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109TH CONGRESS
1ST SESSION

H. R. 2358

To enable the United States to maintain its leadership in aeronautics and aviation, improve its quality of life, protect the environment, support economic growth, and promote the security of the Nation by instituting an initiative to develop technologies that will enable future aircraft with significantly lower noise, emissions, and fuel consumption, to reinvigorate basic and applied research in aeronautics and aviation, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

MAY 12, 2005

Mr. UDALL of Colorado (for himself, Mrs. JO ANN DAVIS of Virginia, Mr. GORDON, Mr. KUCINICH, Mr. SCOTT of Virginia, and Mr. LARSON of Connecticut) introduced the following bill; which was referred to the Committee on Science

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A BILL

To enable the United States to maintain its leadership in aeronautics and aviation, improve its quality of life, protect the environment, support economic growth, and promote the security of the Nation by instituting an initiative to develop technologies that will enable future aircraft with significantly lower noise, emissions, and fuel consumption, to reinvigorate basic and applied research in aeronautics and aviation, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the ''Aeronautics Research and Development Revitalization Act of 2005''.

SEC. 2. FINDINGS.

The Congress finds the following:

(1) It is in the national interest of the United States to maintain international leadership in aeronautics and aviation.

(2) The United States is in danger of losing its leadership in aeronautics and aviation to international competitors.

(3) Past Federal investments in aeronautics research and development have benefited the economy and national security of the United States, and the quality of life of its citizens.

(4) Future growth in aviation increasingly will be constrained by concerns related to aircraft noise, emissions, fuel consumption, and air transportation system congestion.

(5) Current and projected levels of Federal investment in aeronautics research and development are not sufficient to address concerns related to the growth of aviation.

(6) International competitors have recognized the importance of noise, emissions, fuel consumption, and air transportation system congestion in

limiting the future growth of aviation, and have established aggressive agendas for addressing each of those concerns.

(7) An aggressive initiative by the Federal Government to develop technologies that would significantly reduce aircraft noise, harmful emissions, and fuel consumption would benefit the United States by—

(A) improving the competitiveness of the United States aviation industry through the development of new markets for aviation services and the development of superior aircraft for existing markets;

(B) improving the quality of life for our citizens by drastically reducing the level of noise due to aircraft operations;

(C) reducing the congestion of the air transportation system by allowing departures and arrivals at currently underutilized airports through the use of environmentally compatible aircraft;

(D) reducing the rate at which fossil fuels are consumed;

(E) reducing the rate at which greenhouse gases and other harmful gases and particulates are added to the atmosphere by aircraft; and

(F) reinvigorating the human capital in aeronautics and aviation by providing a set of extremely challenging and socially beneficial goals to the next generation of engineers and scientists.

(8) Long-term progress in aeronautics and aviation requires continued Federal investment in fundamental aeronautical research, aeronautical test facilities, and maintenance of a skilled workforce at the Nation's aeronautical research centers.

(9) The Commission on the Future of the United States Aerospace Industry has recommended that ''the Federal government significantly increase its investment in basic aerospace research, which enhances U.S. national security, enables breakthrough capabilities, and fosters an efficient, secure, and safe aerospace transportation system''.

(10) Maintenance of United States leadership in aeronautics and aviation will require the productive collaboration of the National Aeronautics and Space Administration, the Federal Aviation Admin-

istration, the Department of Defense, the aviation industry, and the Nation's universities.

(11) It is in the interest of the United States to maintain a vigorous capability in basic and applied research and development of technologies related to rotorcraft and other runway-independent air vehicles.

(12) Continued research is needed into the flight crew and controller training needed to accommodate new aircraft and air transportation system technologies and procedures.

(13) Improvements to our understanding of convective weather phenomena and of aircraft wake turbulence would significantly improve the performance and safety of the Nation's air transportation system.

(14) The National Aeronautics and Space Administration should continue to pursue research and development in hypersonics.

SEC. 3. DEFINITIONS.

For purposes of this Act—

(1) the term ''institution of higher education'' has the meaning given that term by section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001);

(2) the term ''NASA'' means the National Aeronautics and Space Administration; and

(3) the term ''NASA Administrator'' means the Administrator of NASA.

TITLE I—NATIONAL POLICY FOR AERONAUTICS RESEARCH AND DEVELOPMENT

SEC. 101. POLICY.

