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(Original Signature of Member)

114TH CONGRESS  
2D SESSION

# H. R.

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

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## IN THE HOUSE OF REPRESENTATIVES

Mr. KNIGHT (for himself and Mr. HONDA) introduced the following bill; which was referred to the Committee on \_\_\_\_\_

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# A BILL

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

1 *Be it enacted by the Senate and House of Representa-*  
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Aeronautics Innovation  
5 Act”.

6 **SEC. 2. FINDINGS.**

7 The Congress makes the following findings:

8 (1) Aviation accounts for more than  
9 \$1,500,000,000,000 of total United States economic

1 activity annually and is one of the few industries  
2 that generates a positive trade balance, including  
3 \$82,500,000,000 in 2015 alone.

4 (2) Growth in the commercial aircraft market is  
5 projected to offer 8 to 10 trillion dollars in new air-  
6 craft sales, parts, and services over the next 17  
7 years. International governments are boosting their  
8 research and development investments to give their  
9 domestic industries competitive advantages in the  
10 aircraft market.

11 (3) NASA's aeronautics research and collabo-  
12 rative ventures yield innovations that can eventually  
13 be utilized in the commercial sector, opening up en-  
14 tirely new markets, enabling the United States' avia-  
15 tion industry to grow and maintain global competi-  
16 tiveness, providing high-quality engineering and  
17 manufacturing jobs, and benefitting the quality of  
18 life for our citizens.

19 (4) All of NASA's other directorates and capa-  
20 bilities, including those in space, depend on research  
21 and technology that originated and is maintained in  
22 NASA's Aeronautics Centers.

23 (5) Aviation plays a central role in our national  
24 security strategy, and our technological advantage

1 over potential adversaries must be maintained with  
2 sustained and focused research and development.

3 (6) NASA Aeronautics Research Mission Direc-  
4 torate's six strategic thrusts (safe, efficient growth  
5 in global operations; innovation in commercial super-  
6 sonic aircraft; ultra-efficient commercial vehicles;  
7 transition to low-carbon propulsion; real-time, sys-  
8 tem-wide safety assurance; and assured autonomy  
9 for aviation transformation) are effective and nec-  
10 essary research areas for the development of next  
11 generation aeronautics technology that will preserve  
12 the United States' lead in the global aviation indus-  
13 try.

14 (7) Continued progress in the science and tech-  
15 nology of aeronautics is crucial to the United States'  
16 sustained economic success and the protection of the  
17 United States' security interests at home and  
18 around the world, as acknowledged in the 2006 Na-  
19 tional Aeronautics Research and Development Pol-  
20 icy. To ensure Federal efforts remain on a dis-  
21 ciplined path to meet national objectives, the Direc-  
22 tor of the Office of Science and Technology Policy  
23 is responsible for the implementation and biennial  
24 review of the Nation's aeronautics research and de-  
25 velopment plan.

1           (8) We need an aeronautics program worthy of  
2           the United States of America and capable of meet-  
3           ing our 21st century challenges.

4 **SEC. 3. DEFINITIONS.**

5           In this Act:

6           (1) ADMINISTRATOR.—The term “Adminis-  
7           trator” means the Administrator of NASA.

8           (2) AERONAUTICS STRATEGIC IMPLEMENTA-  
9           TION PLAN.—The term “Aeronautics Strategic Im-  
10          plementation Plan” means the Aeronautics Strategic  
11          Implementation Plan issued by the NASA Aero-  
12          nautics Research Mission Directorate.

13          (3) APPROPRIATE CONGRESSIONAL COMMIT-  
14          TEES.—The term “appropriate congressional com-  
15          mittees” means the Committee on Armed Services,  
16          the Committee on Science, Space, and Technology,  
17          and the Committee on Appropriations of the House  
18          of Representatives and the Committee on Armed  
19          Services, the Committee on Commerce, Science, and  
20          Transportation, and the Committee on Appropria-  
21          tions of the Senate.

22          (4) NASA.—The term “NASA” means the Na-  
23          tional Aeronautics and Space Administration.

1 **SEC. 4. EXPERIMENTAL PLANE PROGRAMS.**

2 (a) SENSE OF CONGRESS.—It is the sense of Con-  
3 gress that—

4 (1) developing high-risk, pre-competitive aero-  
5 space technology for which there is not yet a profit  
6 rationale is a fundamental NASA role;

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

9 (A) transitioning new technologies to com-  
10 mercial and military aeronautics use; and

11 (B) capturing the full breadth of benefits  
12 from the Aeronautics Research Mission Direc-  
13 torate's investments in priority programs called  
14 for in—

15 (i) the National Aeronautics Research  
16 and Development Plan issued by the Na-  
17 tional Science and Technology Council in  
18 February 2010;

19 (ii) the NASA 2014 Strategic Plan;  
20 and

21 (iii) the Aeronautics Strategic Imple-  
22 mentation Plan;

23 (3) a level of funding that adequately supports  
24 full-scale experimentation and related infrastructure  
25 must be assured over a sustained period of time to  
26 restore NASA's capacity to see legacy priority pro-

1       grams through to completion and achieve national  
2       economic and security objectives;

3               (4) NASA should establish a long-term goal of  
4       increasing its Aeronautics research spending, over  
5       time, to 10 percent of its overall budget; and

6               (5) NASA's gradual completion of Next Gen-  
7       eration Air Transportation System tools and tech-  
8       nologies will allow NASA to refocus its resources on  
9       its traditional studies of the problems of flight with  
10      a view to their practical solutions.

