BVLOS) operations and accommodating the anticipated introduction of other vehicles and airspace users, such as potential urban air taxi operations.

This report provides an overview of FAA programs and issues and discusses the supplemental relief and assistance to programs in recent laws and bills. Other federal entities also play significant roles in civil aviation. These include the National Aeronautics and Space Administration, which conducts extensive research on civil aeronautics; the National Oceanic and Atmospheric Administration, which provides research and operational support to FAA regarding aviation weather forecasting; the Transportation Security Administration (TSA) in the Department of Homeland Security (DHS), which has authority over civil aviation security; and the National Transportation Safety Board (NTSB), which investigates aviation accidents and makes safety recommendations to FAA. Programs overseen by those federal entities are not discussed in this report.

Airport and Airway Trust Fund

The AATF, sometimes referred to as the "aviation trust fund," was established in 1970 under the Airport and Airway Development Act of 1970 (P.L. 91-258) to provide for expansion of the nation's airports and air traffic system. It has been the major funding source for federal aviation programs since its creation. In FY2023 and FY2024, FAA reported that the AATF provided 87% and 94% of FAA's total annual funding, respectively, with the remainder coming from Treasury General Fund appropriations.[1]

Revenue sources for the AATF include passenger ticket taxes, segment fees, air cargo fees, and fuel taxes paid by commercial and general aviation aircraft (see **Table 1**). In addition to excise taxes deposited into the aviation trust fund, FAA imposes air traffic service fees on flights that transit U.S.-controlled airspace but do not take off from or land in the United States. These overflight fees partially fund the EAS program.[2]

In early 2020, the COVID-19 pandemic caused air travel to drop significantly. The CARES Act, enacted on March 27, 2020, provided loans, loan guarantees, and payroll support programs, along with emergency program funding, as economic assistance to the U.S. aviation sector. Section 4007 of the CARES Act authorized suspension of aviation excise taxes through calendar year 2020 to reduce overall costs and encourage air travel. The suspended taxes included the 7.5% tax on airline passenger ticket sales, segment fees, the air cargo waybill tax, and the tax on aviation fuel used by commercial aircraft—these were the primary revenue sources for the trust fund.[3]

For FY2025, the AATF is estimated to have excise tax revenues of more than $18.7 billion and to maintain a cash balance of over $17.6 billion. The uncommitted balance—the amount of funds not yet obligated—is estimated to be more than $4.8 billion at the start of FY2026.[4]

Airlines' imposition of separate fees for a variety of services and amenities, such as checked bags, onboard Wi-Fi access, or seats with additional legroom, have adversely affected AATF revenues. Generally, fees not included in the base ticket price are not subject to federal excise taxes. For example, air carriers generated approximately $7.27 billion in baggage fees in 2024.[5] The AATF would have received over $545 million from such baggage fees had they been subject to the 7.5% excise tax. If airlines continue to expand use of ancillary fees as an alternative to increasing base ticket prices, the ability of tax revenues to pay for federal aviation programs may be affected.

[1] Federal Aviation Administration (FAA), "Airport and Airway Trust Fund (AATF) Fact Sheet," February 2025, https://www.faa.gov/about/budget/aatf/airport-and-airway-administration-trust-fund-aatf-fact-sheet.

[2] See CRS Report R44176, *Essential Air Service (EAS)*, by Rachel Y. Tang.

[3] The excise tax suspension (March 28-December 31, 2020) applied to the 7.5% airline passenger ticket tax, flight segment tax ($4.30), cargo waybill tax, frequent flyer tax, international departure/arrival tax, and fuel tax on kerosene used in commercial aviation. See Internal Revenue Service, "FAQs: Aviation Excise Tax Holiday Under the CARES Act," https://www.irs.gov/newsroom/faqs-aviation-excise-tax-holiday-under-the-cares-act.

[4] Congressional Budget Office, *Baseline Projections of the Airport and Airway Trust Fund*, January 2025.

[5] Bureau of Transportation Statistics, "Baggage Fees by Airline 2024," accessed on June 3, 2025, https://www.bts.gov/topics/airlines-and-airports/baggage-fees-airline-2024.

Table 1. Aviation Taxes and Fees

(calendar year 2025 rates)

Tax or Fee	Rate
Passenger Ticket Tax (on domestic ticket purchases and frequent flyer awards)	7.5%
Flight Segment Tax (domestic, indexed annually to the Consumer Price Index)	$5.20/segment
Cargo Waybill Tax	6.25%
Frequent Flyer Tax	7.5%
General Aviation Gasoline[a]	19.3 cents/gallon
General Aviation Jet Fuel[a] (kerosene)	21.8 cents/gallon
Commercial Jet Fuel[a] (kerosene)	4.3 cents/gallon
International Departure/Arrival Tax (adjusted annually for inflation) (Alaska/Hawaii to/from mainland United States)[b]	$22.90/departure or arrival (Alaska/Hawaii = $11.40/departure or arrival)
Fractional Ownership Surtax (on general aviation jet fuel)	14.1 cents/gallon

Source: Internal Revenue Service, *Revenue Procedure No. 2024-40*, October 22, 2024, p. 19.

Notes:

a. Does not include a 0.1 cents/gallon tax for the Leaking Underground Storage Tank trust fund.

b. International arrival and departure taxes have been annually adjusted for inflation since January 1, 1999. The rate for U.S. flights to and from Alaska or Hawaii applies only to domestic departures.

Airlines have long contended that general aviation operators, particularly corporate jets, should provide a larger share of the revenues supporting the trust fund than currently required. General aviation operators argue that the air traffic system mainly supports the airlines and that nonairline users pay a reasonable share given the relatively small incremental costs arising from their flights.

FAA Funding Accounts

FAA funding is divided among four main accounts: Operations and Maintenance (O&M); Grants-in-Aid for Airports (also known as Airport Improvement Program, or AIP); Facilities and Equipment (F&E); and Research, Engineering, and Development.

The O&M account receives approximately 60% of total FAA appropriations. The O&M account, funded by the AATF as well as by General Fund contributions, principally funds air traffic operations and aviation safety programs. The AIP provides federal grants-in-aid for projects, such as new runways and taxiways; runway lengthening, rehabilitation, and repair; and noise mitigation near airports. The F&E account provides funding for the acquisition and maintenance of air traffic facilities and equipment and for engineering, development, testing, and evaluation of technologies related to the federal air traffic system. The Research, Engineering, and Development account finances research on improving aviation safety and operational efficiency and reducing environmental impacts of aviation operations. Authorization levels for these accounts are shown in **Table 2**.

Table 2. Authorized Funding Levels for Major FAA Accounts

(dollars in millions)

Account	Authorized Levels by Fiscal Year				
	FY2024	FY2025	FY2026	FY2027	FY2028
Operations and Maintenance	12,730	13,055	13,354	13,650	13,954
Airport Improvement Program	3,350	4,000	4,000	4,000	4,000
Facilities and Equipment	3,191	3,575	3,625	3,675	3,725
Research, Engineering, and Development	280	311	323	334	345
Fiscal Year Total	19,551	20,941	21,302	21,659	22,024

Source: P.L. 118-63, §101, §102, §103, and §1002.

Airport Financing[6]

AIP provides federal grants for airport development. AIP funding, distributed by both formula and discretionary grants, is usually limited to capital improvements related to aircraft operations, particularly improvements addressing safety, capacity, and environmental concerns. Commercial revenue-producing portions of airports and airport terminals are generally not eligible for AIP funding. AIP money usually cannot be used for airport operational expenses or bond repayments. It may be spent only on public-use airports identified in FAA's National Plan of Integrated Airports Systems, which lists about 3,300 airports across the United States considered significant to national air transportation.

