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Introduction

Federal Aviation Administration (FAA) 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, certain 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 a special trust fund, the Airport and Airway Trust Fund (AATF), and, in part, through general fund contributions. The FAA Reauthorization Act of 2018 (P.L. 115-254) authorizes AATF taxes and revenue collections and civil aviation program expenditures through FY2023.

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 Coronavirus Disease 2019 (COVID-19) pandemic. Additional funding to the aviation sector was provided in the Consolidated Appropriations Act, 2021 (P.L. 116-260) and the American Rescue Plan Act of 2021 (P.L. 117-2). Furthermore, 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.

This report offers an overview of FAA programs and discusses the supplemental relief and assistance provided by these laws. Other federal entities also play significant roles in civil aviation. These include the National Aeronautics and Space Administration (NASA), 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 in the Department of Homeland Security, which has authority over civil aviation security; and the National Transportation Safety Board (NTSB), which investigates aviation accidents and makes safety recommendations to FAA. These programs are not considered in this report.

The 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. Between FY2017 and FY2020, FAA estimates the AATF provided between 86.9% and 97.0% of FAA's total annual funding, with the remainder coming from general fund appropriations.¹ Revenue sources for the trust fund include passenger ticket taxes, segment fees, air cargo fees, and fuel taxes paid by both commercial and general aviation aircraft (see **Table 1**).

¹ Federal Aviation Administration (FAA), *Airport and Airway Trust Fund (AATF) Fact Sheet, Updated: April 2020*, at http://www.faa.gov/about/budget/aatf/media/aatf_fact_sheet.pdf.

In addition to excise taxes deposited into the 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 FY2022, the AATF was estimated to have revenues of over \$15 billion and to maintain a cash balance of about \$17 billion. The uncommitted balance—the amount of funds not yet obligated—was estimated to be about \$4.1 billion at the start of FY2022.³

AATF revenues have been adversely affected by 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. Generally, fees not included in the base ticket price are not subject to federal excise taxes. Air carriers generated more than \$5.7 billion in baggage fees in pre-pandemic 2019.⁴ The trust fund would have received nearly \$432 million from baggage fees alone had these fees 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, tax revenues may not keep up with federal spending on aviation programs.

Table I. Aviation Taxes and Fees
(calendar year 2022 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 Consumer Price Index)	\$4.50
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/Arrivals Tax (adjusted annually for inflation) (Alaska/Hawaii to/from mainland United States) ^b	\$19.70 (Alaska/Hawaii = \$9.90)
Fractional Ownership Surtax on general aviation jet fuel	14.1 cents/gallon

Source: Internal Revenue Service, *Revenue Procedure No. 2021-45*, November 8, 2021, p. 21.

- a. Does not include a 0.1 cents/gallon tax for the Leaking Underground Storage Tank (LUST) 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. General aviation interests dispute this, arguing 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.

Concerns over the viability of the trust fund, however, were overshadowed by the impact of the abrupt drop in air travel in early 2020 as a result of the COVID-19 pandemic. Section 4007 of the

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

³ Congressional Budget Office, *Projected Balance of the Airport and Airway Trust Fund*, Updated May 2022.

⁴ Bureau of Transportation Statistics, "Baggage Fees by Airline 2019," at <https://www.bts.gov/node/221236>, as viewed on June 22, 2020.

CARES Act, enacted March 27, 2020, authorized suspension of aviation excise taxes through calendar year 2020 to encourage air travel by reducing overall costs. The suspended taxes included the 7.5% tax on airline passenger ticket sales, segment fees, the air cargo waybill tax, and tax on aviation fuel used by commercial aircraft—the primary revenue sources for the trust fund.⁵

FAA Funding Accounts

FAA funding is divided among four main accounts. Operations and Maintenance (O&M) receives approximately 60% of total FAA appropriations. The O&M account, funded by the trust fund as well as by general fund contributions, principally funds air traffic operations and aviation safety programs. The Airport Improvement Program (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 Facilities and Equipment (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	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023
Operations and Maintenance (O&M)						
Authorized Levels	10,247	10,486	10,732	11,000	11,269	11,537
Airport Improvement Program (AIP)						
Authorized Levels	3,350	3,350	3,350	3,350	3,350	3,350
Additional General Fund Authorization		1,020	1,041	1,064	1,087	1,110
Facilities and Equipment (F&E)						
Authorized Levels	3,330	3,398	3,469	3,547	3,624	3,701
Research, Engineering, and Development (RE&D)						
Authorized Levels	189	194	199	204	209	214
TOTALS						
Authorized Levels	17,116	18,448	18,791	19,165	19,539	19,912

Source: P.L. 115-254.

