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Federal Civil Aviation Programs: In Brief

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September 27, 2016

Congressional Research Service
7-....
www.crs.gov
R42781

CRS REPORT
Prepared for Members and
Committees of Congress

Contents

Introduction 1
The Airport and Airways Trust Fund 1
FAA Funding Accounts 3
Airport Financing 4
FAA Management and Organizational Issues 4
    Air Traffic Controller Workforce 5
    Facility Consolidation 5
The Next Generation Air Transportation System (NextGen) 6
Aviation Safety Programs 8
    Airline Safety 8
    Air Ambulance Safety 9
    Aviation Cybersecurity 10
    Oversight of Maintenance Repair Stations 10
    Integration of Unmanned Aircraft 11

Tables

Table 1. Aviation Taxes and Fees 2
Table 2. Reauthorization Funding Levels for FAA Accounts 3
Table 3. Funding for NextGen Programs 6

Contacts

Author Contact Information 12

Introduction

Federal Aviation Administration (FAA) programs and activities 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 airport improvements under the Airport Improvement Program (AIP); and civil aviation research and development 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. These programs are funded primarily through a special trust fund, the Airport and Airways Trust Fund (AATF), and, in part, through general fund contributions.

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 in the Department of Homeland Security, which has authority over civil aviation security; and the National Transportation Safety Board, which investigates aviation accidents and makes safety recommendations to FAA. These programs are not considered in this report. This report focuses on FAA and DOT civil aviation programs addressed in the FAA Extension, Safety, and Security Act of 2016 (P.L. 114-190), enacted on July 15, 2016, which authorizes AATF taxes and revenue collections and civil aviation program expenditures through FY2017.

The Airport and Airways 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 FY2013 and FY2016, the AATF provided between 71.5% and 92.8% of FAA's total annual funding, 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**).

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 FY2015 the AATF had revenues of over $14.2 billion and maintained a cash balance of more than $14 billion. The uncommitted balance—the amount of funds not yet obligated—was over $1.3 billion at the end of FY2015. Nonetheless, the long-term vitality of the AATF remains a concern. AATF revenue is largely dependent on airlines' ticket sales, and the spread of low-cost air carrier models has held down ticket prices and therefore AATF receipts.

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

[2] See CRS Report R41666, *Essential Air Service (EAS): Frequently Asked Questions*, by (name redacted)(out of print; available upon request).

Table 1. Aviation Taxes and Fees

(CY2016 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)	$4.00
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 (indexed annually to Consumer Price Index) (prorated Alaska/Hawaii to/from mainland United States)	$17.80 (Alaska/Hawaii = $8.90)
Fractional Ownership Surtax on general aviation jet fuel	14.1 cents/gallon

Source: Federal Aviation Administration, Current Aviation Excise Tax Structure, updated January 2016.

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

AATF revenues have been adversely affected by the recent trend among airlines to impose fees for a variety of add-on services and amenities such as checked bags, onboard Wi-Fi access, or seats with additional leg room. Generally, fees not included in the base ticket price are not subject to federal excise taxes. Air carriers generated over $3.8 billion in baggage fees in 2015.[3] The trust fund would have received more than $285 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.

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.

In 2015, the Obama Administration proposed a per-flight user charge of $100 on commercial and general aviation jets and turboprops that fly in controlled airspace as an additional revenue source for the AATF.[4] The proposal, estimated to generate roughly $1.1 billion annually, was opposed by general aviation interests, which depicted this as a first step toward funding the air traffic control system through user charges. The Administration's budgets for FY2016 and FY2017 did not include such a proposal. Proposals by the Clinton Administration and the George W. Bush Administration to establish user charges for air traffic services also failed to gain congressional support.

[3] Bureau of Transportation Statistics (BTS), "Baggage Fees by Airline 2015," May 2, 2016, http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/subject_areas/airline_information/baggage_fees/html/2015.html.

[4] Office of Management and Budget, *Living Within Our Means and Investing in the Future: The President's Plan for Economic Growth and Deficit Reduction*, September 2011, pp. 22-23.

FAA Funding Accounts

In recent years, FAA funding has totaled between $15 billion and $17 billion annually. FAA funding is divided among four main accounts. Operations and Maintenance (O&M) receives slightly more than 60% of total FAA appropriations. It is the only FAA account that is funded, in part, by general fund contributions. The O&M account 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. Authorizations and appropriations for these accounts are shown in **Table 2**.

