107TH CONGRESS
2D SESSION

S. 2966

To enable the United States to maintain its leadership in aeronautics and aviation by instituting an initiative to develop technologies that will significantly lower noise, emissions, and fuel consumption, to reinvigorate basic and applied research in aeronautics and aviation, and for other purposes.

IN THE SENATE OF THE UNITED STATES

SEPTEMBER 19, 2002

Mr. DODD (for himself and Mr. ALLEN) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

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A BILL

To enable the United States to maintain its leadership in aeronautics and aviation by instituting an initiative to develop technologies that will 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 2002''.

SEC. 2. FINDINGS.

Congress finds the following:

(1) It is in the national interest to maintain 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 these 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 under utilized 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 needed to maintain international leadership in aero-

nautics 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 will require continued Federal investment in fundamental aeronautical research.

(9) The European competitors of United States aircraft companies have invested heavily in new wind tunnels. These new tunnels are better than their older United States counterparts and give European aircraft manufacturers an advantage over United States aircraft manufacturers in the highly competitive civil aircraft sales business. As a result, United States aircraft companies are forced to perform tests in Europe's superior wind tunnels. The security of United States data obtained in these and other foreign test facilities can easily be compromised. New and upgraded United States aeronautical test facilities are needed to support a revitalized aeronautics research and development program, and should be a high national priority.

(10) Continued research is needed into the flight crew and controller training needed to accom-

modate new aircraft and air transportation system technologies and procedures.

(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.

(12) Maintenance of United States leadership in aeronautics and aviation will require the productive collaboration of NASA, the Department of Defense, the FAA, the aviation industry, and the Nation's universities.

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

(14) The terrorist attacks of September 11, 2001, have imposed new requirements for research on aviation security. NASA's aviation safety research must be expanded to include methods that provide for an air transportation system that is both safe and secure from terrorist attacks.

(15) It is important for NASA to continue at a healthy level its cooperative research efforts with the Department of Defense regarding military aviation technologies. These efforts have been all but

eliminated in recent years and must be restored. The Nation must take advantage of the synergy between civil and military aviation research.

(16) The report entitled ''The NASA Aeronautics Blueprint—Toward a Bold New Era of Aviation'' provides an excellent statement of the problems facing aviation today, and presents an exciting vision of what can be achieved by investments in aeronautics research and technology. It does not, however, provide a program plan to actually achieve the vision, nor does it address the huge mismatch between current NASA aeronautics funding and what is required to realize the vision.

SEC. 3. DEFINITIONS.

In this Act:

(1) FAA.—The term ''FAA'' means the Federal Aviation Administration.

(2) FAA ADMINISTRATOR.—The term ''FAA Administrator'' means the Administrator of the FAA.

(3) INSTITUTION OF HIGHER EDUCATION.—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).

(4) NASA.—The term ''NASA'' means the National Aeronautics and Space Administration.

(5) NASA ADMINISTRATOR.—The term ''NASA Administrator'' means the Administrator of NASA.

TITLE I—NASA AERONAUTICS RESEARCH AND DEVELOPMENT

SEC. 101. ENVIRONMENTAL AIRCRAFT RESEARCH AND DEVELOPMENT INITIATIVE.

(a) OBJECTIVE.—Not later than 10 years after the date of enactment of this Act, the NASA Administrator shall develop and demonstrate, in a relevant environment, technologies that result in 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) FUEL EFFICIENCY.—A 10 percent improvement in fuel efficiency, compared to aircraft in commercial service as of the date of enactment of this Act, in each of the following:

(A) Specific fuel consumption.

(B) Lift to drag ratio.

(C) Structural weight fraction.

(3) EMISSIONS.—Nitrogen oxides at less than 5 grams per kilogram of fuel burned.

(b) IMPLEMENTATION.—Not later than 180 days after the date of enactment of this Act, the NASA Administrator shall provide to the Committee on Science of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate 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; and

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

(c) REVIEW.—Not later than 1 year after the date of enactment of this Act, the NASA Administrator shall enter into an arrangement with the National Research

Council to review the adequacy of the implementation plan provided under subsection (b) to achieve the objective described in subsection (a). In addition, the NASA Administrator shall enter into an arrangement with the National Research Council for the review, every 3 years after the initial review under this subsection, of NASA's progress in achieving the objective described in subsection (a), including recommendations for changes to NASA's research and development program. The results of each review shall be provided to the Committee on Science of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate within 30 days after the review is completed.

