2003], technologies to enable rotorcraft with the following improvements relative to rotorcraft existing as of the date of the enactment of this Act:

''(1) 80 percent reduction in noise levels on takeoff and on approach and landing as perceived by a human observer.

''(2) Factor of 10 reduction in vibration.

''(3) 30 percent reduction in empty weight.

''(4) Predicted accident rate equivalent to that of fixed-wing aircraft in commercial service within 10 years after the date of the enactment of this Act.

''(5) Capability for zero-ceiling, zero-visibility operations.

''(b) IMPLEMENTATION.—Within 180 days after the date of the enactment of this Act [Dec. 12, 2003], the Administrator of the Federal Aviation Administration, in cooperation with the Administrator of the National Aeronautics and Space Administration, shall provide a plan to the Committee on Science [now Committee on Science, Space, and Technology] of the House of Representatives and to the Committee on Commerce, Science, and Transportation of the Senate for the implementation of the initiative described in subsection (a).''

SPECIALTY METALS CONSORTIUM

Pub. L. 106–181, title VII, §742, Apr. 5, 2000, 114 Stat. 175, provided that:

''(a) IN GENERAL.—The Administrator [of the Federal Aviation Administration] may work with a consortium of domestic metal producers and aircraft engine manufacturers to improve the quality of turbine engine materials and to address melting technology enhancements.

''(b) REPORT.—Not later than 6 months after entering into an agreement with a consortium described in subsection (a), the Administrator shall transmit to Congress a report on the goals and efforts of the consortium.''

§ 44505. Systems, procedures, facilities, services, and devices

(a) GENERAL REQUIREMENTS.—(1) The Administrator of the Federal Aviation Administration shall—

(A) develop, alter, test, and evaluate systems, procedures, facilities, services, and devices, and define their performance characteristics, to meet the needs for safe and efficient navigation and traffic control of civil and military aviation, except for needs of the armed forces that are peculiar to air warfare and primarily of military concern; and

(B) select systems, procedures, facilities, services, and devices that will best serve those needs and promote maximum coordination of air traffic control and air defense systems.

(2) The Administrator may make contracts to carry out this subsection without regard to section 3324(a) and (b) of title 31.

(3) When a substantial question exists under paragraph (1) of this subsection about whether a matter is of primary concern to the armed forces, the Administrator shall decide whether the Administrator or the Secretary of the appropriate military department has responsibility. The Administrator shall be given technical information related to each research and development project of the armed forces that potentially applies to, or potentially conflicts with, the common system to ensure that potential application to the common system is considered properly and that potential conflicts with the system are eliminated.

(b) RESEARCH ON HUMAN FACTORS AND SIMULATION MODELS.—The Administrator shall conduct or supervise research—

(1) to develop a better understanding of the relationship between human factors and aviation accidents and between human factors and air safety;

(2) to enhance air traffic controller, mechanic, and flight crew performance;

(3) to develop a human-factor analysis of the hazards associated with new technologies to be used by air traffic controllers, mechanics, and flight crews;

(4) to identify innovative and effective corrective measures for human errors that adversely affect air safety;

(5) to develop or procure dynamic simulation models and tools of the air traffic control system and airport design and operating procedures that will provide analytical technology—

(A) to predict airport and air traffic control safety and capacity problems;

(B) to evaluate planned research projects; and

(C) to test proposed revisions in airport and air traffic control operations programs;

(6) to develop a better understanding of the relationship between human factors and unmanned aircraft system safety; and

(7) to develop or procure dynamic simulation models and tools for integrating all classes of unmanned aircraft systems into the national airspace system without any degradation of existing levels of safety for all national airspace system users.

(c) RESEARCH ON DEVELOPING AND MAINTAINING A SAFE AND EFFICIENT SYSTEM.—The Administrator shall conduct or supervise research on—

(1) airspace and airport planning and design;

(2) airport capacity enhancement techniques;

(3) human performance in the air transportation environment;

(4) aviation safety and security;

(5) the supply of trained air transportation personnel, including pilots and mechanics; and

(6) other aviation issues related to developing and maintaining a safe and efficient air transportation system.

(d) RESEARCH ON DESIGN FOR CERTIFICATION.—

(1) RESEARCH.—Not later than 1 year after the date of enactment of the FAA Modernization and Reform Act of 2012, the Administrator shall conduct research on methods and procedures to improve both confidence in and the timeliness of certification of new technologies for their introduction into the national airspace system.

(2) RESEARCH PLAN.—Not later than 6 months after the date of enactment of the FAA Modernization and Reform Act of 2012, the Administrator shall develop a plan for the research under paragraph (1) that contains objectives, proposed tasks, milestones, and a 5-year budgetary profile.

(3) REVIEW.—The Administrator shall enter into an arrangement with the National Research Council to conduct an independent review of the plan developed under paragraph (2)

and shall provide the results of that review to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 18 months after the date of enactment of the FAA Modernization and Reform Act of 2012.

(e) COOPERATIVE AGREEMENTS.—The Administrator may enter into cooperative agreements on a cost-shared basis with Federal and non-Federal entities that the Administrator may select in order to conduct, encourage, and promote aviation research, engineering, and development, including the development of prototypes and demonstration models.

(Pub. L. 103–272, §1(e), July 5, 1994, 108 Stat. 1177; Pub. L. 103–305, title III, §307, Aug. 23, 1994, 108 Stat. 1593; Pub. L. 112–95, title IX, §§903(b), 905, Feb. 14, 2012, 126 Stat. 138, 139; Pub. L. 118–63, title VI, §618(b)(1), May 16, 2024, 138 Stat. 1231.)