⁵ The excise tax suspension (March 28, 2020–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 <https://www.irs.gov/newsroom/faqs-aviation-excise-tax-holiday-under-the-cares-act>.

Airport Financing⁶

AIP provides federal grants for airport development. AIP funding, distributed both by formula and by 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 (NPIAS), which currently lists over 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 Treasury general fund.⁷ In 2020 and 2021, Congress addressed the financial impact of the pandemic in three separate laws providing approximately \$20 billion from the general fund to eligible U.S. airports.⁸ 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, 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.

The 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 passenger facility charges (PFCs), local taxes 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. Currently, PFCs are capped at \$4.50 per boarded passenger, with a maximum charge of \$18 per round trip, multiple-leg flight. PFCs are collected by the airlines and remitted to the airports. Airports also raise funds for capital projects from bonds, state and local grants, landing fees, on-airport parking, and lease agreements.

⁶ For greater detail, see CRS Report R43327, *Financing Airport Improvements*, by Rachel Y. Tang. Also see Federal Aviation Administration, *Overview: What Is AIP?*, at <http://www.faa.gov/airports/aip/overview/>.

⁷ The Consolidated Appropriations Act, 2018 (P.L. 115-141), provided 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 program page at https://www.faa.gov/airports/aip/aip_supplemental_appropriation/.

⁸ For more information about CARES Act funding for airports, see https://www.faa.gov/airports/cares_act/; for information about the CRRSAA funding for airports, see <https://www.faa.gov/airports/crrsaa/>; for information about the American Rescue Plan funding for airports, see https://www.faa.gov/airports/airport_rescue_grants/.

⁹ Landside projects include airport passenger terminals and ground access improvements, whereas airside projects are typically related to aircraft operations such as runways and taxiways.

FAA Management and Organizational Issues

FAA is a large organization with a staff of about 43,000. More than 31,000 of these 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 completely 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 FY2023 FAA budget submission includes a proposal to establish an Integration and Engagement Office to facilitate incorporation of innovative ideas and technologies, such as unmanned aircraft, into the national airspace system.

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. Consolidation 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 larger geographical areas focusing on small to 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 the 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, closely coupled with airspace modernization initiatives, were anticipated to change the nature of air traffic jobs and consolidate them in fewer physical facilities. However, the Government Accountability Office (GAO) reported that much of this initiative had been deferred until after 2030,¹⁰ and language in P.L. 115-254 formally distinguishes consolidation efforts from airspace modernization transition initiatives. The act also exempts from consolidation TRACON and tower facilities where military flight operations comprised 40% or more of the facilities' flight activity in 2015.

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. Total controller staffing levels are expected to remain near the current level through 2030, and the percentage of controllers in on-the-job training has declined to roughly

¹⁰ U.S. Government Accountability Office, *Air Traffic Control Modernization: Progress and Challenges in Implementing NextGen*, GAO-17-450, August 2017, at <https://www.gao.gov/assets/690/686881.pdf>.

22%, well below the 35% threshold that would raise concerns about controller shortages. FAA projects the percentage of trainees to remain relatively steady over the next decade.¹¹ FAA currently has a relatively young controller workforce, with fewer than 1,000 currently eligible to retire, and it does not anticipate a future wave of retirements that could lead to staffing shortages.

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 controversial biographical assessment tool to screen these applicants.

The Next Generation Air Transportation System (NextGen)

NextGen is a program to modernize and improve the efficiency of the national airspace system, primarily by migrating to satellite-based navigation and aircraft tracking. Funding for NextGen programs totals almost \$1 billion annually, primarily derived from FAA's F&E account.