In general, the federal share of costs for AIP projects is capped at the following levels:

- 75% for large and medium hub airports (80% for noise compatibility projects); and
- 90% or 95% for other airports, depending on statutory requirements.

Additionally, certain economically distressed communities and communities receiving EAS-subsidized air carrier service may be eligible for up to a 95% federal share of project costs.

For many years, AIP was funded entirely by the aviation trust fund. However, between FY2018 and FY2020, AIP received supplemental appropriations of $1.9 billion for airport grants from the U.S. Treasury General Fund.[7] In 2020 and 2021, Congress addressed the financial impact of the COVID-19 pandemic in three separate laws providing approximately $20 billion from the Treasury General Fund to eligible U.S. airports.[8]

[6] For more details, see CRS Report R43327, *Financing Airport Improvements*, by Rachel Y. Tang. Also see FAA, "Overview: What Is AIP?" http://www.faa.gov/airports/aip/overview/.

[7] The Consolidated Appropriations Act, 2018 (P.L. 115-141), provided the Airport Improvement Program (AIP) an additional $1 billion in discretionary grants; the Consolidated Appropriations Act, 2019 (P.L. 116-6), provided an additional $500 million for AIP discretionary grants; and the Further Consolidated Appropriations Act, 2020 (P.L. 116-94), provided $400 million for AIP discretionary grants. See FAA, "Airport Improvement Program (AIP) 2023-2025 Supplemental Appropriation," https://www.faa.gov/airports/aip/aip_supplemental_appropriation/.

[8] For more information about Coronavirus Aid, Relief, and Economic Security Act (P.L. 116-136) funding for airports, see FAA, "2020 CARES Act Grants," https://www.faa.gov/airports/cares_act/; for Coronavirus Response and Relief Supplemental Appropriation Act (P.L. 116-260) funding for airports, see FAA, "Airport Coronavirus Response Grant Program," https://www.faa.gov/airports/crrsaa/; and for American Rescue Plan Act of 2021 (P.L. 117-2) funding for airports, see FAA, "Airport Rescue Grants," https://www.faa.gov/airports/airport_rescue_grants/.

The IIJA (P.L. 117-58), enacted on November 15, 2021, appropriated an additional $25 billion from the General Fund over a five-year period (FY2022-FY2026), including $15 billion for airport infrastructure projects that increase safety and expand capacity, $5 billion for FAA air traffic control facilities, and $5 billion for competitive grants for airport terminals. These competitive grants for airport terminals mark the first time the federal government has provided grants for passenger terminal projects, including airport-owned air traffic control towers. The money supplements the *passenger facility charge* (PFC), which is a local tax imposed, with federal approval, by an airport on each boarding passenger.

PFC funds can be used for a broader range of projects than AIP grants and are more likely to be used for bond repayments and landside projects,[9] such as improvements to passenger terminals and ground transportation facilities. PFCs are capped at $4.50 per boarded passenger, with a maximum charge of $18 per round-trip, multiple-leg flight—the same amount in nominal dollars since 2000. PFCs are collected by airlines and remitted to airports. Airports also raise funds for capital projects from bonds, state and local grants, landing fees, on-airport parking, and lease agreements.

FAA Management and Organizational Issues

FAA is a large organization with a staff of about 45,000. More than 31,000 staff are in the Air Traffic Organization (ATO), including approximately 14,500 air traffic controllers; 5,000 air traffic supervisors and managers; and 7,800 engineers and maintenance technicians. ATO was established under Executive Order 13180 (December 7, 2000) as a functional unit within FAA but with a separate management and organizational structure and a mandate to employ a business-like approach emphasizing defined performance goals and metrics related to operational safety and system efficiency. The Office of Aviation Safety (AVS) comprises about 8,000 FAA employees, including inspectors who oversee airlines, repair stations, and aircraft manufacturers. The NextGen office, staffed by about 800 employees, is statutorily mandated to sunset on December 31, 2025, and is to be replaced by an Airspace Modernization Office that is directed to take on responsibilities for systems and technologies to modernize the national airspace system as prescribed in provisions of the FAA Reauthorization Act of 2024. It has been reported that about 1,200 FAA employees, roughly 3% of the total FAA workforce, are expected to depart in FY2025 as a result of incentive resignations and retirements.[10] Safety-critical workers, including air traffic controllers and inspectors, were not eligible for these incentives. Staff reductions, however, may include senior leaders and technical experts whose potential departure could impact FAA's regulatory activities, modernization efforts, and ATO management.

Facility Consolidation

Consolidation of FAA air traffic facilities and functions is viewed as a means to control operational costs, replace outdated facilities, and improve air traffic services. These efforts to date have focused on consolidation of terminal radar approach control (TRACON) facilities. In the past, consolidation focused on major metropolitan areas such as New York/Northern New Jersey, Washington/Baltimore, and Los Angeles/San Diego. More recently, FAA has sought to consolidate radar facilities across additional, broader geographical areas, focusing on small to

[9] Landside projects include airport passenger terminals and ground access improvements, whereas airside projects are typically related to aircraft operations (e.g., runways and taxiways).

[10] Andrew Tangle, "Exodus of Staff Adds to FAA's Challenges," *Wall Street Journal*, May 29, 2025, https://www.wsj.com/business/airlines/faa-staff-shortages-challenge-c79805f2?st=Q4oCey&reflink=desktopwebshare_permalink.

mid-sized airports with small-scale radar facilities housed inside or adjacent to control towers that handle landings, takeoffs, and airport ground movements. Operations at low-activity towers that lose their TRACON components are more likely to be outsourced under the federal contract tower program. Currently, about half of all airport control towers in the United States are operated by companies contracted by FAA under the federally funded contract tower program.

In 2013, FAA established a statutorily mandated working group consisting of FAA personnel and FAA labor union representatives to make recommendations about facility consolidation. The working group has issued five separate sets of recommendations, which are in various stages of implementation by FAA.

As originally envisioned, realignment and consolidation goals, coupled with airspace modernization initiatives, were anticipated to change the nature of air traffic jobs and consolidate them in fewer physical facilities. The Government Accountability Office (GAO) reported in 2017 that a significant part of these efforts is being deferred until after 2030.[11] In addition, language in the FAA Reauthorization Act of 2018 (P.L. 115-254) formally distinguishes consolidation efforts from airspace modernization transition initiatives and exempts from consolidation TRACON and tower facilities where military flight operations comprised 40% or more of the facilities' flight activities in 2015.

A provision in the FAA Reauthorization Act of 2024 orders a study to examine consolidating or otherwise reorganizing air traffic facilities and the management of airspace controlled by such facilities, thus reopening potential discussions about future facility consolidation. The study is to be conducted by a federally funded research and development center and is to include details regarding how consolidation may result in improved efficiency, flexibility, and collaboration and potentially address staffing shortages.

Air Traffic Controller Workforce

Although air traffic modernization will likely have some impact on the nature of controller job functions and training, it is not expected to have a significant impact on the size of the FAA controller workforce. According to FAA, total controller staffing demand is expected to remain near current levels through 2030, and the percentage of controllers in on-the-job training has declined to roughly 22%, below the 35% threshold that FAA regards as an upper limit for managing the flow of trainees. FAA projects the percentage of trainees will remain relatively steady over the next decade.[12] FAA currently has a relatively young controller workforce, with fewer than 1,000 eligible to retire, and it does not anticipate a future wave of retirements.