11      (b) NATIONAL POLICY.—It is the policy of the United  
12     States to maintain world leadership in air power projection  
13     and industrial aviation leadership, and to this end one of  
14     the fundamental objectives of NASA aeronautics research  
15     is the steady progression and expansion of high-speed  
16     flight capabilities, including the underlying aerothermo-  
17     dynamics, high temperature structures, propulsion, and  
18     flight controls science and technologies.

19      (c) ESTABLISHMENT OF PROGRAMS.—NASA shall  
20     establish the following full-scale technology, experimental  
21     flight research, multidisciplinary, and revolutionary con-  
22     cepts programs to demonstrate innovative advances in aer-  
23     onautics and aviation and the feasibility of transformative  
24     ideas and concepts:

1           (1) A low-boom supersonic aircraft program, to  
2           demonstrate supersonic aircraft designs and tech-  
3           nologies that reduce sonic boom noise to levels that  
4           will encourage the repeal of domestic and inter-  
5           national bans on commercial supersonic flight over-  
6           land.

7           (2) Three subsonic flight programs, from  
8           among the ultra-efficient X-Plane and hybrid-electric  
9           X-Plane programs, each centered around a set of  
10          new configuration concepts or technologies deter-  
11          mined by the Administrator of NASA, to—

12                (A) enable significant increases in energy  
13                efficiency and lower life cycle emissions in the  
14                aviation system;

15                (B) demonstrate transformative propulsion  
16                systems, as described in the 3rd and 4th stra-  
17                tegic thrusts of the Aeronautics Strategic Im-  
18                plementation Plan (ultra-efficient commercial  
19                vehicles and the transition to low-carbon pro-  
20                pulsion);

21                (C) introduce and integrate a progression  
22                of technologies and systems enabling trans-  
23                formative levels of environmental-related per-  
24                formance improvements in the next generations  
25                of large civil air transports; and

1 (D) culminate in large-scale X-Plane dem-  
2 onstrations.

3 (3) An unmanned aircraft operations program  
4 that—

5 (A) researches, develops, and tests capa-  
6 bilities and concepts for integrating unmanned  
7 aircraft systems into the national airspace sys-  
8 tem;

9 (B) advances technologies for a future un-  
10 manned aircraft traffic management system for  
11 low altitude operations;

12 (C) advances technologies for unmanned  
13 vehicles and informs airworthiness requirements  
14 for all categories of unmanned systems;

15 (D) benefits industry, especially as oper-  
16 ations transition to more autonomous systems;  
17 and

18 (E) is consistent with national safety and  
19 national security objectives.

20 (d) PROGRAM ELEMENTS.—For each of the pro-  
21 grams established under subsection (c), NASA shall—

22 (1) include development of experimental aircraft  
23 (X-Plane), experimental systems (X-System), mul-  
24 tiple technologies, and all necessary supporting flight  
25 assets;



1           (2) pursue a robust technology maturation and  
2 flight validation program that addresses challenges  
3 in technology development and maturation;

4           (3) improve necessary facilities and flight test-  
5 ing capabilities to support the program;

6           (4) coordinate demonstrations with the aviation  
7 community, the armed services, and the Defense Ad-  
8 vanced Research Projects Agency; and

9           (5) ensure that the program remains aligned  
10 with the Aeronautics Strategic Implementation Plan.

11 (e) CROWDSOURCING PILOT PROGRAM.—

12           (1) ESTABLISHMENT.—The Administrator shall  
13 establish a crowdsourcing pilot program to allow  
14 NASA to experiment with the crowdsourcing of early  
15 stage experimental aerospace vehicle design work.

16           (2) MECHANISM.—As part of such program,  
17 NASA shall establish a mechanism from which to  
18 crowdsource the preliminary designs of advanced  
19 aerospace vehicles that will increase the speed,  
20 range, capacity, safety, and affordability of aero-  
21 space transportation, such as supersonic or  
22 hypersonic aircraft.

23           (3) PRIVATE SECTOR EXPERTS.—NASA may  
24 work with private sector subject matter experts in

1       crowdsourcing to assist in the development of the  
2       pilot program.

3           (4) SUNSET.—This pilot program shall termi-  
4       nate 5 years after the date of enactment of this Act.