Table 2. Reauthorization Funding Levels for FAA Accounts

($ in millions)

Account	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
Operations and Maintenance (O&M)						
Authorized Levels	9,653	9,539	9,596	9,653	9,910	9,910
Appropriated/Requested Amounts	9,653	9,148	9,651	9,741	9,909	9,994
Airport Improvement Program (AIP)						
Authorized Levels	3,350	3,350	3,350	3,350	3,350	3,350
Appropriated/Requested Amounts	3,350	3,343	3,480	3,350	3,350	2,900
Facilities and Equipment (F&E)						
Authorized Levels	2,731	2,715	2,730	2,730	2,855	2,855
Appropriated/Requested Amounts	2,731	2,588	2,600	2,600	2,855	2,838
Research, Engineering, and Development (RE&D)						
Authorized Levels	168	168	168	168	166	166
Appropriated/Requested Amounts	168	159	133	157	166	168
TOTALS						
Authorized Levels	15,902	15,772	15,814	15,901	16,281	16,281
Appropriated/Requested Amounts	15,902	15,238	15,864	15,848	16,281	16,281

Source: CRS analysis of P.L. 114-190, P.L. 112-55 (FY2012 Appropriations), P.L. 113-6 (FY2013 Appropriations), P.L. 113-76 (FY2014 Appropriations), P.L. 113-235 (FY2015 Appropriations), P.L. 114-190, and the FY2017 Budget Request.

Airport Financing[5]

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, 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.

Passenger facility charges (PFCs) provide a source of nonfederal funds intended to complement AIP spending. A PFC 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 landside projects such as improvements to passenger terminals and ground transportation facilities. PFCs can also be used for bond repayments. Currently, PFCs are capped at $4.50 per boarded passenger, with a maximum charge of $18 per round trip 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.

FAA Management and Organizational Issues

FAA is a large organization, with about 46,000 full-time equivalent (FTE) positions. Almost 30,000 of these are in the Air Traffic Organization (ATO), including approximately 14,500 air traffic controllers, 5,000 air traffic supervisors and managers, and 7,000 engineers and maintenance technicians. ATO was established under Executive Order 12/07/00 in December 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. Employee pay and advancement are based, in part, on meeting annual organizational goals. Creation of the ATO as a distinct entity within FAA also had the effect of more clearly separating operational components related to air traffic control from components concerned with regulation and safety oversight of aircraft operators, repair stations, flight schools, pilots and mechanics, and other entities.

[5] For greater detail, see CRS Report R43327, *Financing Airport Improvements*, by (name redacted) and (name redacted) See also Federal Aviation Administration, *Overview: What Is AIP?*, http://www.faa.gov/airports/aip/overview/.

Air Traffic Controller Workforce

FAA currently faces a backlog in controller hiring. Total controller hiring over the 10-year period ending in FY2025 is expected to be slightly above 12,000, which will maintain the controller workforce at roughly its current level. However, FAA plans to hire about 1,700 controllers annually over the next three years, almost double the number of new hires anticipated farther into the future, in order to address the backlog. As hiring stabilizes in FY2022 and beyond to around 850 new hires per year, FAA anticipates that the ratio of trainees to fully qualified controllers will drop considerably, addressing current concerns regarding the number of fully qualified controllers, a designation that takes several years to attain.

Section 2106 of 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 applicants, and allows individuals who did not pass the biographical assessment under previous hiring announcements to reapply, even if they are now older than 30, the maximum entry age for controllers set by FAA. For applicants with one or more years of prior air traffic control experience, the law increases the maximum entry age to 35 years.

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 terminal radar approach control (TRACON) facilities. TRACON consolidation has been ongoing for many years, but in the past it has been limited to nearby and overlapping terminal areas in 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 terminal radar facilities housed in the towers that also control landings, takeoffs, and ground movements.

Replacements are being designed to house airport tower functions only, and TRACON components are to be relocated to consolidated facilities that may be at some distance from the airport. Operations at low-activity towers that lose their TRACON components are more likely to be outsourced under the federal contract tower program, an issue of particular concern to FAA labor unions. Currently, about half of all airport control towers in the United States are operated under the contract tower program.