A number of high-profile incidents over the past few years and challenges to FAA's methods for determining adequate staffing levels at air traffic control facilities have focused attention on air traffic controller staffing. In 2024, FAA published in its controller workforce plan facility staffing targets that are based on its Collaborative Resource Working Group (CRWG) initiative, which utilizes survey data from air traffic experts at each facility; data are intended to reflect position coverage based on typical busy day traffic volume and timekeeping records of controller work and leave statuses.[13] The CRWG targets were considerably higher than FAA's standard at many

[11] Government Accountability Office (GAO), *Air Traffic Control Modernization: Progress and Challenges in Implementing NextGen*, GAO-17-450, August 2017, https://www.gao.gov/assets/690/686881.pdf.

[12] FAA, *The Air Traffic Controller Workforce Plan: 2021-2030*, 2021, https://www.faa.gov/air_traffic/publications/controller_staffing/media/2021-AFN_010-CWP2021.pdf.

[13] FAA, "Administrator's Letter to Congress on the Controller Workforce Plan," January 31, 2025, https://www.faa.gov/about/office_org/headquarters_offices/afn/offices/finance/offices/office-financial-labor-analysis/ (continued...)

facilities—system-wide, the CRWG set a target of 14,633 controllers in contrast to FAA's staffing target of 12,242 controllers.

In response, the FAA Reauthorization Act of 2024 directed FAA to sponsor a Transportation Research Board assessment of the CRWG methodology and provide recommendations on the most suitable staffing model to account for operational staffing needs of the air traffic control system. That assessment found staffing shortages at certain facilities and staffing imbalances across facilities that have increased FAA's reliance on overtime in recent years. It did not recommend the CRWG model over the traditional FAA modeling approach. Rather, it recommended that the existing FAA staffing plan be refined to include additional local input on unique staffing considerations for each facility. It also recommended validation of the staffing model based on safety and risk indicators.[14]

The FAA Reauthorization Act of 2024 directs FAA to implement the identified staffing model and for each fiscal year through FY2028, set minimum hiring targets based on maximum training capacity at the FAA Academy. The act also directs FAA to expand availability of tower simulators, expand recruitment and hiring of air traffic control instructors, and take steps to improve instructor retention. FAA has worked to expand controller career pathways and hiring, including by augmenting FAA's Air Traffic Collegiate Training Initiative (AT-CTI) to include an Enhanced AT-CTI curriculum at certain approved colleges and universities that will allow program graduates who are hired by FAA to bypass FAA Academy training and be placed directly in an assigned air traffic control facility.

The FAA Extension, Safety, and Security Act of 2016 (P.L. 114-190) requires FAA to give hiring preference to controller candidates with prior military or civilian air traffic control experience, veterans, and graduates of FAA-approved college training programs. It also prohibits FAA from utilizing a biographical assessment tool, considered controversial by some, to screen these applicants. Language in the FAA Reauthorization Act of 2024 requires that FAA ensure hiring of all air traffic controller trainees is based solely on job-relevant aptitudes.

National Airspace System Modernization

NextGen is a multiyear program to modernize and improve the efficiency of the national airspace system, primarily by migrating to satellite-based navigation and aircraft tracking that was authorized in 2003 under provisions in the Vision 100—Century of Aviation Reauthorization Act (P.L. 108-176). Funding for NextGen programs totals almost $1 billion annually, primarily derived from FAA's F&E account. FAA asserts that between 2010 and 2024, NextGen capabilities yielded benefits totaling $12.3 billion in 2024 dollars.[15] Based on FAA's analysis, investment in NextGen has not yet paid for its cumulative costs but would do so in about a decade if program benefits continue to accrue on a consistent trajectory.

Core components of the NextGen system include

- **Automatic Dependent Surveillance—Broadcast (ADS-B)**, a system for broadcasting and receiving aircraft identification, position, altitude, heading, and

plans/controller-workforce_old; and FAA, *The Air Traffic Controller Workforce Plan 2024-2033*, https://www.faa.gov/sites/faa.gov/files/afn-aba-20240509-cwp-congress.pdf.

[14] National Academies of Sciences, Engineering, and Medicine, *The Air Traffic Controller Workforce Imperative: Staffing Models and Their Implementation to Ensure Safe and Efficient Airspace Operations* (National Academies Press, 2025), https://doi.org/10.17226/29112.

[15] FAA, *2024 NextGen Annual Report*, https://www.faa.gov/nextgen/NextGen-Annual-Report-2024.pdf.

speed data derived from on-board navigation systems, primarily Global Positioning System (GPS) receivers.

- **Performance Based Navigation**, using GPS and precision avionics to allow aircraft to fly efficient routes and arrival and departure paths that improve airspace utilization, potentially allowing for reductions in flight delays and aircraft fuel consumption.
- **System Wide Information Management**, a data network for sharing real-time operational information, including flight plans, weather, airport conditions, and temporary airspace restrictions across the entire airspace system.
- **Decision Support Systems Automation**, a suite of automation and decision support tools designed to improve aircraft flow management, including traffic flow management, time-based flow management, and terminal flight data management tools that share real-time data among controllers, aircraft operators, and airports. These tools are intended to improve strategic traffic flow, airspace utilization, airport arrival and departure efficiency, and airport surface operations.
- **Data Communications (DataComm)**, a digital voice and data network for communications between aircraft and air traffic control.
- **National Airspace System Voice System**, a standardized digital voice network for communications within and between FAA air traffic facilities that is to replace aging analog equipment.
- **NextGen Weather**, an integrated platform for providing a common weather picture to air traffic controllers, air traffic managers, and system users.
- **Trajectory-Based Operations**, an air traffic concept for strategic planning, management, and optimization of flights by continuous monitoring of predicted flight trajectories throughout the national airspace system using integrated data from the NextGen capabilities described above.

Many of these NextGen capabilities are operational. Most airlines and many business jet operators are equipped with performance-based navigation capabilities allowing them to fly more efficient routes and airport arrival and departure paths. The network of ADS-B ground receivers linking these ADS-B feeds to air traffic facilities across the country was completed in October 2019, and ADS-B Out (transmission) functionality is now mandatory for most aircraft being operated in controlled airspace. Airlines have invested in cockpit technologies compatible with FAA DataComm systems, which are being deployed to several commercial service airport towers.

As NextGen transitions to full-scale operations, concerns over community noise from new flight patterns may limit the extent to which NextGen improves airspace utilization and efficiency. As part of the NextGen effort, FAA has redesigned terminal airspace around the largest urban areas through initiatives it refers to as “metroplex” projects. The redesigns are intended to make the best use of performance-based navigation and improved aircraft tracking capabilities. Some of these changes have increased overflights above communities that previously experienced relatively little aircraft noise, triggering resident complaints. P.L. 115-254 included provisions directing FAA to review its community engagement practices, appoint regional noise ombudsmen, and assess the use of dispersed headings and lateral track variations to approach and departure paths at airports that request such analyses. The legislation also instructed FAA to complete a study assessing alternative ways to gauge aircraft noise impacts; FAA has largely concluded that its existing assessment methods are appropriate while acknowledging that supplementary noise metrics may be helpful to support public understanding of community noise

effects.[16] A 2021 FAA-sponsored study found that communities around U.S. airports are much less tolerant of aircraft noise than policies based on decades-old research assume.[17] This suggests that FAA may continue to grapple with community noise concerns as it expands capacity and reconfigures airspace to improve efficiency utilizing NextGen capabilities.