It shall be the policy of the United States to reaffirm the National Aeronautics and Space Act of 1958 and its identification of aeronautical research and development as a core mission of NASA. Further, it shall be the policy of the United States to promote aeronautical research and development that will expand the capacity, ensure the safety, and increase the efficiency of the Nation's air transportation system, promote the security of the Nation, protect the environment, and retain the leadership of the United States in global aviation.

TITLE II—NASA AERONAUTICS BREAKTHROUGH RESEARCH INITIATIVES

SEC. 201. ENVIRONMENTAL AIRCRAFT RESEARCH AND DEVELOPMENT INITIATIVE.

(a) OBJECTIVE.—The NASA Administrator shall establish an initiative with the objective of developing, and

demonstrating in a relevant environment, within 10 years after the date of enactment of this Act, technologies to enable the following commercial aircraft performance characteristics:

(1) NOISE.—Noise levels on takeoff and on airport approach and landing that do not exceed ambient noise levels in the absence of flight operations in the vicinity of airports from which such commercial aircraft would normally operate.

(2) ENERGY CONSUMPTION.—Twenty-five percent reduction in the energy required for medium to long range flights, compared to aircraft in commercial service as of the date of enactment of this Act. This reduction may be achieved by a combination of improvements to—

(A) specific fuel consumption;

(B) lift-to-drag ratio; and

(C) structural weight fraction.

(3) EMISSIONS.—Nitrogen oxides on take-off and landing that are reduced by 50 percent relative to aircraft in commercial service as of the date of enactment of this Act.

(b) IMPLEMENTATION.—Not later than 270 days after the date of enactment of this Act, the NASA Administrator shall provide to Congress a plan for the implemen-

tation of the initiative described in subsection (a). Such implementation plan shall include—

(1) technological roadmaps for achieving each of the performance characteristics specified in subsection (a);

(2) an estimate of the 10-year funding profile required to achieve the objective specified in subsection (a);

(3) a plan for carrying out a formal quantification of the estimated costs and benefits of each technological option selected for development beyond the initial concept definition phase; and

(4) a plan for transferring the technologies to industry, including the identification of requirements for technology demonstrations, as appropriate.

(c) STUDY.—

(1) REQUIREMENT.—The NASA Administrator shall enter into an arrangement for the National Research Council to conduct a study to identify and quantify new markets that would be created, as well as existing markets that would be expanded, by the incorporation of the technologies developed pursuant to this section into future commercial aircraft. The study shall identify whether any of the performance characteristics specified in subsection (a) would need

to be made more stringent in order to create new markets or expand existing markets. The National Research Council shall seek input from at least the aircraft manufacturing industry, academia, and the airlines in carrying out the study.

(2) REPORT.—A report containing the results of the study conducted under paragraph (1) shall be provided to Congress not later than 18 months after the date of enactment of this Act.

SEC. 202. CIVIL SUPERSONIC TRANSPORT RESEARCH AND DEVELOPMENT INITIATIVE.

(a) OBJECTIVE.—The NASA Administrator shall establish an initiative with the objective of developing, and demonstrating in a relevant environment, within 20 years after the date of enactment of this Act, technologies to enable overland flight of supersonic civil transport aircraft with at least the following performance characteristics:

(1) Mach number of at least 1.4.

(2) Range of at least 4,000 nautical miles.

(3) Payload of at least 24 passengers.

(4) Noise levels on takeoff and on airport approach and landing that meet community noise standards in place at airports from which such commercial supersonic aircraft would normally operate

at the time the aircraft would enter commercial service.

(5) Shaped sonic boom signatures sufficiently low to permit overland flight over populated areas.

(6) Nitrogen oxide, carbon dioxide, and water vapor emissions consistent with regulations likely to be in effect at the time of this aircraft's introduction.

(b) IMPLEMENTATION.—Not later than 270 days after the date of enactment of this Act, the NASA Administrator shall provide to Congress a plan for the implementation of the initiative described in subsection (a). Such implementation plan shall include—

(1) technological roadmaps for achieving each of the performance characteristics specified in subsection (a);

(2) an estimate of the 10-year funding profile required to achieve the objective specified in subsection (a);

(3) a plan for carrying out a formal quantification of the estimated costs and benefits of each technological option selected for development beyond the initial concept definition phase;

(4) a plan for transferring the technologies to industry, including the identification of requirements for technology demonstrations, as appropriate;

(5) a plan for research to quantify, within 3 years after the date of enactment of this Act, the limits on sonic boom parameters, such as overpressure and rise time, that would be acceptable to the general public; and

(6) a plan for adjusting the noise reduction research and development activities as needed to accommodate changes in community noise standards that may occur over the lifetime of the initiative.