Facility consolidation has been particularly controversial because FAA's system-wide plan for realignment and consolidation is still evolving. The plan is politically sensitive, as TRACON consolidation could result in job losses in specific congressional districts even if it does not lead to an overall decrease in jobs for air traffic controllers, systems specialists, and other supporting personnel. Rather, realignment and consolidation coupled with airspace modernization are anticipated to change the nature of these job functions and consolidate them in fewer physical facilities.

Section 804 of the FAA Modernization and Reform Act (P.L. 112-95) required FAA to develop a report providing a comprehensive list of its proposed recommendations for realignment and consolidation of services and facilities. The report is to include a justification, projected cost savings, and a timeline for each proposed action. FAA is required to subsequently provide Congress with formal consolidation and realignment recommendations, along with public comments received. Congress would then have the opportunity to, within 30 days, pass a joint

resolution formally disapproving any recommendation in the FAA plan. If Congress disapproves, FAA would not be able to implement that specific recommendation. The law is silent with respect to FAA's recourse to subsequently propose alternative approaches.

FAA efforts to meet the reporting requirements outlined in P.L. 112-95 have been delayed and limited in scope. In 2013, FAA established a Section 804 collaborative working group consisting of FAA personnel and FAA labor union representatives. The working group developed an analytical process to support realignment recommendations and issued its first set of recommendations in March 2015, recommending only to consolidate one TRACON facility in Cape Cod, MA, with the facility in Boston, and to leave a facility in Abilene, TX, in place.[6] A second set of recommendations was issued in May 2016,[7] offering three recommendations for facility consolidation, out of five facilities examined, focusing on facilities in northern Ohio and central Michigan.

The Next Generation Air Transportation System (NextGen)

NextGen is a multiyear initiative to modernize and improve the efficiency of the national airspace system, primarily by migrating to technologies and procedures using satellite-based navigation and aircraft tracking. Funding for NextGen programs totals almost $1 billion annually, primarily funded through FAA's F&E account (see **Table 3**).

Table 3. Funding for NextGen Programs

($ in millions)

Account	FY2015	FY2016	FY2017 Request
Operations and Maintenance (O&M)	14	55	60
Facilities and Equipment (F&E)	792	855	877
Research, Engineering, and Development (RE&D)	51	71	63
TOTALS	**857**	**980**	**1,000**

Source: U.S. Department of Transportation, Budget Estimates Fiscal Year 2017, Federal Aviation Administration.

Note: Columns may not sum to totals due to rounding.

Core components of the NextGen system include the following:

- **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 such as a Global Positioning System (GPS) receiver. "ADS-B Out" functionality refers to a basic level of aircraft equipage that transmits position data. "ADS-B In" incorporates

[6] Federal Aviation Administration, Section 804 Collaborative Working Group, *FAA National Facilities Realignment and Consolidation Report, Year 1, Part 1 Recommendations.* Response to U.S. Congress FAA Reauthorization Bill Public Law 112-095, Section 804, March 11, 2015.

[7] Federal Aviation Administration, Section 804 Collaborative Working Group, *FAA National Facilities Realignment and Consolidation Report, Part 2 Recommendations.* Response to U.S. Congress FAA Reauthorization Bill Public Law 112-095, Section 804, May 11, 2016.

aircraft reception of ADS-B signals from other aircraft and uplinks of traffic, weather, and flight information from ground stations. FAA funds support the installation, operation, and maintenance of the ground infrastructure to receive ADS-B transmissions and relay them to air traffic facilities and other aircraft. Most aircraft will be required to have "ADS-B Out" capability by 2020.

- **System Wide Information Management (SWIM)**, an extensive, scalable data network to share real-time operational information, such as flight plans, flight trajectories, weather, airport conditions, and temporary airspace restrictions across the entire airspace system.
- **Collaborative Air Traffic Management Technologies (CATMT)**, a suite of automation and decision-support tools designed to improve aircraft flow management by exploiting other NextGen technologies and capabilities such as SWIM.
- **Terminal Flight Data Manager (TFDM)**, a system to share real-time data among controllers, aircraft operators, and airports to improve airport arrival and departure efficiency and coordinate airport surface operations.
- **Data Communications (DataComm)**, a digital voice and data network, similar to wireless telephone capabilities, to transmit instructions, advisories, and other routine communications between aircraft and air traffic service providers.
- **National Airspace System Voice System (NVS)**, a standardized digital voice network for communications within and between FAA air traffic facilities that will 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.