To address the end of NextGen's development phase, FAA appointed a chief technology officer to manage the operation and maintenance of these new technologies. Most core NextGen systems are at or reaching technological maturity, and many are fully operational. As a result, Congress has directed FAA to sunset the office that oversees NextGen development on December, 31, 2025, and, in its place, establish a new Airspace Modernization Office. Under provisions of the FAA Reauthorization Act of 2024, the Airspace Modernization Office will assume the residual functions of the NextGen program office and take on the responsibilities of overseeing research and development related to national airspace system modernization; developing an information-centric national airspace system, including digitization of supporting processes and technologies; improving the interoperability of FAA and third-party systems that support safe airspace operations; and developing an integrated plan for the future airspace system. That plan is to describe forecast demand for air transportation services; operational concepts and resources to meet that demand, including anticipated demand from new entrants such as unmanned aircraft and advanced air mobility concepts; technical and operational challenges; a systems framework; and anticipated annual costs to develop and deploy system advances to meet the needs of airspace users by 2040.

On May 8, 2025, DOT unveiled a modernization plan in a document titled *Brand New Air Traffic Control System*.[18] The plan seeks to upgrade and replace aging air traffic control infrastructure by replacing aging telecommunications with new fiber, wireless, and satellite systems and replacing antiquated surveillance radar systems. The plan is to build on FAA's ongoing initiatives to transition to a modernized voice over internet protocol-based communications system. The plan raises concerns that under historical funding levels, FAA's transition to this new system is not projected to be completed until 2038. The plan also seeks to deploy new common controller terminal workstations across various types of FAA facilities and accelerate the replacement of aging FAA air traffic facilities. The plan proposes to deploy additional airport surface monitoring systems in towers without such capabilities to improve runway safety. It also proposes additional aviation weather stations in Alaska to address the state's unique safety concerns of flight operations.

In the 119th Congress, P.L. 119-21, the FY2025 reconciliation law commonly known as the One Big Beautiful Bill Act, provided $12.52 billion in additional funds for the acquisition, construction, sustainment, and improvement of facilities and equipment necessary to improve and maintain aviation safety. The funding includes $4.75 billion for air traffic control

[16] FAA, *Report to Congress, FAA Reauthorization Act of 2018 (P.L. 115-254), Section 188 and Sec 173,* April 14, 2020, https://www.faa.gov/about/plans_reports/congress/media/Day-Night_Average_Sound_Levels_COMPLETED_report_w_letters.pdf.

[17] Nicholas P. Miller et al., *Analysis of the Neighborhood Environmental Survey, Final Report,* DOT/FAA/TC-21/4, February 2021, https://www.airporttech.tc.faa.gov/DesktopModules/EasyDNNNews/DocumentDownload.ashx?portalid=0&moduleid=3682&articleid=2845&documentid=3005.

[18] U.S. Department of Transportation (DOT), *Brand New Air Traffic Control System,* https://www.transportation.gov/sites/dot.gov/files/2025-05/Brand%20New%20Air%20Traffic%20Control%20System%20Plan.pdf; and DOT, "U.S. Transportation Secretary Sean P. Duffy Unveils Plan to Build Brand New State-of-the-Art Air Traffic Control System," May 8, 2025, https://www.transportation.gov/briefing-room/us-transportation-secretary-sean-p-duffy-unveils-plan-build-brand-new-state-art-air.

telecommunication infrastructure modernization and system upgrades and $3 billion for radar system upgrades.

Aviation Workforce

Airline travel has rebounded from the downturn experienced in 2020 and 2021 during the COVID-19 pandemic. Airlines have struggled to meet the rapid rise in demand. One challenge is labor shortages, particularly a lack of pilots at regional carriers, as major airlines have been hiring pilots away from their regional partners at a rapid pace.[19] Long anticipated airline pilot shortages were exacerbated by increased retirements during the COVID-19 pandemic, including when several airlines offered retirement incentives to shrink their payrolls. A potential option to address current workforce shortages is to increase the mandatory retirement age for airline pilots, last raised in 2007 from 60 to 65, up to 67.[20] This proposal was debated in the 118th Congress, but no further action to change the pilot retirement age resulted.

Laws and FAA regulations requiring a minimum of 1,500 hours of flight time to become an airline pilot have been cited as a barrier to hiring entry-level first officers, particularly at regional airlines, which have argued that the requirement is a contributor to the pilot shortage.[21] Congress has debated whether alternative training approaches, including greater use of flight simulators and structured ground school curricula, could adequately substitute for the 1,500-hour requirement. A provision in the FAA Reauthorization Act of 2024 directs FAA to establish requirements allowing for the approval of airline and flight training school programs to qualify pilots as airline first officers with fewer than 1,500 total flight hours. Currently, only former military pilots and graduates of FAA-approved college and university flight training programs may qualify as first officers with fewer than 1,500 hours. The provision expressly does not modify the 1,500-hour requirement set by FAA for qualification as an airline transport pilot.

Citing training costs as a significant barrier to attracting new pilot candidates, some major airlines, in coordination with regional airlines, universities, and flight schools, have recently developed programs to train candidates with little or no flight experience to become airline pilots.[22] Another option, considered controversial by some, is to revise or grant exemptions to the 1,500-hour requirement. This option has faced opposition from safety advocates and from some Members of Congress who consider the flight time standard—enacted in response to the February 2009 crash of a Colgan Air turboprop aircraft near Buffalo, NY—a vital improvement to airline safety.[23]

Airlines have also projected future shortages of mechanics, suggesting that the practice of outsourcing heavy aircraft maintenance to overseas facilities could expand if the supply of

[19] Alison Sider and Allison Pohle, "Small Cities Lose Flights Despite Airline Travel Boom," *Wall Street Journal*, June 8, 2022, p. A1.

[20] Jonathan Welsh, "Will Congress Bump Airline Pilots' Retirement Age to 67?," *Flying*, May 18, 2022, https://www.flyingmag.com/will-congress-bump-airline-pilots-retirement-age-to-67/.

[21] For example, see Ben Baldanza, "The 1,500-Hour Rule Has Broken the Pilot Pipeline in the U.S.," *Forbes*, July 11, 2022, https://www.forbes.com/sites/benbaldanza/2022/07/11/the-1500-hour-rule-has-broken-the-pilot-pipeline-in-the-us/.

[22] For example, see United Aviate Academy, https://unitedaviate.com/; Delta Propel, https://propel.delta.com/content/propel/en_US/home.html; and American Airlines Cadet Academy, http://www.aacadetacademy.com/CadetAcademy/Index; and JetBlue Gateways, https://www.jetbluegateways.com/.

[23] For example, see Jerry Zremski, "Flight 3407 Families, Lawmakers Decry Attempt to Trim Pilot Experience Rule," *Buffalo News*, May 12, 2022, https://buffalonews.com/news/flight-3407-families-lawmakers-decry-attempt-to-trim-pilot-experience-rule/article_6c22d730-d21c-11ec-bbe5-4b1feda592f2.html.

certified aircraft mechanics in the United States were to become inadequate. P.L. 115-254 directed FAA to update regulations to modernize training programs at aviation maintenance technical schools. Similarly, Section 135 of the Consolidated Appropriations Act, 2021 (P.L. 116-260), directed FAA to adopt industry-backed standards using an interim final rule. FAA published the interim rule on May 24, 2022, with an effective date of September 21, 2022.[24] Under those regulations, FAA is to rely on the Department of Education and national accrediting organizations to approve curricula, instructional delivery, and other program details for each aviation maintenance training school, while FAA continues to oversee facilities, equipment, and instructor qualifications. Additionally, FAA is to retain responsibility for setting mechanic certification requirements, which it plans to update, and continuously assess student pass rates as a key performance-based measure.

