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S. 2977

To secure the technological edge of the United States in civil and military aviation.

IN THE SENATE OF THE UNITED STATES

MAY 24, 2018

Mr. WARNER (for himself and Mr. MORAN) 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 secure the technological edge of the United States in civil and military aviation.

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 Innovation Act''.

SEC. 2. FINDINGS.

Congress finds the following:

(1) The United States aircraft manufacturing industry produced $342,682,000,000 in economic ac-

tivity from manufacture of aircraft and parts sales and supported 547,900 direct jobs in 2016.

(2) Growth in the civil aircraft market is projected to offer $8,000,000,000,000 to $10,000,000,000,000 in new aircraft sales, parts, and services over the next 17 years. International governments are boosting their research and development investments to give their domestic industries competitive advantages in the aircraft market.

(3) In 2015, the Department of Defense spent $10,600,000,000 on jet fuel and $441,600,000 on jet fuel transportation to support the warfighter. NASA's research into ultra-efficient air transport is important to the military's efforts to reduce fuel costs, logistics pressures, and the level of human risk involved with providing worldwide energy solutions.

(4) NASA's aeronautics research and collaborative ventures yield innovations that can eventually be utilized in the aviation sector, opening up entirely new markets, enabling the United States aviation industry to grow and maintain global competitiveness, providing high-quality engineering and manufacturing jobs, and benefitting the quality of life for our citizens.

(5) Continued progress in the science and technology of aeronautics is crucial to the United States sustained economic success and the protection of the United States security interests at home and around the world, as acknowledged in the 2006 National Aeronautics Research and Development Policy. To ensure Federal efforts remain on a disciplined path to meet national objectives, the Director of the Office of Science and Technology Policy is responsible for the implementation and biennial review of the aeronautics research and development plan of the United States.

(6) All of NASA's other directorates and capabilities, including those in space, depend on research and technology that originated and is maintained in NASA's Aeronautics Centers.

(7) Aeronautics plays a central role in our national security strategy, and our technological advantage over potential adversaries must be maintained with sustained and focused research and development.

(8) NASA Aeronautics Research Mission Directorate's 6 strategic thrusts (safe, efficient growth in global operations; innovation in supersonic aircraft; ultra-efficient vehicles; transition to alternative pro-

pulsion and energy; real-time, system-wide safety assurance; and assured autonomy for aviation transformation) are effective and necessary research areas for the development of next generation aeronautics technology that will preserve the United States lead in the global aviation industry.

(9) Aeronautics research is focused on fundamental capabilities that have the potential to open entirely new industries, including low-cost electric propulsion, advanced composite material manufacturing, simplified air vehicle operation, and increased vertical takeoff and landing, that will allow for safer and more efficient aviation products and support mobility and economic growth.

(10) To meet the challenges of the 21st century, the United States needs to support NASA's Aeronautics Research Program at funding levels that are commensurate with its past, present, and future contributions to the economic competitiveness and national security of the United States.

SEC. 3. DEFINITIONS.

In this Act:

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

(2) AERONAUTICS STRATEGIC IMPLEMENTATION PLAN.—The term ''Aeronautics Strategic Implementation Plan'' means the Aeronautics Strategic Implementation Plan issued by the NASA Aeronautics Research Mission Directorate.

(3) AIR TRAFFIC MANAGEMENT SYSTEM.—the term ''air traffic management system'' means the procedures, technology, and human resources to guide aircraft through the sky and on the ground and to manage low- and high-altitude airspace use.

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

(5) UNMANNED AIRCRAFT SYSTEM; UNMANNED AIRCRAFT.—The terms ''unmanned aircraft system'' and ''unmanned aircraft'' have the meanings given those terms in section 331 of the FAA Modernization and Reform Act of 2012 (49 U.S.C. 40101 note).

(6) X-PLANE.—The term ''X-Plane'' means an experimental aircraft.

SEC. 4. EXPERIMENTAL PLANE PROJECTS.