HISTORICAL AND REVISION NOTES

Revised Section	*Source (U.S. Code)*	*Source (Statutes at Large)*
44505(a)(1) ..	49 App.:1353(c) (1st sentence).	Aug. 23, 1958, Pub. L. 85–726, §312(c) (1st, 5th–last sentences), 72 Stat. 752.
	49 App.:1655(c)(1).	Oct. 15, 1966, Pub. L. 89–670, §6(c)(1), 80 Stat. 938; Jan. 12, 1983, Pub. L. 97–449, §7(b), 96 Stat. 2444.
44505(a)(2) ..	49 App.:1353(c) (5th sentence).	
	49 App.:1655(c)(1).	
44505(a)(3) ..	49 App.:1353(c) (6th, last sentences).	
	49 App.:1655(c)(1).	
44505(b)	49 App.:1353(c) (2d, 3d sentences).	Aug. 23, 1958, Pub. L. 85–726, 72 Stat. 731, §312(c) (2d, 3d sentences); added Nov. 3, 1988, Pub. L. 100–591, §3, 102 Stat. 3011.
44505(c)	49 App.:1353(c) (4th sentence).	Aug. 23, 1958, Pub. L. 85–726, 72 Stat. 731, §312(c) (4th sentence); added Nov. 5, 1990, Pub. L. 101–508, §9209(c), 104 Stat. 1388–378.

In this section, the word ''Administrator'' in section 312(c) of the Federal Aviation Act of 1958 (Public Law 85–726, 72 Stat. 752) is retained on authority of 49:106(g).

In subsection (a)(1) and (3), the words ''the armed forces'' are substituted for ''military agencies'' and ''the military'' because of the definition of ''armed forces'' in 10:101.

In subsection (a)(3), the words ''military department'' are substituted for ''military agency'' because of the definition of ''military department'' in 10:101. The words ''the needs of'' and ''to the maximum extent necessary'' are omitted as surplus.

Editorial Notes

REFERENCES IN TEXT

The date of enactment of the FAA Modernization and Reform Act of 2012, referred to in subsec. (d), is the date of enactment of Pub. L. 112–95, which was approved Feb. 14, 2012.

AMENDMENTS

2024—Pub. L. 118–63, §618(b)(1)(A), substituted ''services, and devices'' for ''and devices'' in section catchline.

Subsec. (a)(1). Pub. L. 118–63, §618(b)(1)(B), substituted ''services, and devices'' for ''and devices'' in subpars. (A) and (B).

Subsec. (b)(5), (7). Pub. L. 118–63, §618(b)(1)(C), substituted ''develop or procure dynamic simulation models and tools'' for ''develop dynamic simulation models''.

2012—Subsec. (b)(6), (7). Pub. L. 112–95, §903(b), added pars. (6) and (7).

Subsecs. (d), (e). Pub. L. 112–95, §905, added subsec. (d) and redesignated former subsec. (d) as (e).

1994—Subsec. (d). Pub. L. 103–305 added subsec. (d).

Statutory Notes and Related Subsidiaries

REDUCING TURBULENCE-RELATED INJURIES ON PART 121 AIRCRAFT OPERATIONS

Pub. L. 118–63, title III, §321, May 16, 2024, 138 Stat. 1083, provided that:

''(a) IN GENERAL.—Not later than 2 years after the date of enactment of this Act [May 16, 2024], the Administrator [of the Federal Aviation Administration] shall review the recommendations made by the Chair of the National Transportation Safety Board to the Administrator contained in the safety research report titled 'Preventing Turbulence-Related Injuries in Air Carrier Operations Conducted Under Title 14 Code of Federal Regulations Part 121', issued on August 10, 2021 (NTSB/SS–21/01) and provide a briefing to the appropriate committees of Congress [Committee on Commerce, Science, and Transportation of the Senate and Committee on Transportation and Infrastructure of the House of Representatives] with any planned actions in response to the recommendations of the report.

''(b) IMPLEMENTATION.—Not later than 3 years after the date of enactment of this Act, the Administrator shall implement, as appropriate, the recommendations in the safety research report described in subsection (a).

''(c) REPORT.—

''(1) IN GENERAL.—Not later than 2 years after completing the review under subsection (a), and every 2 years thereafter, the Administrator shall submit to the appropriate committees of Congress a report on the implementation status of the recommendations in the safety research report described in subsection (a) until the earlier of—

''(A) the date on which such recommendations have been adopted or adjudicated as described in paragraph (2); or

''(B) the date that is 10 years after the date of enactment of this Act.

''(2) CONTENTS.—If the Administrator decides not to implement a recommendation in the safety research report described in subsection (a), the Administrator shall provide, as a part of the report required under paragraph (1), a description of why the Administrator did not implement such recommendation.''

FLIGHT PROFILE OPTIMIZATION

Pub. L. 118–63, title VI, §609, May 16, 2024, 138 Stat. 1225, provided that:

''(a) PILOT PROGRAM.—

''(1) ESTABLISHMENT.—The Administrator [of the Federal Aviation Administration] shall establish a pilot program to award grants to air traffic flow management technology providers to develop prototype capabilities to incorporate flight profile optimization (in this section referred to as 'FPO') into the trajectory based-operations air traffic flow management system of the FAA [Federal Aviation Administration].

''(2) CONSIDERATIONS.—In establishing the pilot program under paragraph (1), the Administrator shall consider the following:

''(A) The extent to which developed FPO capabilities may reduce strain on the national airspace system infrastructure while facilitating safe and efficient flow of future air traffic volumes and diverse range of aircraft and advanced aviation aircraft.

''(B) The extent to which developed FPO capabilities may achieve environmental benefits and time savings.

''(C) The perspectives of FAA employees responsible for air traffic flow management development projects, bilateral civil aviation regulatory part-

ners, and industry applicants on the performance of the FAA in carrying out air traffic flow management system development projects.

''(D) Any other information the Administrator determines appropriate.

''(3) APPLICATION.—To be eligible to receive a grant under the program, an air traffic flow management technology provider shall submit an application to the Administrator at such time, in such manner, and containing such information as the Administrator may require.

''(4) MAXIMUM AMOUNT.—A grant awarded under the program may not exceed $2,000,000 to a single air traffic flow management technology provider.