SEC. 203. ROTORCRAFT AND OTHER RUNWAY-INDEPENDENT AIR VEHICLES RESEARCH AND DEVELOPMENT INITIATIVE.

(a) OBJECTIVE.—The NASA Administrator shall establish a rotorcraft and other runway-independent air vehicles initiative with the objective of developing and demonstrating in a relevant environment, within 10 years after the date of enactment of this Act, technologies to enable significantly safer, quieter, and more environmentally compatible operation from a wider range of airports under a wider range of weather conditions than is the case for rotorcraft and other runway-independent air vehicles in service as of the date of enactment of this Act.

(b) IMPLEMENTATION.—Not later than 270 days after the date of enactment of this Act, the NASA Administrator shall provide a plan to the Congress for the implementation of the initiative described in subsection (a). The implementation plan shall include—

(1) a set of performance characteristics, developed in consultation with the National Research Council, that shall quantify the objectives specified in subsection (a);

(2) technological roadmaps for achieving each of the performance characteristics developed under paragraph (1);

(3) an estimate of the 10-year funding profile required to achieve the objective specified in subsection (a);

(4) a plan for carrying out a formal quantification of the estimated costs and benefits of each technological option selected for development beyond the initial concept definition phase; and

(5) a plan for transferring the technologies to industry, including the identification of requirements for technology demonstrations, as appropriate.

SEC. 204. REVIEW.

The NASA Administrator shall enter into an arrangement with the National Research Council for the re-

view, within 18 months after the date of enactment of this Act, of the adequacy of the implementation plans provided under sections 201(b), 202(b), and 203(b) to achieve the objectives described in sections 201(a), 202(a), and 203(a). In addition, the NASA Administrator shall enter into an arrangement with the National Research Council for the review, every 3 years subsequent to the initial review under this section, of NASA's progress in achieving the objectives described in sections 201(a), 202(a), and 203(a), including recommendations for changes to NASA's research and development program as needed, as well as recommendations for changes to the desired performance characteristics as needed. The results of each review shall be provided to Congress within 30 days after completion of the review.

TITLE III—OTHER NASA AERONAUTICS RESEARCH AND DEVELOPMENT ACTIVITIES

SEC. 301. FUNDAMENTAL RESEARCH AND TECHNOLOGY BASE PROGRAM.

(a) OBJECTIVE.—In order to ensure that the Nation maintains needed capabilities in fundamental areas of aeronautical research, the NASA Administrator shall establish a program of long-term fundamental research in

aeronautical sciences and technologies that is not tied to specific development projects.

(b) ASSESSMENT.—The NASA Administrator shall enter into an arrangement with the National Research Council for an assessment of the Nation's future requirements for fundamental aeronautics research and whether the Nation will have a skilled research workforce and research facilities commensurate with those requirements. The assessment shall include an identification of any projected gaps, and recommendations for what steps should be taken by the Federal Government to eliminate those gaps.

(c) REPORT.—The NASA Administrator shall transmit the assessment, along with NASA's response to the assessment, to Congress not later than 2 years after the date of enactment of this Act.

SEC. 302. 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 2 years after the date of enactment of this Act, the NASA 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.

SEC. 303. 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) PLAN.—Not later than 1 year after the date of enactment of this Act, the NASA Administrator shall transmit to Congress a 5-year prioritized plan for the research to be conducted within the Aviation Safety and Security Research program. The plan shall be aligned with the objectives of the Joint Planning and Development Office's Next Generation Air Transportation System Integrated Plan.

SEC. 304. ZERO-EMISSIONS AIRCRAFT RESEARCH.

(a) OBJECTIVE.—The NASA Administrator shall establish a zero-emissions 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.

(b) APPROACH.—The NASA Administrator shall 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.

SEC. 305. MARS AIRCRAFT RESEARCH.

(a) OBJECTIVE.—The NASA Administrator shall 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.

(b) APPROACH.—The NASA Administrator shall 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.

SEC. 306. HYPERSONICS RESEARCH.