(a) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) developing high-risk, precompetitive aerospace technologies for which there is not yet a profit rationale is a fundamental NASA role;

(2) near-full-scale to full-scale vehicle flight test experimentation and validation are necessary for—

(A) transitioning new technologies and materials, as well as their associated manufacturing processes, for general aviation, commercial, and military aeronautics use; and

(B) capturing the full breadth of benefits from the Aeronautics Research Mission Directorate's investments in priority programs called for in—

(i) the National Aeronautics Research and Development Plan issued by the National Science and Technology Council in February 2010;

(ii) the NASA 2014 Strategic Plan;

(iii) the Aeronautics Strategic Implementation Plan; and

(iv) any updates to the programs called for in the plans described in clause (i) through (iii); and

(3) a level of funding that adequately supports full-scale experimentation and related infrastructure

must be assured over a sustained period of time to restore NASA's capacity to see legacy priority programs through to completion and achieve national economic and security objectives.

(b) NATIONAL POLICY.—It is the policy of the United States to maintain world leadership in military and civilian aeronautical science and technology, global air power projection, and industrial leadership. To this end, one of the fundamental objectives of NASA aeronautics research is the steady progression and expansion of high-speed flight research and capabilities, including the science and technology of critical underlying disciplines and competencies, chief among which are computational-based analytical and predictive tools and methodologies, aerothermodynamics, high-speed flight propulsion, advanced materials and manufacturing processes, high-temperature structures and materials, and flight controls.

(c) ESTABLISHMENT OF EXPERIMENTAL PLANE PROJECTS.—The Administrator shall establish the following projects:

(1) A low-boom supersonic aircraft project that will—

(A) demonstrate supersonic aircraft designs and technologies that reduce sonic boom noise to levels that encourage the repeal of do-

mestic and international bans on supersonic flight overland; and

(B) gather the data needed to support informed decisions of the Federal Aviation Administration regarding overland supersonic flight.

(2) A series of large-scale X-Plane demonstrators developed sequentially or in parallel, each based on a set of new configuration concepts or technologies determined by the Administrator—

(A) to demonstrate aircraft vehicle and propulsion concepts and technologies and related advances in alternative propulsion and energy;

(B) to enable significant increases in energy efficiency and lower life cycle emissions in the aviation system while achieving a step change in noise emissions; and

(C) to demonstrate high-speed flight propulsion concepts and technologies.

(d) PROJECT ELEMENTS.—For each of the projects established under subsection (c), the Administrator shall—

(1) include development of X-Planes and all necessary supporting flight assets;

(2) pursue a robust technology maturation and flight validation effort;

(3) improve necessary facilities, flight testing capabilities, and computational tools to support the program;

(4) award primary contracts for design, procurement, and manufacture to United States companies, consistent with international obligations and commitments;

(5) coordinate research and flight demonstration activities with other Federal agencies, as appropriate, and the United States aviation community; and

(6) ensure that the program remains aligned with the Aeronautics Strategic Implementation Plan, and any updates to the Aeronautics Strategic Implementation Plan.

(e) ESTABLISHMENT OF ADVANCED MATERIALS AND MANUFACTURING PROGRAM.—The Administrator shall establish an advanced materials and manufacturing technology program consisting of new material developments, from base material formulation through full-scale structural validation and manufacture, that will—

(1) draw from and continue the work carried out by, the Advanced Composites Project of NASA;

(2) be conducted in partnership with academic and private sector partners, including members of the Advanced Composites Consortium;

(3) develop materials and processes that reduce the cost of manufacturing scale-up and certification for use in general aviation, commercial, and military aeronautics;

(4) shorten the time necessary to design, industrialize, and certify advanced materials and manufacturing processes, including manufacturing;

(5) provide a structure for managing intellectual property generated by the program similar to the structure of the Advanced Composites Consortium;

(6) address global cost competitiveness for United States aeronautical industries and technological leadership in advanced materials and structures;

(7) coordinate with advanced manufacturing and composites initiatives in other NASA mission directorates, as the Administrator considers to be appropriate; and

(8) comply with existing Federal Aviation Administration regulations for use within programs in

general aviation, commercial, and military aeronautics.