(d) AUTHORIZATION OF APPROPRIATIONS.—

(1) IN GENERAL.—Of the amounts authorized to be appropriated under section 107, there are authorized to be appropriated to the NASA Administrator to carry out this section—

(A) $125,000,000 for fiscal year 2003;

(B) $150,000,000 for fiscal year 2004;

(C) $175,000,000 for fiscal year 2005;

(D) $200,000,000 for fiscal year 2006; and

(E) $225,000,000 for fiscal year 2007.

(2) AMOUNTS TO CERTAIN ENTITIES.—Of the amounts authorized to be appropriated in paragraph (1), the percentage of the annual appropriation that shall be used to fund research and development conducted at universities, industrial research entities, and not-for-profit research consortia is—

(A) 20 percent for fiscal year 2003;

(B) 30 percent for fiscal year 2004;

(C) 40 percent for fiscal year 2005; and

(D) 50 percent for fiscal years 2006 and 2007.

SEC. 102. ROTORCRAFT RESEARCH AND DEVELOPMENT INITIATIVE.

(a) OBJECTIVE.—Not later than 10 years after the date of enactment of this Act, the NASA Administrator shall develop and demonstrate, in a relevant environment, technologies that result in rotorcraft with the following improvements compared to rotorcraft operating on the date of enactment of this Act:

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

(2) Factor of 10 percent reduction in vibration.

(3) 30 percent reduction in empty weight.

(4) Predicted accident rate equivalent to that of fixed-wing aircraft in commercial service.

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

(b) IMPLEMENTATION.—Not later than 180 days after the date of enactment of this Act, the NASA Administrator shall provide a plan to the Committee on Science 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). The implementation plan shall include—

(1) technological roadmaps for achieving each of the improvements 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 prototype demonstrations, as appropriate.

(c) AUTHORIZATION OF APPROPRIATIONS.—Of the amounts authorized to be appropriated under section 107,

there are authorized to be appropriated to the NASA Administrator to carry out this section—

(1) $40,000,000 for fiscal year 2003;

(2) $40,000,000 for fiscal year 2004;

(3) $40,000,000 for fiscal year 2005;

(4) $50,000,000 for fiscal year 2006; and

(5) $70,000,000 for fiscal year 2007.

SEC. 103. CIVIL SUPERSONIC TRANSPORT RESEARCH AND DEVELOPMENT INITIATIVE.

(a) OBJECTIVE.—Not later than 20 years after the date of enactment of this Act, the NASA Administrator shall develop and demonstrate, in a relevant environment, technologies to enable overland flight of supersonic civil transport aircraft with at least the following performance characteristics:

(1) Mach number of at least 1.6.

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

(3) Payload of at least 150 passengers.

(4) Lift to drag ratio of at least 9.0.

(5) 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.

(6) Shaped signature sonic boom overpressure of less than 1.0 pounds per square foot.

(7) Nitrogen oxide emissions of less than 15 grams per kilogram of fuel burned.

(8) Water vapor emissions for stratospheric flight of no greater than 1,400 grams per kilogram of fuel burned.

(b) IMPLEMENTATION.—Not later than 180 days after the date of enactment of this Act, the NASA Administrator shall provide to the Committee on Science of the House of Representatives and to the Committee on Commerce, Science, and Transportation of the Senate 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 prototype 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.

(c) AUTHORIZATION OF APPROPRIATIONS.—Of the amounts authorized to be appropriated under section 107, there are authorized to be appropriated to the NASA Administrator to carry out this section—

(1) $15,000,000 for fiscal year 2003;

(2) $20,000,000 for fiscal year 2004;

(3) $30,000,000 for fiscal year 2005;

(4) $30,000,000 for fiscal year 2006; and

(5) $30,000,000 for fiscal year 2007.

SEC. 104. NASA AERONAUTICS SCHOLARSHIPS.

(a) OBJECTIVE.—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.

(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.

(d) AUTHORIZATION OF APPROPRIATIONS.—Of the amounts authorized to be appropriated under section 107, there are authorized to be appropriated to the NASA Administrator to carry out this section—

(1) $500,000 for fiscal year 2003;

(2) $750,000 for fiscal year 2004;

(3) $1,000,000 for fiscal year 2005;

(4) $1,000,000 for fiscal year 2006; and

(5) $1,000,000 for fiscal year 2007.

SEC. 105. AVIATION WEATHER RESEARCH.

There are authorized to be appropriated to the NASA Administrator $10,000,000 for each of the fiscal years 2003 through 2007 for collaborative research with the National Oceanic and Atmospheric Administration on convective weather events, with the goal of improving the reliability of 2- to 6-hour aviation weather forecasts to a level of at least 0.75.