''(b) BRIEFING TO CONGRESS.—Not later than 1 year after the date of enactment of this Act [May 16, 2024], and annually thereafter until the termination of the pilot program under subsection (d) established under this section, the Administrator shall brief the appropriate committees of Congress [Committee on Commerce, Science, and Transportation of the Senate and Committee on Transportation and Infrastructure of the House of Representatives] on the progress of such pilot program, including any implementation challenges of the program, detailed metrics of the program, and any recommendations to achieve the adoption of FPO.

''(c) TRAJECTORY-BASED OPERATIONS DEFINED.—In this section, the term 'trajectory-based operations' means an air traffic flow management method for strategically planning, managing, and optimizing flights that uses time-based management, performance-based navigation, and other capabilities and processes to achieve air traffic flow management operational objectives and improvements.

''(d) SUNSET.—The pilot program under this section shall terminate on October 1, 2028.''

AERONAUTICAL MOBILE COMMUNICATIONS SERVICES

Pub. L. 118–63, title VI, §613, May 16, 2024, 138 Stat. 1227, provided that:

''(a) SATELLITE VOICE COMMUNICATIONS SERVICES.—The Administrator [of the Federal Aviation Administration] shall evaluate the addition of satellite voice communication services (in this section referred to as 'SatVoice') to the Aeronautical Mobile Communications program (in this section referred to as the 'AMCS program') that provides for the delivery of air traffic control messages in oceanic and remote continental airspace.

''(b) ANALYSIS AND IMPLEMENTATION PROCEDURES.—Not later than 1 year after the date of enactment of this Act [May 16, 2024], the Administrator shall begin to develop the safety case analysis and implementation procedures for SatVoice instructions over the controlled oceanic and remote continental airspace regions of the FAA [Federal Aviation Administration].

''(c) REQUIREMENTS.—The analysis and implementation procedures required under subsection (b) shall include, at a minimum, the following:

''(1) Network and protocol testing and integration with satellite service providers.

''(2) Operational testing with aircraft to identify and resolve performance issues.

''(3) A definition of Satcom Standards and Recommended Practices established through a collaboration with the International Civil Aviation Organization, which shall include an RCP–130 performance standard as well as SatVoice standards.

''(4) Training for radio operators on new operation procedures and protocols.

''(5) A phased implementation plan for incorporating SatVoice services into the AMCS program.

''(6) The estimated cost of the implementation procedures for relevant stakeholders.

''(d) HF/VHF MINIMUM EQUIPAGE.—

''(1) RULE OF CONSTRUCTION.—Nothing in this section shall be construed to affect the HF/VHF equipage requirement for communications in oceanic and remote continental airspace as of the date of enactment of this Act.

''(2) MAINTENANCE OF HF/VHF SERVICES.—The Administrator shall maintain HF/VHF services existing as of the date of enactment of this Act as minimum equipage under the AMCS program to provide for auxiliary communication and maintain safety in the event of a satellite outage.''

DELIVERY OF CLEARANCE TO PILOTS VIA INTERNET PROTOCOL

Pub. L. 118–63, title VI, §614, May 16, 2024, 138 Stat. 1228, provided that:

''(a) IN GENERAL.—Not later than 18 months after the date of enactment of this Act [May 16, 2024], the Administrator [of the Federal Aviation Administration] shall establish a pilot program to conduct testing and an evaluation to determine the feasibility of the use, in air traffic control towers, of technology for mobile clearance delivery for general aviation and on-demand air carriers operating under part 135 of title 14, Code of Federal Regulations, at suitable airports that do not have tower data link services.

''(b) AIRPORT SELECTION.—

''(1) IN GENERAL.—The Administrator shall designate 5 suitable airports for participation in the program established under subsection (a) after consultation with the exclusive representatives of air traffic controllers certified under section 7111 of title 5, United States Code, airport sponsors, aircraft and avionics manufacturers, MITRE, and aircraft operators

''(2) AIRPORT SIZE AND COMPLEXITY.—In designating airports under paragraph (1), the Administrator shall designate airports of different size and complexity.

''(c) PROGRAM OBJECTIVE.—The program established under subsection (a) shall address and include safety, security, and operational requirements for mobile clearance delivery at airports and heliports across the United States.

''(d) REPORT.—Not later than 1 year after the date on which the program under subsection (a) is established, the Administrator shall submit to the appropriate committees of Congress [Committee on Commerce, Science, and Transportation of the Senate and Committee on Transportation and Infrastructure of the House of Representatives] a report on the safety, security, and operational performance of mobile clearance delivery at airports pursuant to this section and recommendations on how best to improve the program.

''(e) DEFINITIONS.—In this section:

''(1) MOBILE CLEARANCE DELIVERY.—The term 'mobile clearance delivery' means the delivery of access to departure clearance and clearance cancellation via internet protocol via applications to pilots while aircraft are on the ground where traditional data link installations are not feasible or possible.

''(2) TOWER DATA LINK SERVICES.—The term 'tower data link services' means communications between controllers and pilots using controller-pilot data link communications.

''(3) SUITABLE AIRPORT.—The term 'suitable airport' means towered airports, non-towered airports, and heliports.''

AUDIT OF LEGACY SYSTEMS

Pub. L. 118–63, title VI, §622, May 16, 2024, 138 Stat. 1237, provided that:

''(a) IN GENERAL.—Not later than 120 days after the date of enactment of this Act [May 16, 2024], the Administrator [of the Federal Aviation Administration] shall initiate an audit of all legacy systems of the national airspace system to determine the level of operational risk, functionality, and security of such systems and the compatibility of such systems with current and future technology.