(f) ON-DEMAND AVIATION.—Congress finds the following:

(1) Fuller utilization of high-speed air transportation, small airports, helipads, vertical flight infrastructure, and other infrastructure can alleviate transportation congestion and support economic growth within cities.

(2) NASA should continue to develop and test air vehicles, different propulsion systems, network systems, unmanned aircraft system traffic management systems, and technology that can be utilized in on-demand air transportation.

(3) NASA should actively support the research around the use of airspace for on-demand aviation.

(4) This work should leverage NASA's ongoing efforts in developing advanced technologies for large, high volume commercial aircraft applications and airspace operations. The Administrator should assess which air traffic concepts perform most efficiently, taking into consideration factors such as existing city infrastructure, small airports, and current airspace operations.

SEC. 5. UNMANNED AIRCRAFT SYSTEMS.

(a) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) to ensure United States competitiveness on the global stage, the Federal Government must work with the private sector to safely integrate the increasing number of commercial applications for unmanned aircraft systems; and

(2) the sustained, efficient growth of the United States transportation system will require harnessing the safety and efficiency benefits of automated systems to relieve pressure on infrastructure and traffic management.

(b) POLICY.—It is the policy of the United States Government to be an active partner with the private sector in the development of technologies, capabilities, and operating procedures for the safe, efficient integration of unmanned aircraft systems into the national airspace, while ensuring current and future air traffic management systems are able to manage unmanned aircraft systems.

(c) UNMANNED AIRCRAFT SYSTEMS OPERATION PROGRAM.—To advance the national policy described in subsection (b), the Administrator shall—

(1) research, develop, and test capabilities and concepts, including unmanned aircraft systems communications and spectrum-related resources, for in-

tegrating unmanned aircraft systems into the national airspace system;

(2) leverage NASA's partnership with industry focused on the advancement of technologies for future air traffic management systems for unmanned aircraft for low- and high-altitude operations;

(3) leverage industry's advancement of technologies for unmanned aircraft to inform regulatory and standards requirements for various sizes of civil unmanned aircraft systems;

(4) consider the needs of United States industry, especially as operations transition to more automated systems; and

(5) continue to align its research and testing portfolio to inform unmanned aircraft system integration consistent with public safety and national security objectives.

(d) COORDINATION WITH THE FEDERAL AVIATION ADMINISTRATION.—It is the sense of Congress that—

(1) NASA should continue to coordinate with the Federal Aviation Administration on research on air traffic management systems for unmanned aircraft systems and assist in the establishment of the pilot program required under section 2208 of the FAA Extension, Safety, and Security Act of 2016

(49 U.S.C. 40101 note) and the subsequent implementation of unmanned aircraft system traffic management systems; and

(2) unmanned aircraft system integration and unmanned traffic management research should continue to leverage the resources available through the unmanned aircraft system test ranges designated by the Federal Aviation Administration under section 332 of the FAA Modernization and Reform Act of 2012 (Public Law 112–95; 49 U.S.C. 40101 note).

SEC. 6. 21ST CENTURY AERONAUTICS RESEARCH CAPABILITIES INITIATIVE.

(a) ESTABLISHMENT.—The Administrator shall establish a 21st Century Aeronautics Capabilities Initiative, within the Construction and Environmental Compliance and Restoration Account, to ensure that NASA possesses the infrastructure capabilities and computational tools necessary to conduct proposed flight demonstration projects across the range of NASA aeronautics interests. As part of such Initiative, the Administrator shall carry out the following activities:

(1) Any investments necessary to upgrade and create facilities for civil and national security aeronautics research to support advancements in long-term foundational science and technology, advanced

aircraft systems, air traffic management systems, fuel efficiency and electric propulsion technologies, system-wide safety assurance, autonomous aviation, and supersonic and hypersonic aircraft design and development.