P.L. 115-254 also authorized grants to support the education of future pilots and aviation maintenance technical workers. FAA established the Aviation Workforce Development Grants programs to fund initiatives to foster interest in and prepare students for careers as aircraft pilots and aviation maintenance technical workers.[25] The FAA Reauthorization Act of 2024 expanded the program to include project grants to (1) support aviation manufacturing workforce growth, in addition to the existing initiatives to (2) support pilot workforce growth and (3) support aviation maintenance technical workforce growth. The 2024 reauthorization act also increased funding authorizations for each of these three initiatives to $20 million per fiscal year through FY2028. The act also directed DOT to develop and maintain a national strategic plan for aviation workforce development and establish a standing council composed of aviation industry advisors to assist with the development of that plan and provide guidance regarding the administration and selection of projects and programs for aviation workforce grants.

Aviation Safety Programs

FAA's regulatory functions are primarily focused on the safety of civil aviation operations. FAA's AVS consists of about 7,700 positions, including regulators, inspectors, engineers, and support personnel who are responsible for developing and enforcing federal civil aviation safety standards. FAA's role in aviation safety includes certification of aircraft and aircraft components, regulation and oversight of airlines and other aircraft operators, and initiatives to reduce safety risks associated with airport operations.

Flight Operations and Airline Safety

Recent crashes and close calls have focused policy attention on the safety of flight operations and air traffic control procedures. FAA data show that, notwithstanding data from 2020 and 2021 when flight operations were curtailed by the COVID-19 pandemic, runway incursion incidents have remained steady at about 1,750 reported events per year since 2017.[26] Extensive media coverage of some of these events has raised public awareness and concern about airport surface movement safety and the risks associated with runway and taxiway operations. In March 2023, FAA convened a Safety Call to Action, a meeting of over 200 aviation safety professionals to

[24] FAA, "Aviation Maintenance Technical Schools," 87 *Federal Register* 31391, May 24, 2022.

[25] See FAA, "Aviation Workforce Development Grants," https://www.faa.gov/about/office_org/headquarters_offices/ang/grants/awd.

[26] FAA, "Runway Safety Statistics: National Runway Incursion Totals by Quarter," https://www.faa.gov/airports/runway_safety/statistics.

discuss ways to improve flight safety.[27] In response to the meeting discussions, FAA asserts that it has taken several actions to address ongoing safety challenges, including proposing an increased recording duration for cockpit voice recorders to help investigators analyze incidents and accidents, conducting targeted runway safety reviews at airports across the country, implementing various improvements to runway lighting, accelerating deployment of airport surface situational awareness technologies, and making procedural changes to improve training and supervision in air traffic facilities.[28]

A number of safety mishaps have occurred in 2025. In January, a fatal midair crash between a commuter jet approaching Washington Reagan National Airport (DCA) and a U.S. Army helicopter on a training mission resulted in 67 fatalities.[29] The ongoing NTSB investigation of that event identified frequent close calls in the vicinity of DCA, prompting FAA to make procedural changes to air traffic operations to mitigate the risks posed by helicopters operating along routes near DCA.

Other crashes and incidents involving commuter jets, including the February 17, 2025, crash of a Delta Connection CRJ-900 at Toronto Pearson International Airport (YYZ) and a March 16, 2025, wing strike of another Delta Connection CRJ-900 aircraft during a landing attempt at LaGuardia Airport (LGA) have raised anew questions about pilot training and qualifications (see the 1,500-hour requirement discussed in "Aviation Workforce").

In addition to increasing qualification standards and flight time minimums for airline pilots, the Airline Safety and Federal Aviation Administration Extension Act of 2010 (P.L. 111-216), enacted in the wake of the 2009 Colgan Air crash, required FAA to make regulatory changes to address flight crew fatigue. FAA issued regulations setting duty limits for passenger airline pilots based on time of day, number of flight segments, and number of time zones crossed and established a minimum 10-hour rest period between duty periods, two hours more than previously required. FAA also required air carriers to implement fatigue risk management programs to help ensure that pilots are fit for duty.[30] Cargo operations are governed by more flexible flight time limitations and rest requirements for crewmembers than passenger operations. Legislative proposals to bring duty time and rest rules for cargo pilots in line with those governing passenger operations have not gained traction in Congress.[31]

Language in P.L. 115-254 directed FAA to bring regulations on flight attendant duty times and rest requirements in line with regulations for pilots, including a mandatory 10-hour rest period. In October 2022, FAA published a final rule mandating flight attendant rest breaks of at least 10 consecutive hours following duty periods of up to 14 hours.[32] The law also mandates that airlines implement fatigue risk management programs for flight attendants.

[27] FAA, "FAA Safety Call to Action," https://www.faa.gov/aviation-safety-call-to-action.

[28] FAA, "FAA Safety Call to Action," https://www.faa.gov/aviation-safety-call-to-action.

[29] National Transportation Safety Board, "Midair Collision PSA Airlines Bombardier CRJ700 Airplane and Sikorsky UH-60 Military Helicopter," https://www.ntsb.gov/investigations/Pages/DCA25MA108.aspx; and CRS Insight IN12498, *Midair Collision in Washington, DC, Focuses National Attention on Aviation Safety*, by Bart Elias.

[30] FAA, "Flightcrew Member Duty and Rest Requirements," 77 *Federal Register* 330, January 4, 2012; and FAA, "Flightcrew Member Duty and Rest Requirements; Correction," 77 *Federal Register* 28763, May 16, 2012.

[31] For example, see Safe Skies Act of 2023 (H.R. 4014, 118th Congress) and Safe Skies Act of 2021 (S. 2350, 117th Congress; H.R. 4075, 117th Congress).

[32] FAA, "Flight Attendant Duty Period Limitations and Rest Requirements; Advance Notice of Proposed Rulemaking (ANPRM)," 84 *Federal Register* 50349, September 25, 2019; and FAA, "Flight Attendant Duty Period Limitations and Rest Requirements," 86 *Federal Register* 60424, November 2, 2021.

Safety Management Systems

FAA regulations, related legislation, and international safety standards mandate the adoption of formal safety management programs by airlines, other aircraft operators, aircraft manufacturers, airports, and FAA air traffic control and air traffic management functions. A Safety Management System (SMS) refers to a formal unified approach to safety and risk management that permeates an organization such as an airline, airport, or aircraft manufacturer. It consists of four key components: (1) a formal safety policy; (2) safety risk management practices, including system analysis and hazard identification; (3) safety assurance measures, including safety audits, evaluations, and incident and accident investigations; and (4) safety promotion to train employees and communicate critical information regarding SMS practices and compliance.[33] In January 2015, FAA set a requirement for all airlines to implement approved SMS programs.[34] The rule conforms with an international standard mandating air carrier implementation of SMS. SMS requirements have been expanded to include most other facets of the aviation system. In 2022, the ATO implemented a formal SMS program for FAA's air traffic service functions. On February 23, 2023, FAA published a final rule requiring certain commercial service airports to implement SMS programs. The requirement generally applies to all hub airports, airports with 100,000 or more annual operations, and certain other airports with international flight operations.[35] On April 26, 2024, FAA published a final rule mandating that charter flight and commercial air tour operators as well as aircraft developers and manufacturers implement SMS programs.[36] The Aircraft Certification Safety and Accountability Act (P.L. 116-260), enacted in 2020, had mandated the adoption of SMS regulations by entities holding aircraft design type certificates and aircraft and engine production certificates. The FAA Reauthorization Act of 2024 establishes specific protections regarding the disclosure of confidential information collected as part of an SMS program, directs FAA to ensure that SMS requirements are scalable to reflect the diversity of regulated entities that vary with respect to size and complexity, and mandates that FAA review SMS requirements to ensure they are applied to commuter and charter flight operations as well as all commercial air tour operators, including those operating under 14 C.F.R. Part 91 general operating rules.[37]

Aircraft Certification and Manufacturing

The FAA Reauthorization Act of 2018 (P.L. 115-254) mandated changes to FAA oversight of aircraft certification. It directed FAA to establish a Safety Oversight and Certification Advisory Committee and required FAA to establish formal objectives to eliminate delays in certification and more closely oversee its Organization Designation Authorization (ODA) program, which provides a process for delegating certain certification functions to manufacturers. The act also required FAA to establish a Regulatory Consistency Communications Board to review questions regarding regulatory interpretations.