These programs are in various stages of development. While the network of ADS-B receivers has been deployed, there is still limited integration to provide ADS-B feeds to air traffic facilities. Meanwhile, FAA must pay annual subscription fees totaling about $124 million for these data from the ADS-B system contractor. The SWIM architecture is well defined and has been in use since 2010, allowing appropriately equipped system users to access weather and flight planning information. However, the addition of more extensive services is planned. Much of this will focus on improving collaborative air traffic management technologies to improve airspace and airport efficiency.

Airlines have already invested in cockpit technologies compatible with FAA DataComm systems, which are currently being deployed to several commercial service airport towers, and therefore the transition to digital voice and data communications between pilots and controllers is expected to proceed smoothly. Likewise, most airlines and many business jet operators have already equipped with precision navigation capabilities allowing them to fly more efficient routes and airport arrival and departure paths, which have been implemented by FAA as required under P.L. 112-95. General aviation operators, however, have been reluctant to equip with ADS-B despite a regulatory mandate to install ADS-B Out by January 2020. P.L. 112-95 authorized DOT to establish an incentive program to help equip aircraft with NextGen equipment. Under this authority, DOT has set up a public-private partnership offering low-cost unsecured loans for general aviation aircraft owners to purchase equipment to comply with the ADS-B Out mandate. In addition, FAA is offering a $500 rebate for owners of certain small general aviation aircraft to

equip with ADS-B Out. According to FAA, this is a "first-come, first-served program that will only last for a limited time."[8]

For airlines and business jets, on the other hand, FAA has proposed various "best-equipped best-served" concepts to encourage adoption of NextGen technologies, particularly ADS-B. Under this concept, those that equip early with NextGen capabilities will reap some of the benefits of those capabilities through preferential treatment with respect to flight routing and arrival and departure queuing. Examples include giving ADS-B equipped aircraft priority access to more efficient offshore routes along the East Coast and allowing ADS-B aircraft more flexibility to climb to fuel-saving altitudes in the South Pacific.[9] In addition, ADS-B and other NextGen technologies may provide some intrinsic benefits, particularly to small general aviation aircraft, by bringing pilots robust traffic and weather data that may enhance safety. FAA plans to promote these benefits to encourage more users to adopt NextGen technologies quickly.

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 full-time equivalent positions including regulators, inspectors, engineers, and support personnel who are responsible for writing and enforcing all 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. Although the United States achieves extremely high levels of aviation safety and has one of the safest aviation systems in the world, Congress has expressed particular concern in recent years about safety regulation and oversight of smaller regional air carriers; the safety of air ambulances; regulation of outsourced air carrier maintenance; airport surface movement safety; and, most recently, the integration of unmanned aircraft (drones) into the national airspace system.

Airline Safety

In response to concerns over regional airline safety following the February 12, 2009, crash of a Continental Connection flight from Newark, NJ, to Buffalo, NY, the Airline Safety and Federal Aviation Administration Extension Act of 2010 (P.L. 111-216) required FAA to make substantive regulatory changes addressing airline pilot fatigue; airline pilot qualifications; FAA pilot records; airline flight crew and dispatcher training; FAA oversight and surveillance of air carriers; pilot mentoring, professional development, and leadership; and flight crewmember pairing and crew resource management techniques.

In response to these mandates, 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 establishing a minimum 10-hour rest period between duty periods, two hours more than previously required. FAA also requires air carriers to implement fatigue risk management programs to aid airlines and flight crews in ensuring that pilots are fit for duty.[10] In addition, FAA

[8] Federal Aviation Administration, *General Aviation ADS-B Rebate Program Rules,* http://www.faa.gov/nextgen/equipadsb/rebate/media/ADS-B_Rebate_Program_Rules.pdf.

[9] Federal Aviation Administration, *Fact Sheet—Aircraft Priority Access Selection Sequence (AirPASS),* March 14, 2013, http://www.faa.gov/news/fact_sheets/news_story.cfm?newsid=14413.