''(b) SCOPE OF AUDIT.—The audit required under subsection (a)—

''(1) shall be conducted by an independent third-party contractor or a federally funded research and development center selected by the Administrator;

''(2) shall include an assessment of whether a legacy system is an outdated, insufficient, unsafe, or unstable legacy system;

''(3) with respect to any legacy systems identified in the audit as an outdated, insufficient, unsafe, or unstable legacy system, shall include—

''(A) an analysis of the operational risks associated with using such legacy systems;

''(B) recommendations for replacement or enhancement of such legacy systems; and

''(C) an analysis of any potential impact on aviation safety and efficiency; and

''(4) shall include recommended performance metrics by which the Administrator can assess the circumstances in which safety-critical communication, navigation, and surveillance aviation infrastructure within the national airspace system can remain in operational service, which take into account—

''(A) the expected lifespan of such aviation infrastructure;

''(B) the number and type of mechanical failures of such aviation infrastructure;

''(C) the average annual costs of maintaining such aviation infrastructure over a 5-year period and whether such costs exceed the cost to replace such aviation infrastructure; and

''(D) the availability of replacement parts or labor capable of maintaining such aviation infrastructure.

''(c) DEADLINE.—Not later than 15 months after the date of enactment of this Act, the audit required under subsection (a) shall be completed.

''(d) REPORT.—Not later than 180 days after the audit required under subsection (a) is completed, the Administrator shall provide to the appropriate committees of Congress [Committee on Commerce, Science, and Transportation of the Senate and Committee on Transportation and Infrastructure of the House of Representatives] a report on the findings and recommendations of such audit, including—

''(1) an inventory of the legacy systems in use;

''(2) an assessment of the operational condition of the legacy systems in use, including the interoperability of such systems;

''(3) the average age of such legacy systems and, for each such legacy system, the intended design life of the system, by type; and

''(4) the availability of replacement parts, equipment, or technology to maintain such legacy systems.

''(e) PLAN TO ACCELERATE DRAWDOWN, REPLACEMENT, OR ENHANCEMENT OF IDENTIFIED LEGACY SYSTEMS.—

''(1) IN GENERAL.—Not later than 120 days after the date on which the Administrator provides the report under subsection (d), the Administrator shall develop and implement a plan, in consultation with industry representatives, to accelerate the drawdown, replacement, or enhancement of any legacy systems that are identified in the audit required under subsection (a) as outdated, insufficient, unsafe, or unstable legacy systems.

''(2) PRIORITIES.—In developing the plan under paragraph (1), the Administrator shall prioritize the drawdown, replacement, or enhancement of such legacy systems based on the operational risks such legacy systems pose to aviation safety and the costs associated with the replacement or enhancement of such legacy systems.

''(3) COLLABORATION WITH EXTERNAL EXPERTS.—In carrying out this subsection, the Administrator shall—

''(A) collaborate with industry representatives and other external experts in information technology to develop the plan under paragraph (1) within a reasonable timeframe;

''(B) identify technologies in existence or in development that, with or without adaptation, are expected to be suitable to meet the technical information technology needs of the FAA [Federal Aviation Administration]; and

''(C) maintain consistency with the acquisition management system established and updated pursuant to section 40110(d) of title 49, United States Code.

''(4) PROGRESS UPDATES.—The Administrator shall provide the appropriate committees of Congress with semiannual updates through September 30, 2028 on the progress made in carrying out the plan under paragraph (1).

''(5) INSPECTOR GENERAL REVIEW.—

''(A) IN GENERAL.—Not later than 3 years after the Administrator develops the plan required under paragraph (1), the inspector general of the Department of Transportation shall assess such efforts of the Administration to drawdown, replace, or enhance any legacy systems identified under subsection (a).

''(B) REPORT.—The inspector general shall submit to the appropriate committees of Congress a report on the results of the review carried out under subparagraph (A).

''(f) DEFINITIONS.—In this section:

''(1) INDUSTRY.—The term 'industry' means aviation industry organizations with expertise in aviation-dedicated network systems, systems engineering platforms, aviation software services, air traffic management, flight operations, and International Civil Aviation Organization standards.

''(2) LEGACY SYSTEM.—The term 'legacy system' means any communication, navigation, surveillance, or automation or network applications or ground-based aviation infrastructure, or other critical software and hardware systems owned by the FAA, that were deployed prior to the year 2000, including the Notice to Air Missions system.

''(3) OUTDATED, INSUFFICIENT, UNSAFE, OR UNSTABLE LEGACY SYSTEM.—The term 'outdated, insufficient, unsafe, or unstable legacy system' means a legacy system for which the likelihood of failure of such system creates a risk to air safety or security due to the age, ability to be maintained in a cost-effective manner, vulnerability to degradation, errors, or malicious attacks of such system, or any other factors that may compromise the performance or security of such system, including a legacy system—

''(A) that is vulnerable or susceptible to mechanical failure; and

''(B) with a risk of a single point of failure or that lacks sufficient contingencies in the event of such failure.''

RADAR DATA PILOT PROGRAM

Pub. L. 118–63, title IX, §905, May 16, 2024, 138 Stat. 1341, provided that:

''(a) SENSITIVE RADAR DATA FEED PILOT PROGRAM.—Not later than 270 days after the date of enactment of this Act [May 16, 2024], the Administrator [of the Federal Aviation Administration], in coordination with the Secretary of Defense, and other heads of relevant Federal agencies, shall establish a pilot program to make airspace data feeds containing controlled unclassified information available to qualified users (as determined by the Administrator), consistent with subsection (b).

''(b) AUTHORIZATION.—In carrying out subsection (a), the Administrator, in coordination with the Secretary of Defense and other heads of relevant Federal agencies, shall establish a process to authorize qualified users to receive airspace data feeds containing controlled unclassified information related to air traffic within the national airspace system and use such information in an agreed upon manner to—

''(1) provide and enable—

''(A) air traffic management services; and

''(B) unmanned aircraft system traffic management services; or

''(2) to test technologies that may enable or enhance the provision of the services described in paragraph (1).

''(c) CONSULTATION.—In establishing the process described in subsection (b), the Administrator shall con-

sult with representatives of the unmanned aircraft systems industry and related technical groups to identify an efficient, secure, and effective format and method for providing data described in this section.