The Aircraft Certification Safety and Accountability Act (P.L. 116-260) mandated further changes to the aircraft certification process, the ODA program, and FAA oversight of that program. The act, introduced following the worldwide grounding of Boeing 737 Max aircraft after two fatal

[33] See 14 C.F.R. Part 5: Safety Management Systems.

[34] FAA, "Safety Management Systems for Domestic, Flag, and Supplemental Operations Certificate Holders," 80 *Federal Register* 1308, January 8, 2015; and FAA, "Safety Management Systems for Domestic, Flag, and Supplemental Operations Certificate Holders [Correction]," 80 *Federal Register* 1584, January 13, 2015.

[35] FAA, "Airport Safety Management System," 88 *Federal Register* 11642, February 23, 2023.

[36] FAA, "Safety Management Systems," 89 *Federal Register* 33068, April 26, 2024.

[37] See 14 C.F.R. §91.147: Passenger-carrying flights for compensation or hire.

crashes overseas, requires aircraft manufacturers to implement FAA-approved safety management systems. The act also requires newly certified aircraft to be equipped with updated alerting systems that assist crews in resolving warning signals. Congress recognized that certification delays to additional variants of the Boeing 737 Max would conflict with this mandate because existing 737 Max models lack these modernized crew alerting capabilities, and Boeing and its customers seek commonality across all 737 Max variants.[38] Lawmakers included a provision in the Consolidated Appropriations Act, 2023 (P.L. 117-328, Division O, §501), to exempt from these alerting system requirements aircraft whose application for original or amended type certification was submitted prior to December 27, 2020. The law imposed new requirements for all Boeing 737 Max aircraft, including those already delivered, to install two additional safety enhancements to improve alerting and to give crews the capability to silence certain alerts to minimize distraction. Provisions in the Aircraft Certification Safety and Accountability Act (P.L. 116-260) require FAA to conduct a comprehensive review and reevaluate its practices for certifying variants of existing aircraft models, such as the 737 Max.

The FAA Reauthorization Act of 2024 established requirements for a biennial forum to share ODA best practices and directed FAA to carry out an assessment of the use of advanced tools and high-risk flight-testing during the aircraft certification process.

Helicopter Air Ambulance and Air Tour Safety

In February 2014, FAA mandated changes in helicopter operational procedures and cockpit technologies to improve operational safety of helicopter air ambulance flights.[39] Subsequent helicopter crashes involving air ambulances in Texas, Missouri, and Colorado in 2015 and a February 2018 air tour helicopter crash in Arizona are among aviation accidents that have raised safety concerns about the design of helicopter fuel systems. These and other accidents prompted NTSB to recommend that FAA update regulations and guidelines regarding helicopter fuel system crashworthiness.[40] In 2016, P.L. 114-190 directed FAA to evaluate and update crash resistance standards for helicopter fuel systems. In 2018, P.L. 115-254 mandated that all helicopters meet current crashworthiness standards or employ other acceptable means to provide an equivalent level of fuel system crash resistance. The FAA Reauthorization Act of 2024 directs FAA to review the work of the aviation rulemaking advisory committee it convened to address rotorcraft occupant protection and update that work to reflect NTSB data on helicopter post-crash fires. In addition, FAA is to analyze whether and to what extent crash-resistant fuel systems might have mitigated fatalities in these accidents. Based on this analysis, the aviation rulemaking advisory committee is to provide FAA with recommendations for expediting the installation of crash-resistant fuel systems regardless of original certification and manufacture dates of the aircraft. FAA is to partner with the U.S. Helicopter Safety Team, an industry safety organization, to implement these regulations.

Additional safety concerns have been raised about helicopter air tours. An NTSB investigation of a December 2019 helicopter air tour crash in Hawaii cited FAA's failure to act on prior NTSB recommendations, including those requiring helicopter air taxi and air tour operators to implement safety management systems and cue-based weather training, as a factor contributing to

[38] Sean Broderick and Guy Norris, "Boeing Reiterates Risk in 737-10 Alerting Addition," *Aviation Daily*, May 24, 2022, https://aviationweek.com/air-transport/safety-ops-regulation/boeing-reiterates-risk-737-10-alerting-addition.

[39] FAA, "Helicopter Air Ambulance, Commercial Helicopter, and Part 91 Helicopter Operations," 79 *Federal Register* 9931, April 22, 2014.

[40] See NTSB, *Safety Recommendation A-15-12*, July 23, 2015, https://www.ntsb.gov/safety/safety-recs/recletters/A-15-012.pdf.

the crash.[41] The FAA Reauthorization Act of 2024 mandates that within two years after enactment (by May 2026), all commercial tour operations are to be certified under 14 C.F.R. Part 135 regulations, which encompass commuter and on-demand (charter) flights. Under a special regulatory provision, certain air tour operators with appropriate FAA authorization may currently operate under less stringent 14 C.F.R. Part 91 general operating rules provided that they remain within 25 miles of their airport or heliport base, do not conduct point-to-point operations to other airports or heliports, and implement FAA-approved drug and alcohol misuse programs for safety-critical personnel. The act also requires FAA to convene a rulemaking committee and conduct rulemaking to mandate that all commercial air tour operators install flight data recorders and implement a flight data monitoring program as well as terrain awareness and warning methods and traffic avoidance capabilities for flights operated in high-traffic areas, including ADS-B Out and ADS-B In capabilities.

Aviation Cybersecurity

The shift from stand-alone navigation equipment, radar tracking, and analog two-way radios to highly integrated and interdependent computers and networks, both onboard aircraft and in air traffic control facilities, creates inherent cybersecurity vulnerabilities.[42] P.L. 114-190 directed FAA to develop a comprehensive strategic framework to reduce cybersecurity risks to aviation and to establish a cybersecurity research and development plan for the national airspace system.[43] P.L. 115-254 directed FAA to address cybersecurity in avionics and software systems through its aircraft certification process and assure that flight guidance and control systems are secured from potential hacking by way of in-flight entertainment systems. The FAA Reauthorization Act of 2024 imposes additional requirements for FAA to establish a timeline and process though which software-based systems and equipment, including flight critical systems of air carrier aircraft, are regularly screened to determine possible unauthorized compromises through either internal or external access.

