

mental areas of aeronautics research, the Administrator shall establish a program of long-term fundamental research in aeronautical sciences and technologies that is not tied to specific development projects.

(b) OPERATION.—The Administrator shall conduct the program under this section, in part by awarding grants to institutions of higher education. The Administrator shall encourage the participation of institutions of higher education located in States that participate in the Experimental Program to Stimulate Competitive Research. All grants to institutions of higher education under this section shall be awarded through merit review.

(Pub. L. 111-314, § 3, Dec. 18, 2010, 124 Stat. 3379.)

HISTORICAL AND REVISION NOTES

Revised Section	Source (U.S. Code)	Source (Statutes at Large)
40111	42 U.S.C. 16721(a), (b).	Pub. L. 109-155, title IV, § 421(a), (b), Dec. 30, 2005, 119 Stat. 2924.

§ 40112. Research and technology programs

(a) SUPERSONIC TRANSPORT RESEARCH AND DEVELOPMENT.—The Administrator may establish an initiative with the objective of developing and demonstrating, in a relevant environment, airframe and propulsion technologies to enable efficient, economical overland flight of supersonic civil transport aircraft with no significant impact on the environment.

(b) RESEARCH AND DEVELOPMENT INITIATIVE ON REDUCTION OF GREENHOUSE GAS AND NOISE EMISSIONS FROM AIRCRAFT.—

(1) IN GENERAL.—The Administrator shall establish an initiative to research, develop, and demonstrate new technologies and concepts—

(A) to reduce greenhouse gas emissions from aviation, including carbon dioxide, nitrogen oxides, other greenhouse gases, water vapor, black carbon and sulfate aerosols, and increased cloudiness due to contrail formation;

(B) to reduce aviation noise emissions; and

(C) to enable associated aircraft performance characteristics.

(2) GOALS.—The goals of the initiative required by paragraph (1) shall be—

(A) to ensure United States leadership in research and technology innovation leading to substantial reductions in aviation noise and greenhouse gas emissions;

(B) to enhance and expand basic research, and the translation of basic research into applications, that may lead to transformational advances in reducing aviation noise and greenhouse gas emissions;

(C) to accelerate research and development that contributes to maturing new technologies for reducing aircraft noise and greenhouse gas emissions; and

(D) to obtain and disseminate associated testing and performance data that facilitates the incorporation of new technologies into commercial aircraft development as soon as practicable.

(3) OBJECTIVES.—The objectives of the initiative established under paragraph (1) and the goals described in paragraph (2) shall include—

(A) as soon as practicable, a reduction of greenhouse gas emissions from new aircraft by at least 50 percent, as compared to the highest-performing aircraft technologies in service as of December 31, 2021;

(B) noise levels from aircraft throughout all phases of flight that do not exceed ambient noise levels in the absence of flight operations in the vicinity of the flight route;

(C) net-zero greenhouse gas emissions from aircraft by 2050; and

(D) demonstration of new technologies developed pursuant to such initiative on—

(i) regional aircraft intended to enter into service by 2030; and

(ii) single-aisle aircraft designed to accommodate more than 125 passengers intended to enter into service by 2040.

(c) ROTORCRAFT AND OTHER RUNWAY-INDEPENDENT AIR VEHICLES.—The Administrator may establish a rotorcraft and other runway-independent air vehicles initiative with the objective of developing and demonstrating improved safety, noise, and environmental impact in a relevant environment.

(d) HYPERSONICS RESEARCH.—The Administrator may establish a hypersonics research program with the objective of exploring the science and technology of hypersonic flight using air-breathing propulsion concepts, through a mix of theoretical work, basic and applied research, and development of flight research demonstration vehicles. The program may also include the transition to the hypersonic range of Mach 3 to Mach 5.

(e) REVOLUTIONARY AERONAUTICAL CONCEPTS.—The Administrator may establish a research program which covers a unique range of subsonic, fixed wing vehicles and propulsion concepts. This research is intended to push technology barriers beyond current subsonic technology. Propulsion concepts include advanced materials, morphing engines, hybrid engines, and fuel cells.