SEC. 106. AIR TRAFFIC MANAGEMENT RESEARCH AND DEVELOPMENT INITIATIVE.

(a) OBJECTIVE.—The FAA Administrator and the NASA Administrator shall participate in a national initiative with the objective of defining and developing an air traffic management system designed to meet national long-term aviation security, safety, and capacity needs. The initiative should result in a multiagency blueprint for acquisition and implementation of an air traffic management system that would—

(1) build upon current air traffic management and infrastructure initiatives;

(2) improve the security, safety, quality, and affordability of aviation services;

(3) utilize a system of systems approach;

(4) develop a highly integrated, secure common information network to enable common situational awareness for all appropriate system users; and

(5) ensure seamless global operations for system users.

(b) IMPLEMENTATION.—In implementing subsection (a), the FAA Administrator and the NASA Administrator shall work with other appropriate Government agencies and industry to—

(1) develop system performance requirements;

(2) determine an optimal operational concept and system architecture to meet such requirements;

(3) utilize new modeling, simulation, and analysis tools to quantify and validate system performance and benefits;

(4) ensure the readiness of enabling technologies; and

(5) develop a transition plan for successful implementation into the National Airspace System.

(c) AUTHORIZATION.—Of the amounts authorized to be appropriated under section 107—

(1) there are authorized to be appropriated to the NASA Aerospace Technology Program to carry out this section—

(A) $50,000,000 in fiscal year 2003;

(B) $50,000,000 in fiscal year 2004;

(C) $100,000,000 in fiscal year 2005;

(D) $100,000,000 in fiscal year 2006; and

(E) $50,000,000 in fiscal year 2007; and

(2) there are authorized to be appropriated to the FAA Research, Engineering, and Development account to carry out this section—

(A) $20,000,000 in fiscal year 2003;

(B) $30,000,000 in fiscal year 2004;

(C) $40,000,000 in fiscal year 2005;

(D) $40,000,000 in fiscal year 2006; and

(E) $20,000,000 in fiscal year 2007.

SEC. 107. AUTHORIZATION OF APPROPRIATIONS.

(a) AUTHORIZATION.—The total amounts authorized to be appropriated for aeronautics research, development, and demonstration activities at NASA, including the amounts authorized by sections 101 through 106 of this Act, are—

(1) $675,000,000 for fiscal year 2003;

(2) $750,000,000 for fiscal year 2004;

(3) $900,000,000 for fiscal year 2005;

(4) $1,050,000,000 for fiscal year 2006; and

(5) $1,150,000,000 for fiscal year 2007.

(b) LIMITATION.—All amounts authorized to be appropriated by this title are for research and development

activities and do not include amounts required to support the labor, travel, environmental compliance, and nonprogrammatic construction of facilities activities of the Office of Aeronautics.

TITLE II—FEDERAL AVIATION ADMINISTRATION RESEARCH AND DEVELOPMENT

SEC. 201. UNIVERSITY-BASED CENTERS FOR RESEARCH ON AVIATION TRAINING.

(a) IN GENERAL.—Subchapter I of chapter 449 of title 49, United States Code, is amended by adding at the end the following:

"§ 44921. Grants for university-based centers for research on aviation training

''(a) IN GENERAL.—The Administrator of the Federal Aviation Administration shall award grants to institutions of higher education (or consortia thereof) to establish 1 or more Centers for Research on Aviation Training.

''(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 of the Federal Aviation Administration at such time, in such manner, and containing such information as the Administrator may require, including, at a minimum, a 5-year research plan.

''(d) AWARD DURATION.—An award made by the Administrator of the Federal Aviation Administration 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 for Research on Aviation Training in its application under subsection (c); and

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

''(e) INSTITUTION OF HIGHER EDUCATION.—In this section, 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).''.

(b) CHAPTER 449 TABLE OF SECTIONS.—The table of sections at the beginning of subchapter I of chapter 449 of such title is amended by adding at the end the following:

''44921. Grants for university-based centers for research on aviation training.''.

(c) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the FAA Administrator to carry out this section $5,000,000 for each of the fiscal years 2003 through 2007.

SEC. 202. AUTHORIZATION OF APPROPRIATIONS.