FAA developed the National Airspace System (NAS) Cyber Engineering Facility and NAS Cyber Monitoring System to assess cyberthreats and vulnerabilities and conduct cybertesting and evaluation.[44] In addition, FAA is collaborating with DHS and the Department of Defense (DOD) on a strategic framework for civil aviation cybersecurity.[45] The FAA Reauthorization Act of 2024 directs FAA to establish a NAS cyberthreat management process that monitors significant cybersecurity incidents; evaluates the cyberthreat landscape annually and in response to identified threats; performs NAS cyberincident analyses; creates a common operating picture of the NAS cyberenvironment; coordinates NAS cyberincident responses; tracks cyberincident detection, response, mitigation, recovery, and closure; establishes processes to share NAS-related significant cyberincident data; and facilitates significant cybersecurity reporting. The act also grants FAA exclusive rulemaking authority over the cybersecurity aspects of civil aircraft, aircraft engines, and other aircraft components. The act directs FAA to convene an aviation rulemaking committee to develop findings and recommendations regarding cybersecurity standards for civil aircraft,

[41] NTSB, "Failure of FAA to Implement NTSB Recommendations Contributed to Fatal Air Tour Helicopter Crash, NTSB Says," https://www.ntsb.gov/news/press-releases/Pages/NR20220510.aspx; and NTSB, "Collision into Terrain Safari Aviation Inc. Airbus AS350 B2, N985SA," https://www.ntsb.gov/investigations/Pages/ANC20MA010.aspx.

[42] GAO, *Air Traffic Control: FAA Needs a More Comprehensive Approach to Address Cybersecurity as Agency Transitions to NextGen*, GAO-15-370, April 14, 2015, https://www.gao.gov/products/gao-15-370.

[43] GAO, *Air Traffic Control: FAA Needs a More Comprehensive Approach to Address Cybersecurity as Agency Transitions to NextGen*, GAO-15-370, April 14, 2015.

[44] FAA, "Cyber Threat Intelligence," https://www.faa.gov/air_traffic/technology/cas/cti.

[45] FAA, "FAA Cybersecurity Strategy," https://www.faa.gov/about/plansreports/faa-cybersecurity-strategy.

aircraft ground support information systems, airports, air traffic control systems, and aeronautical products and articles.

Separately, TSA imposed specific cybersecurity requirements for commercial passenger airports effective at the beginning of calendar year 2022. The TSA directives mandate that each covered airport designate a cybersecurity coordinator, complete a cybersecurity vulnerability assessment, develop a cybersecurity incident response plan, and report all cybersecurity incidents to the Cybersecurity and Infrastructures Security Agency of DHS within 24 hours.[46]

Oversight of Maintenance Repair Stations

Many airlines outsource at least some of their maintenance work to repair stations in the United States and abroad. In 2015, FAA rolled out a safety assurance system to aid in risk-based repair station oversight and targeted inspections. In 2016, GAO found that FAA had not validated the system and did not have a process in place to evaluate its effectiveness.[47] In March 2014, FAA published an advance notice of proposed rulemaking regarding drug and alcohol testing of maintenance workers at FAA-approved repair stations located in foreign countries.[48] P.L. 114-190 specified that a proposed rule mandating drug and alcohol testing programs at foreign repair stations be published by mid-October 2016, with a final rule to be issued one year thereafter. The FAA Reauthorization Act of 2024 directed FAA to finalize the delayed regulations pertaining to alcohol and drug testing of maintenance workers at foreign repair stations that perform heavy maintenance work on U.S. air carrier aircraft and engines placed on those aircraft. In December 2024, FAA published a final rule mandating drug and alcohol testing programs at certificated repair stations located outside the United States that service air carrier aircraft, unless otherwise covered under existing requirements of a foreign regulator that are formally recognized by FAA.[49] Foreign repair stations are to comply with these requirements no later than December 20, 2027.

Unmanned Aircraft and Advanced Air Mobility

In June 2016, FAA published a final rule allowing routine commercial operation of certain small unmanned aircraft (drones) weighing less than 55 pounds.[50] To fly for commercial purposes, operators must obtain a remote pilot certification from FAA. Flights must stay below 400 feet, and speeds must be kept below 100 miles per hour. Flights are generally limited to daylight hours in good visibility, and the drone must be kept within sight of the operator and cannot be flown over people. The regulations provide a mechanism for commercial entities to obtain waivers from these restrictions on a case-by-case basis. In January 2021, FAA issued updated regulations allowing for routine operations of unmanned aircraft systems (UAS) over people and at night under certain conditions. To fly at night requires additional remote pilot training and the

[46] Alan Suderman, "TSA Requires Rail and Airports to Strengthen Cybersecurity," *Federal News Network*, December 2, 2021, https://federalnewsnetwork.com/government-news/2021/12/tsa-requires-rail-and-airports-to-strengthen-cybersecurity/.

[47] GAO, *Aviation Safety: FAA's Risk-Based Oversight for Repair Stations Could Benefit from Additional Airline Data and Performance Metrics*, GAO-16-679, reissued September 2, 2016, https://www.gao.gov/products/GAO-16-679.

[48] FAA, "Drug and Alcohol Testing of Certain Maintenance Provider Employees Located Outside of the United States," 79 *Federal Register* 14621, March 17, 2014.

[49] FAA, "Drug and Alcohol Testing of Certificated Repair Station Employees Located Outside of the United States," 89 *Federal Register* 103416, December 18, 2024.

[50] See 14 C.F.R. Part 107.

installation of anti-collision lights that are visible for at least three miles, and flights over people are limited to small UAS considered to pose a minimal risk of injury.[51]

Future expansion of commercial applications for unmanned aircraft may hinge on further regulatory action allowing for routine operations BVLOS, during both night and day and in poor visibility, as well as permitting operations in which multiple drones may be monitored and controlled by a single operator. P.L. 115-254 directed FAA to authorize package and cargo delivery with small UAS and implement a plan for managing drone traffic in low-altitude airspace. FAA has permitted a limited number of drone operators to perform drone deliveries as part of demonstration projects using certificates issued under existing charter flight regulations. In September 2020, FAA issued an updated policy[52] allowing for the type certification of UAS as a special class of aircraft without occupants. In January 2021, FAA issued regulations requiring all UAS to broadcast remote identification data to assist in tracking and airspace management. Existing UAS not manufactured with remote identification capabilities are to be retrofitted with remote identification broadcast modules or be limited to operations within designated FAA-recognized identification areas. Under FAA's implementation plan, a network of approved remote identification service suppliers will track location and identification information transmitted from drones and provide UAS traffic management (UTM) services to drone operators. The fee structure for such services is yet to be determined.

In 2021, FAA chartered an aviation rulemaking committee to make recommendations regarding BVLOS UAS operations.[53] The committee issued its final report on March 10, 2022.[54] That report made a number of recommendations and identified several challenges in implementing routine BVLOS drone operations, including addressing aircraft right-of-way rules, collision avoidance capabilities, conspicuity, and risk mitigation. In 2023, FAA solicited comments on detect-and-avoid performance standards, UTM for the deconfliction of BVLOS operations, and provisions for certain BVLOS operations where the drone is shielded from conflicting with other aircraft because it is being operated close to tall buildings or other structures that those aircraft must avoid.[55] The FAA Reauthorization Act of 2024 directed FAA to issue proposed rulemaking on BVLOS by mid-September 2024 that would establish acceptable minimum risks for BVLOS operations; remote pilot certification standards for conducting BVLOS operations; approvals processes and operating rules for UAS seeking to engage in BVLOS operations; protocols for network-based remote identification of UAS in support of BVLOS operations; and safety considerations for manned aircraft and consideration of maneuverability characteristics and other limitations of certain aircraft, such as hot air balloons, that may share airspace with BVLOS UAS. The legislation further requires that FAA issue a final rule no later than 16 months after the proposed rule is published. As of May 31, 2025, FAA had not published the proposed rule.