(a) OBJECTIVE.—The NASA Administrator shall establish a hypersonics research program whose objective shall be to explore the science and technology of hypersonic flight using air-breathing propulsion concepts, through a mix of theoretical work, basic and applied re-

search, and development of flight research demonstration vehicles.

(b) PLAN.—Not later than 1 year after the date of enactment of this Act, the NASA Administrator shall develop a 10-year hypersonics research plan and shall have that plan reviewed by the National Research Council. The results of that review shall be provided to Congress.

SEC. 307. NASA AERONAUTICS SCHOLARSHIPS.

(a) ESTABLISHMENT.—The NASA Administrator shall establish a program of scholarships for full-time graduate students who are United States citizens and are enrolled in, or have been accepted by and have indicated their intention to enroll in, accredited Masters degree programs in aeronautical engineering at institutions of higher education. Each such scholarship shall cover the costs of room, board, tuition, and fees, and may be provided for a maximum of 2 years.

(b) IMPLEMENTATION.—Not later than 180 days after the date of enactment of this Act, the NASA Administrator shall publish regulations governing the scholarship program under this section.

(c) COOPERATIVE TRAINING OPPORTUNITIES.—Students who have been awarded a scholarship under this section shall have the opportunity for paid employment at one of the NASA Centers engaged in aeronautics research

and development during the summer prior to the first year of the student's Masters program, and between the first and second year, if applicable.

SEC. 308. NASA AERONAUTICAL TEST FACILITIES POLICY.

The NASA Administrator shall establish a policy of charging users of NASA's aeronautical test facilities for the costs associated with their tests, but shall not seek to recover the full costs of the operation of those facilities from the users. The NASA Administrator shall establish a core funding account that shall be used to maintain the operation and viability of NASA's aeronautical test facilities during periods of low utilization. The NASA Administrator shall not close or mothball any aeronautical test facilities identified in the 2003 independent assessment by the RAND Corporation, entitled ''Wind Tunnel and Propulsion Test Facilities: An Assessment of NASA's Capabilities to Serve National Needs'' as being part of the minimum set of those facilities necessary to retain and manage to serve national needs until such time as the Office of Science and Technology Policy of the Executive Office of the President has commissioned and received the results of an independent review of the Nation's long term strategic needs for aeronautical test facilities and transmitted the results of that review to Congress.

SEC. 309. AVIATION WEATHER RESEARCH.

The NASA Administrator shall 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.

SEC. 310. ASSESSMENT OF WAKE TURBULENCE RESEARCH AND DEVELOPMENT PROGRAM.

(a) ASSESSMENT.—The NASA Administrator shall enter into an arrangement with the National Research Council for an assessment of Federal wake turbulence research and development programs. The assessment shall address at least the following questions:

(1) Are the Federal research and development goals and objectives well defined?

(2) Are there any deficiencies in the Federal research and development goals and objectives?

(3) What roles should be played by each of the relevant Federal agencies, such as NASA, the Federal Aviation Administration, and the National Oceanic and Atmospheric Administration, in wake turbulence research and development?

(b) REPORT.—A report containing the results of the assessment conducted pursuant to subsection (a) shall be provided to Congress not later than 1 year after the date of enactment of this Act.

SEC. 311. UNIVERSITY-BASED CENTERS FOR RESEARCH ON AVIATION TRAINING.

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

(b) PURPOSE.—The purpose of the Centers 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 NASA Administrator at such time, in such manner, and containing such information as the NASA Administrator may require, including, at a minimum, a 5-year research plan.

(d) AWARD DURATION.—An award made by the NASA Administrator under this section shall be for a period of 5 years and may be renewed on the basis of—

(1) satisfactory performance in meeting the goals of the research plan proposed by the Center in its application under subsection (c); and

(2) other requirements as specified by the NASA Administrator.

TITLE IV—AUTHORIZATION OF APPROPRIATIONS

SEC. 401. TOTAL AUTHORIZATIONS.

The total amounts authorized to be appropriated for aeronautics research, development, and demonstration activities at NASA, including the amounts authorized by this Act, are—

(1) $1,057,000,000 for fiscal year 2006;

(2) $1,089,000,000 for fiscal year 2007;

(3) $1,121,000,000 for fiscal year 2008;

(4) $1,155,000,000 for fiscal year 2009; and

(5) $1,190,000,000 for fiscal year 2010.

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