''(d) BRIEFING.—Not later than 90 days after establishing the pilot program under subsection (a), and annually thereafter through 2028, the Administrator shall brief the appropriate committees of Congress [Committee on Commerce, Science, and Transportation of the Senate and Committee on Transportation and Infrastructure of the House of Representatives] on the findings of the pilot program established under this section.

''(e) SUNSET.—This section shall cease to be effective on October 1, 2028.''

[For definition of ''unmanned aircraft system'' as used in section 905 of Pub. L. 118–63, set out above, see section 44801 of this title, as made applicable by section 901 of Pub. L. 118–63, which is set out as a note under section 44502 of this title.]

RESEARCH AND DEVELOPMENT OF FAA'S AERONAUTICAL INFORMATION SYSTEMS MODERNIZATION ACTIVITIES

Pub. L. 118–63, title X, §1016, May 16, 2024, 138 Stat. 1395, provided that:

''(a) IN GENERAL.—Using amounts made available under section 48102(a) of title 49, United States Code, and subject to the availability of appropriations, the Administrator [of the Federal Aviation Administration], in coordination with the John A. Volpe National Transportation Systems Center, shall establish a research and development program, not later than 60 days after the date of enactment of this Act [May 16, 2024], to inform the continuous modernization of the aeronautical information systems of the FAA [Federal Aviation Administration], including—

''(1) the Aeronautical Information Management Modernization, including the Notice to Air Missions system of the FAA;

''(2) the Aviation Safety Information Analysis and Sharing system; and

''(3) the Service Difficulty Reporting System.

''(b) REVIEW AND REPORT.—

''(1) REVIEW.—Not later than 180 days after the date of enactment of this Act, the Administrator shall seek to enter into an agreement with a federally funded research and development center to conduct and complete a review of planned and ongoing modernization efforts of the aeronautical information systems of the FAA. Such review shall identify opportunities for additional coordination between the Administrator and the John A. Volpe National Transportation Systems Center to further modernize such systems.

''(2) REPORT.—Not later than 1 year after the Administrator enters into the agreement with the center under paragraph (1), the Center shall submit to the Administrator, the covered committees of Congress [Committee on Science, Space, and Technology of the House of Representatives and Committee on Commerce, Science, and Transportation of the Senate], and the Committee on Transportation and Infrastructure of the House of Representatives a report on the review conducted under paragraph (1) and such recommendations as the Center determines appropriate.''

AIR TRAFFIC SURVEILLANCE OVER UNITED STATES CONTROLLED OCEANIC AIRSPACE AND OTHER REMOTE LOCATIONS

Pub. L. 118–63, title X, §1021, May 16, 2024, 138 Stat. 1400, provided that:

''(a) PERSISTENT AVIATION SURVEILLANCE OVER OCEANS AND REMOTE LOCATIONS.—Subject to the availability of appropriations, the Administrator [of the Federal Aviation Administration], in consultation with the Administrator of NASA [National Aeronautics and Space Administration] and other relevant Federal agencies, shall carry out research, development, demonstration, and testing to enable civil aviation surveillance over oceans and other remote locations to improve safety.

''(b) REPORT.—Not later than 1 year after the date of enactment of this Act [May 16, 2024], the Administrator shall submit to the covered committees of Congress [Committee on Science, Space, and Technology of the House of Representatives and Committee on Commerce, Science, and Transportation of the Senate] a report on the activities carried out under this section.

''(c) RULE OF CONSTRUCTION.—Nothing in this section shall be construed to duplicate existing efforts conducted by the Administrator, in coordination with other Federal agencies.''

ELECTROMAGNETIC SPECTRUM RESEARCH AND DEVELOPMENT

Pub. L. 118–63, title X, §1026, May 16, 2024, 138 Stat. 1402, provided that:

''(a) IN GENERAL.—The Administrator [of the Federal Aviation Administration], in consultation with the National Telecommunications and Information Administration and the Federal Communications Commission, shall conduct research, engineering, and development related to the effective and efficient use and management of radio frequency spectrum in the civil aviation domain, including for aircraft, unmanned aircraft systems, and advanced air mobility.

''(b) CONTENTS.—The research, engineering, and development conducted under subsection (a) shall, at a minimum, address the following:

''(1) How reallocation or repurposing of radio frequency spectrum adjacent to spectrum allocated for communication, navigation, and surveillance may impact the safety of civil aviation.

''(2) The effectiveness of measures to identify risks, protect, and mitigate against spectrum interference in frequency bands used in civil aviation operations to ensure public safety.

''(3) The identification of any emerging civil aviation systems and their anticipated spectrum requirements.

''(4) The implications of paragraphs (1) through (3) on existing civil aviation systems that use radio frequency spectrum, including on the operational specifications of such systems, as it relates to existing and to future radio frequency spectrum requirements for civil aviation.

''(c) REPORT.—Not later than 2 years after the date of enactment of this Act [May 16, 2024], the Administrator shall submit to the covered committees of Congress [Committee on Science, Space, and Technology of the House of Representatives and Committee on Commerce, Science, and Transportation of the Senate] a report containing the results of the research, engineering, and development conducted under subsection (a).''

TURBULENCE RESEARCH AND DEVELOPMENT

Pub. L. 118–63, title X, §1030, May 16, 2024, 138 Stat. 1404, provided that:

''(a) IN GENERAL.—Subject to the availability of appropriations, the Administrator [of the Federal Aviation Administration], in collaboration with the Administrator of the National Oceanic and Atmospheric Administration, and in consultation with the Administrator of NASA [National Aeronautics and Space Administration], shall carry out applied research and development to—

''(1) enhance the monitoring and understanding of severe turbulence, including clear-air turbulence; and

''(2) inform the development of measures to mitigate safety impacts on crew and the flying public that may result from severe turbulence.