(f) FUEL CELL-POWERED AIRCRAFT RESEARCH.—

(1) OBJECTIVE.—The Administrator may establish a fuel cell-powered aircraft research program whose objective shall be to develop and test concepts to enable a hydrogen fuel cell-powered aircraft that would have no hydrocarbon or nitrogen oxide emissions into the environment.

(2) APPROACH.—The Administrator may establish a program of competitively awarded grants available to teams of researchers that may include the participation of individuals from universities, industry, and government for the conduct of this research.

(g) MARS AIRCRAFT RESEARCH.—

(1) OBJECTIVE.—The Administrator may establish a Mars Aircraft project whose objective shall be to develop and test concepts for an uncrewed aircraft that could operate for sustained periods in the atmosphere of Mars.

(2) APPROACH.—The Administrator may establish a program of competitively awarded grants available to teams of researchers that may include the participation of individuals from universities, industry, and government for the conduct of this research.

(Pub. L. 111–314, § 3, Dec. 18, 2010, 124 Stat. 3379; Pub. L. 117–167, div. B, title VII, § 10833(a), Aug. 9, 2022, 136 Stat. 1749.)

HISTORICAL AND REVISION NOTES

Revised Section	Source (U.S. Code)	Source (Statutes at Large)
40112(a)	42 U.S.C. 16722(b).	Pub. L. 109–155, title IV, § 422(b)–(g), Dec. 30, 2005, 119 Stat. 2925.
40112(b)	42 U.S.C. 16722(c).	
40112(c)	42 U.S.C. 16722(d).	
40112(d)	42 U.S.C. 16722(e).	
40112(e)	42 U.S.C. 16722(f).	
40112(f)	42 U.S.C. 16722(g).	

Editorial Notes

AMENDMENTS

2022—Subsecs. (b) to (g). Pub. L. 117–167 added subsec. (b) and redesignated former subsecs. (b) to (f) as (c) to (g), respectively.

Statutory Notes and Related Subsidiaries

TECHNOLOGY FOCUS AREAS, IMPLEMENTATION, AND ANNUAL REPORT FOR THE RESEARCH AND DEVELOPMENT INITIATIVE

Pub. L. 117–167, div. B, title VII, § 10833(b)–(d), Aug. 9, 2022, 136 Stat. 1750, 1751, provided that:

“(b) TECHNOLOGY FOCUS AREAS.—In carrying out the research and development initiative established under section 40112(b) of title 51, United States Code, the Administrator [of the National Aeronautics and Space Administration] shall advance research, development, and demonstration projects on promising technologies such as—

- “(1) advanced subsonic propulsion technology, design, and integration;
- “(2) electric and hybrid-electric propulsion, including battery electric and hydrogen fuel cell electric systems;
- “(3) airframe concepts and configurations;
- “(4) analysis of technology options, including cost-benefit analysis of greenhouse gas and noise emissions reduction technologies;
- “(5) analytical tools for system-level and system-of-systems-level modeling and integration;
- “(6) airspace operations improvements;
- “(7) noise emissions reduction; and
- “(8) any other effort, as determined by the [National Aeronautics and Space] Administration, that contributes to a sustainable future for aviation.

“(c) IMPLEMENTATION.—In implementing the initiative established under section 40112(b) of title 51, United States Code, the Administrator shall, to the extent practicable—

- “(1) ensure that testing and performance data integrates the results of community acceptance surveys conducted by the Federal Aviation Administration and other relevant studies, including studies on the impacts of new noise effects from novel propulsion systems and from airspace operations changes;
- “(2) provide testing and performance data on the technologies described in subsection (b) of this section to the Administrator of the Federal Aviation Administration to facilitate the work of the Federal Aviation Administration in identifying new requirements for policy, infrastructure, and administrative capacity necessary to enable the safe integration of such technologies on aircraft;
- “(3) pursue partnerships with organizations, current commercial production aircraft providers, academic institutions, small businesses, and new entrants, including partnerships to advance research and development activities related to both regional aircraft and aircraft designed to accommodate more than 125 passengers;
- “(4) include universities, academic institutions, and other research organizations in the partnerships described in paragraph (3);