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 speed data derived from on-board navigation systems, primarily Global Positioning System (GPS) receivers.
- **Performance Based Navigation (PBN)**, navigation using GPS and precision avionics to allow aircraft to fly more 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 (SWIM)**, 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 System (DSS) 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 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 (NVS)**, 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 (TBO)**, an air traffic concept for strategic planning, management, and optimization of flights by continuous monitoring of

¹¹ Federal Aviation Administration, *The Air Traffic Controller Workforce Plan: 2021-2030*, at https://www.faa.gov/air_traffic/publications/controller_staffing/media/2021-AFN_010-CWP2021.pdf.

predicted flight trajectories throughout the national airspace system using integrated data from the NextGen capabilities described above.

Many of these NextGen capabilities are already operational. Most airlines and many business jet operators are already 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 already invested in cockpit technologies compatible with FAA DataComm systems, which are now being deployed to several commercial service airport towers.

Recognizing that NextGen’s development phase is ending, FAA plans to establish a Chief Technology Officer to manage the operation and maintenance of these new technologies. It also seeks to establish an Integration and Engagement Office to work with industry to address new airspace users, operations, and technologies, including technologies to enhance and expand on NextGen capabilities. FAA also seeks to restructure its research and development office to address the long-term evolution of these technologies.

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, but 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.¹² 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.¹³ This suggests that FAA will continue to grapple with community noise concerns as it expands capacity and reconfigures airspace to improve efficiency utilizing NextGen capabilities.

Aviation Workforce

Airline travel has quickly rebounded from the considerable downturn experienced during the COVID-19 pandemic. Airlines are struggling to meet this rapid rise in demand due to 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.¹⁴ Long-anticipated airline pilot shortages

¹² Federal Aviation Administration, *Report to Congress, FAA Reauthorization Act of 2018 (P.L. 115-254), Section 188 and Sec 173*, April 14, 2020, at https://www.faa.gov/about/plans_reports/congress/media/Day-Night_Average_Sound_Levels_COMPLETED_report_w_letters.pdf.

¹³ Nicholas P. Miller, Joseph J. Czech, Kurt M. Hellauer, et al., *Analysis of the Neighborhood Environmental Survey, Final Report*, February DOT/FAA/TC-21/4, February 2021, at file:///C:/Users/belias/Downloads/TC-21-4_Analysis%20of%20the%20Neighborhood%20Environmental%20Survey_Update_022321.pdf.

¹⁴ Alison Sider and Allison Pohle, “Small Cities Lose Flights Despite Airline Travel Boom,” *Wall Street Journal*, June

have been exacerbated by increased retirements during the pandemic when several airlines offered retirement incentives to shrink their payrolls. A potential option to address the shortage currently under consideration is to increase the mandatory retirement age for airline pilots, which was last raised in 2007 from 60 to 65, up to 67.¹⁵

Legislation and FAA regulations requiring a minimum of 1,500 hours of flight time to become an airline pilot has been cited as a significant barrier to hiring entry-level first officers, particularly at regional airlines that have argued that the requirement is another contributor to the pilot shortage. Congress previously 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, but provisions to that effect were dropped during consideration of P.L. 115-254. 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.¹⁶ A more controversial option to revise or grant exemptions to the 1,500-hour requirement has faced considerable opposition from safety advocates and some Members of Congress who consider the standard, enacted in response to the February 2009 crash of a Colgan Air turboprop aircraft near Buffalo, NY, a vital improvement to airline safety.¹⁷

Airlines have also projected future shortages of mechanics, suggesting that the practice of outsourcing heavy aircraft maintenance to overseas facilities could further expand if the supply of certified aircraft mechanics in the United States is 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, 2022.¹⁸ Under the new regulations, FAA will 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 will continue to oversee facilities, equipment, and instructor qualifications. Additionally, FAA will retain responsibility for setting mechanic certification requirements, which it plans to update, and will 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.¹⁹

8, 2022, p A1.

¹⁵ Jonathan Welsh, “Will Congress Bump Airline Pilots’ Retirement Age to 67?,” *Flying*, May 18, 2022, at <https://www.flyingmag.com/will-congress-bump-airline-pilots-retirement-age-to-67/>.