(a) AMOUNTS AUTHORIZED.—Section 48102(a) of title 49, United States Code, is amended—

(1) by striking ''and'' at the end of paragraph (7);

(2) by striking the period at the end of paragraph (8) and inserting a semicolon; and

(3) by adding at the end the following:

''(9) for fiscal year 2003, $366,100,000, including—

''(A) $25,500,000 for weather projects and activities;

''(B) $81,600,000 for aircraft safety technology projects and activities;

''(C) $27,300,000 for human factors and aviation medicine projects and activities; and

''(D) $30,000,000 for environment and energy projects and activities;

''(10) for fiscal year 2004, $410,000,000, including—

''(A) $30,600,000 for weather projects and activities;

''(B) $90,100,000 for aircraft safety technology projects and activities;

''(C) $30,200,000 for human factors and aviation medicine projects and activities; and

''(D) $37,500,000 for environment and energy projects and activities;

''(11) for fiscal year 2005, $462,000,000, including—

''(A) $37,000,000 for weather projects and activities;

''(B) $99,800,000 for aircraft safety technology projects and activities;

''(C) $33,500,000 for human factors and aviation medicine projects and activities; and

''(D) $47,000,000 for environment and energy projects and activities;

''(12) for fiscal year 2006, $520,000,000; and

''(13) for fiscal year 2007, $550,000,000.''.

(b) RESEARCH PRIORITIES.—Section 48102(b) of title 49, United States Code, is amended by adding at the end the following new paragraphs:

''(4) Of the amount authorized under subsection (a)(9)—

''(A) $2,000,000 shall be made available for wake turbulence research; and

''(B) $10,000,000 shall be made available for information security research.

''(5) Of the amount authorized under subsection (a)(10)—

''(A) $3,000,000 shall be made available for wake turbulence research; and

''(B) $12,000,000 shall be made available for information security research.

''(6) Of the amount authorized under subsection (a)(11)—

''(A) $4,000,000 shall be made available for wake turbulence research; and

''(B) $13,200,000 shall be made available for information security research.

''(7) The Administrator is authorized to use amounts authorized under subsection (a), regardless of the appropriations account through which the amounts may be provided, for making grant awards for support of research and development activities.''.

TITLE III—STUDIES

SEC. 301. STUDY OF MARKETS ENABLED BY ENVIRONMENTAL TECHNOLOGIES FOR FUTURE AIRCRAFT.

(a) OBJECTIVE.—The NASA Administrator shall 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 section 101 into future commercial aircraft. As part of the study, the NASA Administrator shall identify whether any of the performance characteristics specified in section 101(a) would need to be made more stringent in order to create new markets or expand existing markets. The NASA Administrator shall seek input from at least the aircraft manufacturing industry, academia, and the airlines in carrying out the study.

(b) REPORT.—A report containing the results of the study shall be provided to the Committee on Science of the House of Representatives and to the Committee on Commerce, Science, and Transportation of the Senate within 18 months after the date of enactment of this Act.

(c) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the NASA Administrator $500,000 to carry out this section.

SEC. 302. ASSESSMENT OF WAKE TURBULENCE RESEARCH AND DEVELOPMENT PROGRAM.

(a) ASSESSMENT.—The FAA Administrator shall enter into an arrangement with the National Research Council for an assessment of the FAA's proposed wake turbulence research and development program. The assessment shall include—

(1) an evaluation of the research and development goals and objectives of the program;

(2) a listing of any additional research and development objectives should be included in the program;

(3) any modifications that will be necessary for the program to achieve the program's goals and objectives on schedule and within the proposed level of resources; and

(4) an evaluation of the roles, if any, that should be played by other Federal agencies, such as NASA and the National Oceanic and Atmospheric Administration, in wake turbulence research and development, and how those efforts could be coordinated.

(b) REPORT.—A report containing the results of the assessment shall be provided to the Committee on Science of the House of Representatives and to the Committee on

Commerce, Science, and Transportation of the Senate not later than 1 year after the date of enactment of this Act.

(c) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the FAA Administrator for fiscal year 2003, $500,000 to carry out this section.

SEC. 303. ASSESSMENT OF FUNDAMENTAL AERONAUTICS RESEARCH CAPABILITIES.

(a) ASSESSMENT.—In order to ensure that the Nation retains needed capabilities in fundamental aerodynamics and other areas of fundamental aeronautics research, 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 the Nation's needs for a skilled research workforce and research facilities commensurate with the 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.

(b) REPORT.—The NASA Administrator shall transmit the assessment described in subsection (a), along with NASA's response to the assessment, to the Committee on Science of the House of Representatives and to the Committee on Commerce, Science, and Transportation of the

Senate not later than 2 years after the date of enactment of this Act.

(c) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the NASA Administrator $500,000 for fiscal year 2003 to carry out this section.

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