(2) Any measures supporting flight testing activities, to include continuous refinement and development of free-flight test techniques and methodologies, upgrades and improvements to real-time tracking and data acquisition, and any other measures related to aeronautics research support and modernization as the Administrator may consider appropriate to carry out the scientific study of the problems of flight, with a view to their practical solution.

(b) AUTHORIZATION OF APPROPRIATIONS.—For the purpose of carrying out this section, there are authorized to be appropriated to NASA $100,000,000 for each of fiscal years 2019 through 2023, to be derived from amounts otherwise authorized to be appropriated to NASA.

(c) REPORT.—

(1) REPORT REQUIRED.—Not later than 120 days after the date of enactment of this Act, the Administrator shall transmit to Congress a report containing a 5-year plan for the implementation of the

21st Century Aeronautics Research Capabilities Initiative.

(2) ELEMENTS.—The report required by this subsection shall include—

(A) a description of proposed projects;

(B) a description of how the projects align with the Aeronautics Strategic Implementation Plan or the roadmap developed by the joint technology office on hypersonics under section 218(d) of the John Warner National Defense Authorization Act for Fiscal Year 2007, and any updates to such Aeronautics Strategic Implementation Plan or roadmap; and

(C) a timetable for carrying out activities and initiatives authorized under this section.

SEC. 7. AUTHORIZATION OF APPROPRIATIONS.

(a) FISCAL YEAR 2019.—There are authorized to be appropriated to NASA Aeronautics Research Mission Directorate for fiscal year 2019, $790,000,000, as follows:

(1) For Airspace Operations and Safety Program, $159,000,000.

(2) For Advanced Air Vehicles Program, $280,000,000.

(3) For Integrated Aviation Systems Program, $251,000,000.

(4) For Transformative Aero Concepts Program, $100,000,000.

(b) FISCAL YEAR 2020.—There are authorized to be appropriated to NASA Aeronautics Research Mission Directorate for fiscal year 2020, $930,000,000, as follows:

(1) For Airspace Operations and Safety Program, $165,000,000.

(2) For Advanced Air Vehicles Program, $303,000,000.

(3) For Integrated Aviation Systems Program, $300,000,000.

(4) For Transformative Aero Concepts Program, $112,000,000.

(5) For Advanced Materials and Manufacturing Program, $50,000,000.

(c) FISCAL YEAR 2021.—There are authorized to be appropriated to NASA Aeronautics Research Mission Directorate for fiscal year 2021, $974,000,000, as follows:

(1) For Airspace Operations and Safety Program, $170,000,000.

(2) For Advanced Air Vehicles Program, $290,000,000.

(3) For Integrated Aviation Systems Program, $350,000,000.

(4) For Transformative Aero Concepts Program, $114,000,000.

(5) For Advanced Materials and Manufacturing Program, $50,000,000.

(d) FISCAL YEAR 2022.—There are authorized to be appropriated to NASA Aeronautics Research Mission Directorate for fiscal year 2022, $996,000,000, as follows:

(1) For Airspace Operations and Safety Program, $175,000,000.

(2) For Advanced Air Vehicles Program, $295,000,000.

(3) For Integrated Aviation Systems Program, $360,000,000.

(4) For Transformative Aero Concepts Program, $116,000,000.

(5) For Advanced Materials and Manufacturing Program, $50,000,000.

(e) FISCAL YEAR 2023.—There are authorized to be appropriated to NASA Aeronautics Research Mission Directorate for fiscal year 2023, $1,030,000,000, as follows:

(1) For Airspace Operations and Safety Program, $180,000,000.

(2) For Advanced Air Vehicles Program, $300,000,000.

(3) For Integrated Aviation Systems Program, $382,000,000.

(4) For Transformative Aero Concepts Program, $118,000,000.

(5) For Advanced Materials and Manufacturing Program, $50,000,000.

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