¹⁶ See, e.g., United Aviate Academy at <https://unitedaviate.com/>; Delta Propel at https://propel.delta.com/content/propel/en_US/home.html; American Airlines Cadet Academy at <http://www.aacadetacademy.com/CadetAcademy/Index>; JetBlue Gateways at <https://www.jetbluegateways.com/>.

¹⁷ See, e.g., Jerry Zremski, “Flight 3407 Families, Lawmakers Decry Attempt to Trim Pilot Experience Rule,” *Buffalo News*, May 12, 2022, at https://buffalonews.com/news/flight-3407-families-lawmakers-decry-attempt-to-trim-pilot-experience-rule/article_6c22d730-d21c-11ec-bbe5-4b1feda592f2.html#:~:text=WASHINGTON%20%E2%80%93%20One%20of%20the%20proudest,carrier's%20recent%20request%20for%20a.

¹⁸ Federal Aviation Administration, “Aviation Maintenance Technical Schools,” 87 *Federal Register* 31391-31416, May 24, 2022.

¹⁹ See https://www.faa.gov/about/office_org/headquarters_offices/ang/grants/awd.

Aviation Safety Programs

FAA’s regulatory functions are focused on the safety of civil aviation operations. FAA’s office of aviation safety consists of about 7,300 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.

Airline Safety

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 substantive regulatory changes to address flight crew fatigue. In response, 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.²⁰ Cargo operations are governed by somewhat more lenient and more flexible flight time limitations and rest requirements for crewmembers, and proposals to bring duty time and rest rules for cargo pilots in line with those governing passenger operations have not gained traction in Congress.

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 November 2021, FAA published a proposed rule to mandate flight attendant rest breaks of at least 10 consecutive hours following duty periods of up to 14 hours.²¹ No final regulations have been issued. The law also mandates that airlines implement fatigue risk management programs for flight attendants.

Aircraft Certification

The FAA Reauthorization Act of 2018 (P.L. 115-254) mandated significant changes in 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, 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), enacted in 2020, 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 crashes overseas, requires aircraft manufacturers to implement FAA-

²⁰ Federal Aviation Administration, “Flightcrew Member Duty and Rest Requirements,” 77(2) *Federal Register* 330-403, January 4, 2012; Federal Aviation Administration, “Flightcrew Member Duty and Rest Requirements; Correction,” 77(95) *Federal Register* 28763, May 16, 2012.

²¹ Federal Aviation Administration, “Flight Attendant Duty Period Limitations and Rest Requirements; Advance Notice of Proposed Rulemaking (ANPRM),” 84(186) *Federal Register* 50349-50353, September 25, 2019; Federal Aviation Administration, “Flight Attendant Duty Period Limitations and Rest Requirements,” 86 *Federal Register* 60424-60434, November 2, 2021.

approved safety management systems. It requires FAA to review and update requirements and guidance regarding human factors and human systems integration, particularly those related to aircraft-pilot interfaces. Within two years of enactment, all newly certified aircraft must be equipped with updated alerting systems that assist crews in resolving warning signals. Boeing currently faces a challenge in obtaining certification for the 737 Max-10, the largest version of its 737 Max lineup, before this statutory deadline, as the 737 Max lacks these modernized crew alerting capabilities.²² Provisions in the law also require FAA to reevaluate its practices for certifying variants of existing aircraft models, such as the 737 Max.

Helicopter and Air Ambulance Safety

In February 2014, FAA mandated changes in helicopter operational procedures and cockpit technologies to improve operational safety of helicopter air ambulance flights.²³ Subsequently, P.L. 114-190 directed FAA to evaluate and update crash-resistance standards for helicopter fuel systems, and P.L. 115-254 mandated that all helicopters be retrofitted to meet current crashworthiness standards, which previously applied only to new helicopter designs. Additional safety concerns have been raised about helicopter air tours. A National Transportation Safety Board (NTSB) investigation of a December 2019 helicopter air tour crash in Hawaii cited FAA's failure to act on prior NTSB recommendations, including requiring helicopter air taxi and air tour operators to implement safety management systems and cue-based weather training, as factors in the crash.²⁴

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. 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.²⁵ 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 through in-flight entertainment systems. In response, FAA developed the National Airspace (NAS) System Cyber Engineering Facility and NAS Cyber Monitoring System to assess cyber threats and vulnerabilities and conduct cyber testing and evaluation.²⁶ It is

²² Dominic Gates, "As Boeing Pushes for Exemption for Max 10, Report to FAA Critiques 737 Crew-Alerting System," *Seattle Times*, June 7, 2022, at <https://www.seattletimes.com/business/boeing-aerospace/as-boeing-pushes-for-exemption-for-max-10-report-to-faa-critiques-737-crew-alerting-system/>.