- “(5) expand basic research;
- “(6) ensure equity in research sponsorship of, and partnership opportunities with, underrepresented students, faculty, and minority-serving-institutions [sic];
- “(7) continue to coordinate with the Secretary of Energy on battery technology research;
- “(8) make available the research and development carried out under the initiative established under subsection (b) of section 40112 of title 51, United States Code, to help enable an industry-wide shift toward aircraft concepts that reduce greenhouse gas emissions and aircraft noise to achieve the goals and objectives under paragraphs (2) and (3) of that subsection; and

“(9) continue to support research, development, and demonstration of aircraft concepts, including systems architecture, materials and components, integration of systems and airframe structures, human factors, airspace planning and operations, and the integration of related advanced technologies and concepts, with the goal of carrying out test flights with integrated subsystems by 2025.

“(d) ANNUAL REPORT.—Not later than 1 year after the date of the enactment of this Act [Aug. 9, 2022], and annually thereafter, the Administrator shall submit to the appropriate committees of Congress [Committee on Commerce, Science, and Transportation of the Senate and Committee on Science, Space, and Technology of the House of Representatives] a report on the progress of the efforts carried out under the initiative established under subsection (b) of section 40112 of title 51, United States Code, including—

- “(1) the status of progress on such initiative;
- “(2) an updated, anticipated timeframe for readiness of technologies and aircraft to be adopted by industry with the emissions reduction levels directed under that subsection; and
- “(3) an identification of fundamental aeronautics research activities contributing to achieving the goals and objectives of such initiative, as described in paragraphs (2) and (3) of that subsection, and a description of any obstacles to achieving such goals and objectives.”

[For definition of “minority-serving institution” as used in section 10833(b)–(d) of Pub. L. 117–167, set out above, see section 18901 of Title 42, The Public Health and Welfare.]

NATIONAL AERO-SPACE PLANE PROGRAM

Pub. L. 101–611, title I, § 116, Nov. 16, 1990, 104 Stat. 3202, provided that:

“(a) NATIONAL AERO-SPACE PLANE PROGRAM.—The Secretary of Defense (hereafter in this section referred to as the ‘Secretary’) and the Administrator shall jointly pursue on a high priority basis a National Aero-Space Plane program whose objective shall be the development and demonstration, by 1997, of a primarily air breathing single-stage-to-orbit and long range hypersonic cruise research flight vehicle. The program shall be a research program, and to the extent practicable technological information developed shall be transferred to the military and to the domestic civil aviation and other private industries.

“(b) MANAGEMENT PLAN.—

“(1) The Secretary and the Administrator [sic] shall jointly develop a management plan for the program established under subsection (a), which shall include goals, major tasks, anticipated schedules, organizational structure, funding profiles, details of the respective responsibilities of the Secretary and the Administrator, and resource procurement strategies.

“(2) The management plan developed pursuant to paragraph (1) shall be submitted to the Congress within 120 days after the date of enactment of this Act [Nov. 16, 1990].”

[Pub. L. 101–611, title I, § 127, Nov. 16, 1990, 104 Stat. 3205, provided that: ‘For purposes of this title [see Tables for classification], the term ‘Administrator’ means the Administrator of the National Aeronautics and Space Administration.’]

§ 40113. Airspace systems research

(a) OBJECTIVE.—The Airspace Systems Research program shall pursue research and development to enable revolutionary improvements to and modernization of the National Airspace System, as well as to enable the introduction of new systems for vehicles that can take advantage of an improved, modern air transportation system.

(b) ALIGNMENT.—Not later than 1 year after December 30, 2005, the Administrator shall align the projects of the Airspace Systems Research program so that they directly support the objectives of the Joint Planning and Development Office's Next Generation Air Transportation System Integrated Plan.

(Pub. L. 111-314, § 3, Dec. 18, 2010, 124 Stat. 3380.)

HISTORICAL AND REVISION NOTES

Revised Section	Source (U.S. Code)	Source (Statutes at Large)
40113	42 U.S.C. 16723.	Pub. L. 109-155, title IV, § 423, Dec. 30, 2005, 119 Stat. 2925.

In subsection (b), the date “December 30, 2005” is substituted for “the date of enactment of this Act” to reflect the date of enactment of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109-155, 119 Stat. 2895).