[10] 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; (continued...)

has issued new qualification standards for first officers, generally requiring that they meet the same certification minimum training and experience requirements as airline captains.[11] Some regional air carriers have asserted that these requirements limit the supply of qualified candidates for first officer positions. FAA has also revamped regulations regarding airline training programs for flight crews and dispatchers, and has directed air carriers to develop safety management systems that provide comprehensive, process-oriented safety programs throughout each airline's organization.[12] It plans future modifications to air carrier training programs to address mentoring, leadership, and professional development of less experienced pilots, as mandated in P.L. 111-216.[13]

P.L. 114-190 set a deadline of April 30, 2017, for FAA to make available a pilot records database allowing airlines to review FAA, air carrier, and national driver register records pertaining to pilot job applicants. It also directed FAA to issue guidance to air carriers and inspectors for assessing pilot competency in manual flying skills and use of cockpit automation, and to verify that airline pilot training programs adequately address the monitoring of automated systems and controlling of aircraft without the use of autopilot or autoflight systems. The act also directed FAA to consider whether additional screening and treatment for mental health conditions, including depression and suicidal thoughts or tendencies, should be considered in the medical certification of airline pilots.

Air Ambulance Safety

Accidents have shined a spotlight on the safety of air ambulances, particularly helicopter emergency medical service (HEMS) flights. The National Transportation Safety Board (NTSB) recommended mandatory use of formal flight dispatch procedures and risk management practices by helicopter air ambulance operators as well as mandatory installation of terrain warning systems on HEMS aircraft. NTSB found that many air ambulance accidents have occurred when patients were not on board, and, therefore, operations were permitted to be conducted under less stringent rules regarding weather and pilot duty times. Following NTSB's recommendations, P.L. 112-95 required air ambulances to comply with more stringent commercial operating requirements pertaining to weather conditions and crew flight and duty times whenever medical personnel are on board, and mandated FAA to establish regulations to enhance helicopter air ambulance safety.

In February 2014, FAA finalized a number of safety regulations for helicopter operators, including HEMS. These required changes in operational procedures and cockpit technologies that are designed to improve operational safety and provide better situation awareness and warnings regarding terrain and obstacles to pilots.[14] The regulations apply commercial operating standards

(...continued)

Correction," 77(95) *Federal Register* 28763, May 16, 2012.

[11] Federal Aviation Administration, "Pilot Certification and Qualification Requirements for Air Carrier Operations; Final Rule," 78(135) *Federal Register* 42324-42380, July 15, 2013; Federal Aviation Administration, "Safety Management Systems for Domestic, Flag, and Supplemental Operations Certificate Holders," 80 *Federal Register* 1307-1328, March 9, 2015.

[12] Federal Aviation Administration, "Qualification, Service, and Use of Crewmembers and Aircraft Dispatchers," 78 *Federal Register* 67799-67846, November 12, 2013.

[13] Department of Transportation, *Report on DOT Significant Rulemakings*, Washington, DC, November 2013, http://www.dot.gov/sites/dot.dev/files/docs/NOV%202013%20Internet%20Report.docx.

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

to all air ambulance flights with medical personnel onboard, mandate radio altimeters and terrain awareness and warning systems for HEMS aircraft, and require HEMS operators to conduct pre-flight risk analyses and provide safety training or briefings to onboard medical personnel. Additionally, HEMS operators with 10 or more helicopters are now required to establish operations control centers staffed by FAA-approved operations control specialists.

In response to a number of deadly helicopter air ambulance crashes and other helicopter accidents involving post-crash fires, a provision in P.L. 114-190 directs FAA to evaluate and update, as necessary, crash-resistance standards for helicopter fuel systems.

Aviation Cybersecurity

Cybersecurity has been a growing concern for civil aviation as the shift from stand-alone navigation equipment, radar tracking, and analog two-way radios to highly integrated and interdependent computers and digital networks, both onboard aircraft and in air traffic control facilities, creates inherent security vulnerabilities. Section 2111 of P.L. 114-190 directed FAA to develop a comprehensive strategic framework to reduce cybersecurity risks to aviation. The act also directed FAA to establish a cybersecurity research and development plan for the national airspace system and to assess the cost and timeline of developing and maintaining an agency-wide cybersecurity threat model as recommended in a 2015 Government Accountability Office study.[15] It also instructed FAA to clarify cybersecurity roles and responsibilities among FAA employees; to take various actions to reduce cybersecurity risks to air traffic control systems; and to support industry efforts to apply consensus standards and best practices for information security.