²³ Federal Aviation Administration, "Helicopter Air Ambulance, Commercial Helicopter, and Part 91 Helicopter Operations," 79 *Federal Register* 9931-9979, April 22, 2014.

²⁴ National Transportation Safety Board, *Failure of FAA to Implement NTSB Recommendations Contributed to Fatal Air Tour Helicopter Crash, NTSB Says*, at <https://www.nts.gov/news/press-releases/Pages/NR20220510.aspx>; National Transportation Safety Board, *Collision into Terrain Safari Aviation Inc. Airbus AS350 B2, N985SA*, at <https://www.nts.gov/investigations/Pages/ANC20MA010.aspx>.

²⁵ U.S. Government Accountability Office, *Air Traffic Control: FAA Needs a More Comprehensive Approach to Address Cybersecurity As Agency Transitions to NextGen*, April 2015.

²⁶ See https://www.faa.gov/air_traffic/technology/cas/ct/.

collaborating with the Department of Homeland Security and the Department of Defense on a strategic framework for civil aviation cybersecurity.²⁷

Separately, the Transportation Security Administration (TSA) has 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 within 24 hours.²⁸

Oversight of Maintenance Repair Stations

Many airlines now 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.²⁹ 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; however, no formal action has been taken since FAA published an advance notice of proposed rulemaking in March 2014.³⁰

Integration of Unmanned Aircraft

In June 2016, FAA published a final rule allowing routine commercial operation of certain small unmanned aircraft weighing less than 55 pounds.³¹ In order 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 installation of anti-collision lights that are visible for at least three miles, and flights over people are limited to small UAS assessed to pose a minimal risk of injury.³²

Future expansion of commercial applications for unmanned aircraft may hinge on further regulatory action allowing for routine operations beyond visual line of sight, during both night and day, and in poor visibility, as well as permitting operations in which multiple drones may be

²⁷ See https://www.faa.gov/air_traffic/technology/cas/aci/.

²⁸ Alan Suderman, "TSA Requires Rail and Airports to Strengthen Cybersecurity," *Federal News Network*, December 2, 2021, at <https://federalnewsnetwork.com/government-news/2021/12/tsa-requires-rail-and-airports-to-strengthen-cybersecurity/>.

²⁹ U.S. Government Accountability Office, *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>.

³⁰ Federal Aviation Administration, "Drug and Alcohol Testing of Certain Maintenance Provider Employees Located Outside of the United States," 79 *Federal Register* 14621-14630, March 17, 2014.

³¹ See 14 C.F.R. Part 107.

³² Federal Aviation Administration, "Operation of Small Unmanned Aircraft Systems over People," 86 *Federal Register* 4314-4387, January 15, 2021.

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 issued a limited number of drone operator certificates under existing charter flight regulations to carry out drone delivery demonstration projects, and in September 2020, FAA issued an updated policy³³ allowing for type certification of UAS as a special class of aircraft without occupants.

In January 2021, FAA also 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 will be either required to retrofit with remote identification broadcast modules or will be limited to operations within 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 services to drone operators. The fee structure for such services is yet to be determined.

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 regulations,³⁴ 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.

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 that 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. FAA has not yet issued regulations to implement this requirement.

Congress has taken a particular 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 and the Department of Homeland Security, 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 the Department of Defense and the Department of Energy in the National Defense Authorization Act for Fiscal Year 2017 (P.L. 114-328).

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³³ Federal Aviation Administration, "Type Certification of Certain Unmanned Aircraft Systems," 85 *Federal Register* 58251-58255, September 18, 2020.

³⁴ See https://www.faa.gov/uas/recreational_flyers/knowledge_test_updates.

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