Regulations governing operations of small commercial unmanned aircraft do not apply to drones and remote-controlled aircraft operated strictly for hobby or recreation. FAA has established statutorily mandated requirements for testing recreational users' knowledge of airspace and safety

[51] FAA, "Operation of Small Unmanned Aircraft Systems over People," 86 *Federal Register* 4314, January 15, 2021.

[52] FAA, "Type Certification of Certain Unmanned Aircraft Systems," 85 *Federal Register* 58251, September 18, 2020.

[53] FAA, *Aviation Rulemaking Committee Charter, UAS Beyond Visual Line-of-Sight Operations Aviation Rulemaking Committee*, June 9, 2021, https://www.faa.gov/regulations_policies/rulemaking/committees/documents/media/UAS%20BVLOS%20ARC%20Charter%20(eff.%206-8-2021).pdf.

[54] FAA, *Unmanned Aircraft Systems Beyond Visual Line-of-Sight Aviation Rulemaking Committee, Final Report*, March 10, 2022, https://www.faa.gov/regulations_policies/rulemaking/committees/documents/media/UAS_BVLOS_ARC_FINAL_REPORT_03102022.pdf.

[55] FAA, "UAS Beyond Visual Line-of-Sight Operations," 88 *Federal Register* 33855, May 25, 2023.

regulations,[56] and flights must generally stay below 400 feet and keep clear of manned aircraft. Operators of model aircraft as well as commercial drones must register with FAA and can do so through an online registration system. They must also comply with remote identification requirements.

U.S. law provides for specific civil and criminal penalties for operators of drones that interfere with wildfire suppression and related law enforcement or other emergency response activities and for individuals who equip unmanned aircraft with dangerous weapons. P.L. 114-190 directed FAA to set procedures for imposing unmanned aircraft restrictions around critical infrastructure and other sensitive facilities, including amusement parks. The FAA Reauthorization Act of 2024 added state prisons to the list of sites that may petition FAA to impose drone restrictions and directed FAA to publish proposed rulemaking within 90 days of enactment and issue a final rule within 16 months after publication of the proposed rule. As of May 31, 2025, FAA had not issued the proposed rule to implement this requirement.

Congress has shown interest in technologies to detect and interdict hostile or errant drones. P.L. 115-254 required FAA to establish a pilot program to assess the use of drone detection and identification technologies. That program is ongoing. The act also authorized the Department of Justice (DOJ) and DHS, including the Coast Guard, to interdict hostile or unauthorized drones in certain instances to protect critical infrastructure sites and high-profile events. Similar authority was granted to DOD and the Department of Energy in the National Defense Authorization Act for Fiscal Year 2017 (P.L. 114-328). The DOJ and DHS authorities to deploy counter-UAS capabilities to protect certain facilities and assets have been extended several times and are set to expire at the end of FY2025.[57] Several proposals have been offered to expand these authorities and to potentially grant certain authorities to detect, track, and identify, and, in some cases, interdict drones to state and local law enforcement agencies.[58]

In addition to drones, there is interest in integrating other novel aircraft and aircraft operations into the NAS. In particular, a concept referred to as Advanced Air Mobility (AAM) proposes a transportation system for flying passengers and cargo over short distances using advanced aircraft technologies, principally electric aircraft and aircraft with vertical takeoff and landing capabilities. Such aircraft are referred to as electric vertical takeoff and lift (eVTOL) vehicles and have been classified by FAA as powered-lift aircraft for certification and pilot training purposes. The AAM concept was first introduced in 2016 to include an on-demand urban air transportation system, commonly referred to as urban air mobility or UAM, using a network of vertiports. The use cases for eVTOL aircraft have since expanded to include regional passenger operations to and from small airports; air cargo deliveries; public service operations, such as police, fire, and medical services; agricultural operations, such as crop dusting; and private and recreational flights. In July 2023, FAA published its initial AAM implementation plan, referred to as "Innovate28," reflecting an anticipation that initial operating capabilities for AAM will be achieved in 2028.[59] The plan addresses aircraft and operator certification, infrastructure development, air traffic procedures, and community engagement considerations necessary to move forward with initial AAM operations.

[56] FAA, "The Recreational UAS Safety Test (TRUST)," https://www.faa.gov/uas/recreational_flyers/knowledge_test_updates.

[57] See 6 U.S.C. §124n.

[58] For example, see H.R. 4333, 118th Congress, and H.R. 3598, 119th Congress.

[59] FAA, *Advanced Air Mobility (AAM) Implementation Plan, Near-Term (Innovate28) Focus with an Eye on the Future of AAM, Version 1.0 / July 2023*, https://www.faa.gov/sites/faa.gov/files/AAM-I28-Implementation-Plan.pdf.

There are numerous complex technical challenges related to operational safety and efficiency and the development of ground infrastructure to support AAM operations and electric aircraft. Additionally, the future introduction of AAM technologies raises a number of policy issues, including several common to drone operations. These issues include potential landowner rights to low altitude airspace over their properties; noise and privacy concerns; and the appropriate role of federal, state, and local governments and private industry stakeholders in accessing, regulating, and managing airspace and flight operations.[60]

Congress has expressed support for promoting and fostering AAM concepts and addressing policy issues regarding this emerging technology. The Advanced Air Mobility Coordination and Leadership Act (P.L. 117-203) mandated the establishment of a federal working group to develop a national strategy for AAM. The working group has been formed and is reportedly pursuing efforts to develop the requisite national strategy for AAM.[61] The law also mandated a GAO study assessing the interests, roles, and responsibilities of federal, state, local, and tribal governments regarding AAM aircraft and operations. The mandated GAO study, published in March 2024, discusses FAA actions and plans to address complex policy challenges regarding certification and safety of AAM aircraft, training of pilots and maintainers, airspace management, vertiport construction, and noise management.[62] The Consolidated Appropriations Act of 2023 (P.L. 117-328) directed DOT to establish a pilot program providing planning grants for developing vertiport infrastructure and modifying existing airport and heliport infrastructure to safely accommodate AAM operations.

The FAA Reauthorization Act of 2024 extended the program and authorized $12.5 million annually through FY2026 to carry out infrastructure planning and development to support urban air mobility and regional air mobility. The act also directs FAA to move forward with finalizing regulations pertaining to the certification of powered-lift aircraft and pilots as well as operational rules for transporting passengers and cargo using powered-lift aircraft. It also directs FAA to update orders and policies pertaining to air traffic management and control to allow AAM aircraft to be integrated into the national airspace. The act also directs FAA to establish and update, as needed, new low altitude routes and flight procedures to support AAM operations and to update guidelines for vertiport design. The act allows for streamlined environmental reviews of vertiport sites on existing airports, and it directs FAA to establish a streamlined process for collecting and disseminating safety-critical information regarding aviation facilities, including both public and private vertiports and airports. It also directs FAA to establish a center for advanced aviation technologies to support testing and advancement of new and emerging aviation technologies and innovative aviation concepts with a focus on AAM and powered-lift aircraft.

[60] GAO, *Transforming Aviation: Stakeholders Identified Issues to Address for 'Advanced Air Mobility*,' GAO-22-105020, May 9, 2022, https://www.gao.gov/products/gao-22-105020.

[61] DOT, "Advanced Air Mobility Interagency Working Group," https://www.transportation.gov/aamiwg.

[62] GAO, *Advanced Air Mobility: Legal Authorities and Issues to Consider for Operations*, GAO-24-106451, March 14, 2024, https://www.gao.gov/products/gao-24-106451.

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