Statutory Notes and Related Subsidiaries

UNMANNED AIRCRAFT SYSTEMS

Pub. L. 117-167, div. B, title VII, § 10832, Aug. 9, 2022, 136 Stat. 1748, provided that:

“(a) UNMANNED AIRCRAFT SYSTEMS OPERATION PROGRAM.—The Administrator [of the National Aeronautics and Space Administration] shall—

“(1) research and test capabilities and concepts, including unmanned aircraft systems communications, for integrating unmanned aircraft systems into the national airspace system;

“(2) leverage the partnership NASA [National Aeronautics and Space Administration] has with industry focused on the advancement of technologies for future air traffic management systems for unmanned aircraft systems; and

“(3) continue to leverage the research and testing portfolio of NASA to inform the integration of unmanned aircraft systems into the national airspace system, consistent with public safety and national security objectives.

“(b) SENSE OF CONGRESS ON COORDINATION WITH FEDERAL AVIATION ADMINISTRATION.—It is the sense of Congress that—

“(1) NASA should continue—

“(A) to coordinate with the Federal Aviation Administration on research on air traffic management systems for unmanned aircraft systems; and

“(B) to assist the Federal Aviation Administration in the integration of air traffic management systems for unmanned aircraft systems into the national airspace system; and

“(2) the test ranges (as defined in section 44801 of title 49, United States Code) should continue to be leveraged for research on—

“(A) air traffic management systems for unmanned aircraft systems; and

“(B) the integration of such systems into the national airspace system.”

[For definition of “unmanned aircraft system” as used in section 10832 of Pub. L. 117-167, set out above, see section 10802 of Pub. L. 117-167, set out as a Definitions note under section 10101 of this title.]

§ 40114. Aviation safety and security research

(a) OBJECTIVE.—The Aviation Safety and Security Research program shall pursue research and development activities that directly address the safety and security needs of the National Airspace System and the aircraft that fly in it. The program shall develop prevention, intervention, and mitigation technologies aimed at causal, contributory, or circumstantial factors of aviation accidents.

(b) ALIGNMENT.—Not later than 1 year after December 30, 2005, the Administrator shall align the projects of the Aviation Safety and Security Research program so that they directly support the objectives of the Joint Planning and Development Office's Next Generation Air Transportation System Integrated Plan.

(Pub. L. 111-314, § 3, Dec. 18, 2010, 124 Stat. 3380.)

HISTORICAL AND REVISION NOTES

Revised Section	Source (U.S. Code)	Source (Statutes at Large)
40114	42 U.S.C. 16724.	Pub. L. 109-155, title IV, § 424, Dec. 30, 2005, 119 Stat. 2926.

In subsection (b), the date “December 30, 2005” is substituted for “the date of enactment of this Act” to reflect the date of enactment of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109-155, 119 Stat. 2895).

§ 40115. Aviation weather research

The Administrator may carry out a program of collaborative research with the National Oceanic and Atmospheric Administration on convective weather events, with the goal of significantly improving the reliability of 2-hour to 6-hour aviation weather forecasts.

(Pub. L. 111-314, § 3, Dec. 18, 2010, 124 Stat. 3381.)

HISTORICAL AND REVISION NOTES

Revised Section	Source (U.S. Code)	Source (Statutes at Large)
40115	42 U.S.C. 16725.	Pub. L. 109-155, title IV, § 425, Dec. 30, 2005, 119 Stat. 2926.

§ 40116. University-based Centers for Research on Aviation Training

(a) IN GENERAL.—The Administrator shall award grants to institutions of higher education (or consortia thereof) to establish one or more Centers for Research on Aviation Training under cooperative agreements with appropriate Administration Centers.

(b) PURPOSE.—The purpose of the Centers for Research on Aviation Training shall be to investigate the impact of new technologies and procedures, particularly those related to the aircraft flight deck and to the air traffic management functions, on training requirements for pilots and air traffic controllers.

(c) APPLICATION.—An institution of higher education (or a consortium of such institutions) seeking funding under this section shall submit an application to the Administrator at such time, in such manner, and containing such information as the Administrator may require, including, at a minimum, a 5-year research plan.