''(b) RESEARCH AND DEVELOPMENT ACTIVITIES.—In carrying out the research and development under subsection (a), the Administrator shall—

''(1) establish processes and procedures for comprehensive and systematic data collection, through

both instrumentation and pilot reporting, of severe turbulence, including clear-air turbulence;

''(2) establish measures for storing and managing such data collection;

''(3) support measures for monitoring and characterizing incidents of severe turbulence;

''(4) consider relevant existing research and development from other entities, including Federal departments and agencies, academia, and the private sector; and

''(5) carry out research and development—

''(A) to understand the impacts of relevant factors on the nature of turbulence, including severe turbulence and clear-air turbulence;

''(B) to enhance turbulence forecasts for flight planning and execution, seasonal predictions for schedule and route-planning, and long-term projections of severe turbulence, including clear-air turbulence; and

''(C) on other subject matters areas related to severe turbulence, as determined by the Administrator; and

''(6) support the effective transition of the results of research and development to operations, in cases in which such transition is appropriate.

''(c) DUPLICATIVE RESEARCH AND DEVELOPMENT ACTIVITIES.—The Administrator shall ensure that research and development activities under this section do not duplicate other Federal programs relating to turbulence.

''(d) TURBULENCE DATA.—

''(1) COMMERCIAL PROVIDERS.—In carrying out the research and development under subsection (a) and the activities described in subsection (b), the Administrator may enter into agreements with commercial providers for the following:

''(A) The purchase of turbulence data.

''(B) The placement on aircraft of instruments relevant to understanding and monitoring turbulence.

''(2) DATA ACCESS.—The Administrator shall make the data collected under subsection (b) widely available and accessible to the scientific research, user, and stakeholder communities, including the Administrator of the National Oceanic and Atmospheric Administration, to the greatest extent practicable and in accordance with FAA [Federal Aviation Administration] data management policies.

''(e) REPORT ON TURBULENCE RESEARCH.—Not later than 15 months after the date of enactment of this Act [May 16, 2024], the Administrator, in collaboration with the Administrator of the National Oceanic and Atmospheric Administration, shall submit to the covered committees of Congress [Committee on Science, Space, and Technology of the House of Representatives and Committee on Commerce, Science, and Transportation of the Senate] a report that—

''(1) details the activities conducted under this section, including how the requirements of subsection (b) have contributed to the goals described in paragraphs (1) and (2) of subsection (a);

''(2) assesses the current state of scientific understanding of the causes, occurrence rates, and past and projected future trends in occurrence rates of severe turbulence, including clear-air turbulence;

''(3) describes the processes and procedures for collecting, storing, and managing, data in pursuant to subsection (b);

''(4) assesses—

''(A) the use of commercial providers pursuant to subsection (d)(1); and

''(B) the need for any future Federal Government collection or procurement of data and instruments related to turbulence, including an assessment of costs;

''(5) describes how such data will be made available to the scientific research, user, and stakeholder communities; and

''(6) identifies future research and development needed to inform the development of measures to predict and mitigate the safety impacts that may result from severe turbulence, including clear-air turbulence.''

RESEARCH AND DEPLOYMENT OF CERTAIN AIRFIELD PAVEMENT TECHNOLOGIES

Pub. L. 115–254, div. B, title VII, §744, Oct. 5, 2018, 132 Stat. 3413, as amended by Pub. L. 118–63, title X, §1014, May 16, 2024, 138 Stat. 1393, provided that: ''Using amounts made available under section 48102(a) of title 49, United States Code, the Secretary [of Transportation] may carry out a program for the research and development of airfield pavement technologies under which the Secretary makes grants to, and enters into cooperative agreements with, institutions of higher education (as defined in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001)) and nonprofit organizations that—

''(1) research concrete and asphalt pavement technologies that extend the life of airfield pavements;

''(2) develop sustainability and resiliency guidelines to improve long-term pavement performance;

''(3) develop and conduct training with respect to such airfield pavement technologies;

''(4) provide for demonstration projects of such airfield pavement technologies; and

''(5) promote the latest airfield pavement technologies to aid the development of safer, more cost effective, and more resilient and sustainable airfield pavements.''

AIRCRAFT DEPARTURE QUEUE MANAGEMENT PILOT PROGRAM

Pub. L. 112–95, title V, §507, Feb. 14, 2012, 126 Stat. 106, as amended by Pub. L. 115–254, div. B, title V, §539(t), Oct. 5, 2018, 132 Stat. 3372, provided that:

''(a) IN GENERAL.—The Secretary of Transportation shall carry out a pilot program at not more than 5 public-use airports under which the Federal Aviation Administration shall use funds made available under section 48101(a) of title 49, United States Code, to test air traffic flow management tools, methodologies, and procedures that will allow air traffic controllers of the Administration to better manage the flow of aircraft on the ground and reduce the length of ground holds and idling time for aircraft.

''(b) SELECTION CRITERIA.—In selecting from among airports at which to conduct the pilot program, the Secretary shall give priority consideration to airports at which improvements in ground control efficiencies are likely to achieve the greatest fuel savings or air quality or other environmental benefits, as measured by the amount of reduced fuel, reduced emissions, or other environmental benefits per dollar of funds expended under the pilot program.

''(c) MAXIMUM AMOUNT.—Not more than a total of $2,500,000 may be expended under the pilot program at any single public-use airport.''

RESEARCH PROGRAM ON RUNWAYS

Pub. L. 112–95, title IX, §904, Feb. 14, 2012, 126 Stat. 139, provided that: ''Using amounts made available under section 48102(a) of title 49, United States Code, the Administrator [of the Federal Aviation Administration] shall continue to carry out a research program under which the Administrator may make grants to and enter into cooperative agreements with institutions of higher education and pavement research organizations for research and technology demonstrations related to—

''(1) the design, construction, rehabilitation, and repair of airfield pavements to aid in the development of safer, more cost effective, and more durable airfield pavements; and

''(2) engineered material restraining systems for runways at both general aviation airports and airports with commercial air carrier operations.''