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. Concern about the safety of outsourcing arose following the NTSB investigation of the crash of a USAirways Express flight in January 2003 while taking off from Charlotte, NC. NTSB found that the plane's elevator control system was rigged improperly, and that maintenance work that had been performed by a contract repair facility lacked sufficient oversight and quality assurance. It recommended that FAA perform targeted surveillance and increased oversight of airline maintenance practices, require approved air carrier maintenance training programs, and require air carriers to implement comprehensive aviation maintenance human factors programs.[16]

Congress has expressed specific concern over the quality of work and oversight of maintenance performed on air carrier aircraft at maintenance facilities in foreign countries. P.L. 112-95 required FAA to implement a safety assessment system for all certified repair stations (both in the United States and in foreign countries) by February 14, 2013. Additionally, the act required FAA to ensure that foreign repair stations are subject to inspections consistent with existing U.S. requirements at least annually, consistent with obligations under international agreements. FAA was directed to issue annual reports describing improvements in its capabilities to track where airline maintenance is performed; develop a staffing model regarding the number and geographic

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

[16] National Transportation Safety Board, Loss of Pitch Control During Takeoff Air Midwest Flight 5481, Raytheon (Beechcraft) 1900D, N233YV, NTSB/AAR-04/01, Washington, DC, February 26, 2004.

placement of FAA inspectors; improve maintenance inspector training; and carry out a quality assessment of FAA and foreign authority inspections.

P.L. 112-95 also requires drug and alcohol testing programs for safety-sensitive workers who repair commercial air carrier aircraft at foreign repair stations. Although the law required FAA to publish a proposed rule to require drug and alcohol testing programs at all foreign repair stations that service U.S. air carrier aircraft by February 14, 2013, the rulemaking was delayed, according to DOT, because of the need to coordinate with foreign governments. P.L. 114-190 set deadlines specifying that a proposed rule be published by mid-October, 2016, with a final rule to be issued one year thereafter. The act also directed FAA to focus on foreign repair stations that conduct heavy maintenance work on U.S. air carrier aircraft, and to target its oversight activities based on the frequency and severity of instances in which air carriers must take corrective actions following servicing at foreign facilities.

Integration of Unmanned Aircraft

P.L. 112-95 directed FAA to develop a plan to begin the safe integration of civil unmanned aircraft into the national airspace system. These aircraft, commonly known as drones, are being used for aerial surveillance missions for homeland security, border protection, and law enforcement, as well as for commercial applications such as surveying, imaging, and advertising. Integrating drones into the national airspace system poses a number of challenges including the development of capabilities for drones to sense and avoid other aircraft, mitigation of risks to persons and property on the ground, qualification standards and training for pilots, systems operators, and other safety-critical personnel.

In June 2016, FAA published a final rule allowing routine commercial operations of certain small unmanned aircraft weighing less than 55 pounds.[17] In order to fly for commercial purposes, operators must obtain a remote pilot certification from FAA. Generally, 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 not directly involved in its operation. The regulations provide a mechanism for commercial entities to obtain waivers from these restrictions on a case-by-case basis. P.L. 114-190 included language directing FAA to consider requests allowing beyond visual-line-of-sight operations and night flights to support construction, inspection, and repair of oil and gas facilities, pipelines, and power lines. Future expansion of commercial applications for unmanned aircraft, like remote monitoring and express package delivery service, 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 controlled by a single operator.

The regulations governing small commercial unmanned aircraft do not apply to drones and other remote-controlled aircraft operated strictly for hobby or recreation. These aircraft operate under a more lenient special rule for model aircraft that does not require any specific operator certification. Operators of both commercial drones and model aircraft, however, must register their aircraft with FAA, and can do so through an online registration system.

Registration has been regarded as a step to address growing concerns over drone operations that violate airspace restrictions and interfere with manned aircraft operations. To further address these concerns, P.L. 114-190 included language requiring FAA to develop standards for remote

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

identification of unmanned aircraft. It also established civil penalties for operators of drones that interfere with wildfire suppression, law enforcement, or other emergency response activities. The act directs FAA to set procedures for imposing unmanned aircraft restrictions around critical infrastructure and other sensitive facilities, including amusement parks and to set up a pilot program to assess the use of systems to detect unmanned aircraft in prohibited locations. It also directs FAA to coordinate with the National Aeronautics and Space Administration to research and develop technologies for unmanned aircraft traffic management, and to carry out studies assessing potential consequences of a collision between unmanned aircraft and various types of manned aircraft.

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