WAKE TURBULENCE, VOLCANIC ASH, AND WEATHER RESEARCH

Pub. L. 112–95, title IX, §915, Feb. 14, 2012, 126 Stat. 144, provided that: ''Not later than 60 days after the date of enactment of this Act [Feb. 14, 2012], the Administrator [of the Federal Aviation Administration] shall—

''(1) initiate an evaluation of proposals related to research on the nature of wake vortexes that would increase national airspace system capacity by reducing existing spacing requirements between aircraft of all sizes;

''(2) begin implementation of a system to improve volcanic ash avoidance options for aircraft, including the development of a volcanic ash warning and notification system for aviation; and

''(3) coordinate with NOAA [National Oceanic and Atmospheric Administration], NASA [National Aeronautics and Space Administration], and other appropriate Federal agencies to conduct research to reduce the hazards presented to commercial aviation related to—

''(A) ground de-icing and anti-icing, ice pellets, and freezing drizzle;

''(B) oceanic weather, including convective weather;

''(C) en route turbulence prediction and detection; and

''(D) all hazards during oceanic operations, where commercial traffic is high and only rudimentary satellite sensing is available.''

ASSESSMENT OF WAKE TURBULENCE RESEARCH AND DEVELOPMENT PROGRAM

Pub. L. 108–176, title V, §505, Dec. 12, 2003, 117 Stat. 2559, required the Administrator of the Federal Aviation Administration to enter into an arrangement with the National Research Council for an assessment of the Federal Aviation Administration's proposed wake turbulence research and development program and required that a report on the assessment be provided to Committees of Congress not later than 1 year after Dec. 12, 2003.

ENSURING APPROPRIATE STANDARDS FOR AIRFIELD PAVEMENTS

Pub. L. 108–176, title VII, §705, Dec. 12, 2003, 117 Stat. 2581, provided that:

''(a) IN GENERAL.—The Administrator of the Federal Aviation Administration shall review and determine whether the Federal Aviation Administration's standards used to determine the appropriate thickness for asphalt and concrete airfield pavements are in accordance with the Federal Aviation Administration's standard 20-year-life requirement using the most up-to-date available information on the life of airfield pavements. If the Administrator determines that such standards are not in accordance with that requirement, the Administrator shall make appropriate adjustments to the Federal Aviation Administration's standards for airfield pavements.

''(b) REPORT.—Within 1 year after the date of enactment of this Act [Dec. 12, 2003], the Administrator shall report the results of the review conducted under subsection (a) and the adjustments, if any, made on the basis of that review to the Senate Committee on Commerce, Science, and Transportation and the House of Representatives Committee on Transportation and Infrastructure and Committee on Science [now Committee on Science, Space, and Technology].''

USE OF RECYCLED MATERIALS

Pub. L. 106–181, title I, §157, Apr. 5, 2000, 114 Stat. 89, provided that:

''(a) STUDY.—The Administrator [of the Federal Aviation Administration] shall conduct a study of the use of recycled materials (including recycled pavements, waste materials, and byproducts) in pavement used for runways, taxiways, and aprons and the specification standards in tests necessary for the use of recycled materials in such pavement. The primary focus of the study shall be on the long-term physical performance, safety implications, and environmental benefits of using recycled materials in aviation pavement.

''(b) CONTRACTING.—The Administrator may carry out the study by entering into a contract with a university of higher education with expertise necessary to carry out the study.

''(c) REPORT.—Not later than 1 year after the date of the enactment of this Act [Apr. 5, 2000], the Administrator shall transmit to Congress a report on the results of the study, together with recommendations concerning the use of recycled materials in aviation pavement.

''(d) FUNDING.—Of the amounts appropriated pursuant to section 106(k) of title 49, United States Code, not to exceed $1,500,000 may be used to carry out this section.''

AIRFIELD PAVEMENT CONDITIONS

Pub. L. 106–181, title I, §160, Apr. 5, 2000, 114 Stat. 90, provided that:

''(a) EVALUATION OF OPTIONS.—The Administrator [of the Federal Aviation Administration] shall evaluate options for improving the quality of information available to the Federal Aviation Administration on airfield pavement conditions for airports that are part of the national air transportation system, including—

''(1) improving the existing runway condition information contained in the airport safety data program by reviewing and revising rating criteria and providing increased training for inspectors;

''(2) requiring such airports to submit pavement condition index information as part of their airport master plan or as support in applications for airport improvement grants; and

''(3) requiring all such airports to submit pavement condition index information on a regular basis and using this information to create a pavement condition database that could be used in evaluating the cost-effectiveness of project applications and forecasting anticipated pavement needs.

''(b) REPORT TO CONGRESS.—Not later than 12 months after the date of the enactment of this Act [Apr. 5, 2000], the Administrator shall transmit a report containing an evaluation of the options described in subsection (a) to the Senate Committee on Commerce, Science, and Transportation and the House of Representatives Committee on Transportation and Infrastructure.''

PILOT PROGRAM TO PERMIT COST-SHARING OF AIR TRAFFIC MODERNIZATION PROJECTS

Pub. L. 106–181, title III, §304, Apr. 5, 2000, 114 Stat. 122, provided that:

''(a) PURPOSE.—It is the purpose of this section to improve aviation safety and enhance mobility of the Nation's air transportation system by encouraging non-Federal investment on a pilot program basis in critical air traffic control facilities and equipment.

''(b) IN GENERAL.—Subject to the requirements of this section, the Secretary [of Transportation] shall carry out a pilot program under which the Secretary may make grants to project sponsors for not more than 10 eligible projects.

''(c) FEDERAL SHARE.—The Federal share of the cost of an eligible project carried out under the program shall not exceed 33 percent. The non-Federal share of the cost of an eligible project shall be provided from non-Federal sources, including revenues collected pursuant to section 40117 of title 49, United States Code.

''(d) LIMITATION ON GRANT AMOUNTS.—No eligible project may receive more than $15,000,000 under the program.

''(e) FUNDING.—The Secretary shall use amounts appropriated under section 48101(a) of title 49, United States Code, for fiscal years 2001 through 2003 to carry out the program.

''(f) DEFINITIONS.—In this section, the following definitions apply:

''(1) ELIGIBLE PROJECT.—The term 'eligible project' means a project relating to the Nation's air traffic control system that is certified or approved by the Administrator [of the Federal Aviation Administration] and that promotes safety, efficiency, or mobility. Such projects may include—

''(A) airport-specific air traffic facilities and equipment, including local area augmentation systems, instrument landings systems, weather and wind shear detection equipment, lighting improvements, and control towers;

''(B) automation tools to effect improvements in airport capacity, including passive final approach spacing tools and traffic management advisory equipment; and

''(C) facilities and equipment that enhance airspace control procedures, including consolidation of terminal radar control facilities and equipment, or assist in en route surveillance, including oceanic and offshore flight tracking.

''(2) PROJECT SPONSOR.—The term 'project sponsor' means a public-use airport or a joint venture between a public-use airport and one or more air carriers.

''(g) TRANSFERS OF EQUIPMENT.—Notwithstanding any other provision of law, project sponsors may transfer, without consideration, to the Federal Aviation Administration, facilities, equipment, and automation tools, the purchase of which was assisted by a grant made under this section. The Administration shall accept such facilities, equipment, and automation tools, which shall thereafter be operated and maintained by the Administration in accordance with criteria of the Administration.

''(h) GUIDELINES.—Not later than 90 days after the date of the enactment of this Act [Apr. 5, 2000], the Administrator shall issue advisory guidelines on the implementation of the program.''

AIRCRAFT DISPATCHERS

Pub. L. 106–181, title V, § 516, Apr. 5, 2000, 114 Stat. 145, provided that:

''(a) STUDY.—The Administrator [of the Federal Aviation Administration] shall conduct a study of the role of aircraft dispatchers in enhancing aviation safety.

''(b) CONTENTS.—The study shall include an assessment of whether or not aircraft dispatchers should be required for those operations not presently requiring aircraft dispatcher assistance, operational control issues related to the aircraft dispatching functions, and whether or not designation of positions within the Federal Aviation Administration for oversight of dispatchers would enhance aviation safety.

''(c) REPORT.—Not later than 1 year after the date of the enactment of this Act [Apr. 5, 2000], the Administrator shall transmit to Congress a report on the results of the study conducted under this section.''

OCCUPATIONAL INJURIES OF AIRPORT WORKERS

Pub. L. 106–181, title V, § 520, Apr. 5, 2000, 114 Stat. 149, provided that:

''(a) STUDY.—The Administrator [of the Federal Aviation Administration] shall conduct a study to determine the number of persons working at airports who are injured or killed as a result of being struck by a moving vehicle while on an airport tarmac, the seriousness of the injuries to such persons, and whether or not reflective safety vests or other actions should be required to enhance the safety of such workers.

''(b) REPORT.—Not later than 1 year after the date of the enactment of this Act [Apr. 5, 2000], the Administrator shall transmit to Congress a report on the results of the study conducted under this section.''

ALKALI SILICA REACTIVITY DISTRESS

Pub. L. 106–181, title VII, § 743, Apr. 5, 2000, 114 Stat. 175, provided that:

''(a) IN GENERAL.—The Administrator [of the Federal Aviation Administration] may conduct a study on the impact of alkali silica reactivity distress on airport runways and taxiways and the use of lithium salts and other alternatives for mitigation and prevention of such distress. The study shall include a determination based on in-the-field inspections followed by petrographic analysis or other similar techniques.

''(b) AUTHORITY TO MAKE GRANTS.—The Administrator may carry out the study by making a grant to, or entering into a cooperative agreement with, a nonprofit organization for the conduct of all or a part of the study.

''(c) REPORT.—Not later than 18 months after the date of initiation of the study under subsection (a), the Administrator shall transmit to Congress a report on the results of the study.''

RESEARCH PROGRAM TO IMPROVE AIRFIELD PAVEMENTS

Pub. L. 108–176, title VII, § 704, Dec. 12, 2003, 117 Stat. 2581, provided that:

''(a) CONTINUATION OF PROGRAM.—The Administrator of the Federal Aviation Administration shall continue the program to consider awards to nonprofit concrete and asphalt pavement research foundations to improve the design, construction, rehabilitation, and repair of airfield pavements to aid in the development of safer, more cost effective, and more durable airfield pavements.

''(b) USE OF GRANTS OR COOPERATIVE AGREEMENTS.—The Administrator may use grants or cooperative agreements in carrying out this section.

''(c) STATUTORY CONSTRUCTION.—Nothing in this section requires the Administrator to prioritize an airfield pavement research program above safety, security, Flight 21, environment, or energy research programs.''

Pub. L. 106–181, title IX, § 905, Apr. 5, 2000, 114 Stat. 196, provided that: ''The Administrator [of the Federal Aviation Administration] shall consider awards to nonprofit concrete pavement research foundations to improve the design, construction, rehabilitation, and repair of rigid concrete airfield pavements to aid in the development of safer, more cost-effective, and durable airfield pavements. The Administrator may use a grant or cooperative agreement for this purpose. Nothing in this section shall require the Administrator to prioritize an airfield pavement research program above safety, security, Flight 21, environment, or energy research programs.''

§ 44506. Air traffic controllers

(a) RESEARCH ON EFFECT OF AUTOMATION ON PERFORMANCE.—To develop the means necessary to establish appropriate selection criteria and training methodologies for the next generation of air traffic controllers, the Administrator of the Federal Aviation Administration shall conduct research to study the effect of automation on the performance of the next generation of air traffic controllers and the air traffic control system. The research shall include investigating—

(1) methods for improving and accelerating future air traffic controller training through the application of advanced training techniques, including the use of simulation technology;

(2) the role of automation in the air traffic control system and its physical and psychological effects on air traffic controllers;

(3) the attributes and aptitudes needed to function well in a highly automated air traffic control system and the development of appropriate testing methods for identifying individuals with those attributes and aptitudes;

(4) innovative methods for training potential air traffic controllers to enhance the benefits of automation and maximize the effectiveness of the air traffic control system; and