5           (5) REPORT.—NASA shall report to the appro-  
6       priate congressional committees at the end of the  
7       pilot program to communicate lessons learned under  
8       the program and make recommendations for how  
9       benefits of crowdsourcing may be more broadly ap-  
10      plied to NASA objectives.

11 **SEC. 5. HYPERSONICS.**

12       (a) SENSE OF CONGRESS.—It is the sense of Con-  
13      gress that the Nation’s understanding of hypersonic tech-  
14      nologies and weapons will play an increasingly important  
15      role in our national security. Maintaining United States  
16      preeminence in hypersonics research and development is  
17      key to our military’s ability to project power and defend  
18      the homeland as our adversaries also seek to develop  
19      hypersonic capabilities.

20       (b) POLICY.—It is the policy of the United States to  
21      maintain a clear and consistent commitment to a dis-  
22      ciplined research, development, and testing strategy to  
23      bring hypersonic technology to maturity on a schedule that  
24      sustains the United States strategic military edge.

1           (c)       JOINT       TECHNOLOGY       OFFICE       ON  
2 HYPersonICS.—Section 218 of the John Warner Na-  
3 tional Defense Authorization Act for Fiscal Year 2007  
4 (Public Law 109–364; 10 U.S.C. 2358 note), as most re-  
5 cently amended by section 1079(f) of the National Defense  
6 Authorization Act for Fiscal Year 2016 (Public Law 114–  
7 192; 129 Stat. 999), is amended by striking subsections  
8 (c) through (e) and inserting the following:

9           “(c) RESPONSIBILITIES.—In carrying out the pro-  
10 gram required by subsection (b), the joint technology of-  
11 fice established under subsection (a) shall do the following:

12                   “(1) Coordinate and integrate current and fu-  
13 ture research, development, test, and evaluation pro-  
14 grams and system demonstration programs of the  
15 Department of Defense on hypersonics.

16                   “(2) Undertake appropriate actions to ensure—

17                           “(A) close and continuous integration of  
18 the programs on hypersonics of the military de-  
19 partments with the programs on hypersonics  
20 across the Federal Government; and

21                           “(B) that both foundational research and  
22 developmental testing resources are adequate  
23 and robustly funded, and that facilities are  
24 made available in a timely manner to support

1           hypersonics research, demonstration programs,  
2           and system development.

3           “(3) Approve demonstration programs on  
4           hypersonic systems to speed operational applications.

5           “(4) Ensure that any demonstration program  
6           on hypersonic systems that is carried out in any  
7           year after its approval under paragraph (3) is car-  
8           ried out only if certified under subsection (e) as  
9           being consistent with the roadmap under subsection  
10          (d).

11          “(5) Develop a well-defined path for hypersonic  
12          technologies to transition to operational capabilities  
13          for the warfighter.

14          “(d) ROADMAP.—

15                 “(1) ROADMAP REQUIRED.—The joint tech-  
16                 nology office established under subsection (a) shall  
17                 develop and maintain a roadmap for the hypersonics  
18                 programs of the Department of Defense. The Sec-  
19                 retary of Defense shall ensure that all elements of  
20                 the roadmap are updated to reflect changes in na-  
21                 tional hypersonics assessments and needs not less  
22                 than once every two years.

23                 “(2) COORDINATION.—The roadmap shall be  
24                 developed and updated under paragraph (1) in co-  
25                 ordination with—

1 “(A) the Joint Staff;

2 “(B) the National Security Council;

3 “(C) the Administrator of the National  
4 Aeronautics and Space Administration;

5 “(D) the Director of the Office of Science  
6 and Technology Policy;

7 “(E) the Director of the Defense Advanced  
8 Research Projects Agency; and

9 “(F) the Director of National Intelligence.

10 “(3) ELEMENTS.—The roadmap shall include  
11 the following matters:

12 “(A) Anticipated or potential mission re-  
13 quirements for offensive hypersonics systems  
14 and defenses against hypersonics systems of po-  
15 tential adversaries.

16 “(B) Short-term, mid-term, and long-term  
17 goals for Department of Defense hypersonics,  
18 which shall be consistent with the missions and  
19 anticipated requirements of the Department  
20 over the applicable period.

21 “(C) A schedule for meeting such goals, in-  
22 cluding—

23 “(i) the activities and funding antici-  
24 pated to be required for meeting such  
25 goals; and

1                   “(ii) the activities of the National  
2                   Aeronautics and Space Administration to  
3                   be leveraged by the Department of Defense  
4                   to meet such goals.

5                   “(D) The research, development, test, and  
6                   evaluation facilities required to support the ac-  
7                   tivities identified in subparagraph (C), along  
8                   with the schedule and funding required to up-  
9                   grade those facilities, as necessary.

10                  “(E) Recommendations on the pro-  
11                  grammatic resources necessary for each agency  
12                  to advance the collective goals and priorities of  
13                  the roadmap in an efficient, sustained manner.

14                  “(F) Recommendations to transition  
15                  hypersonic science and technology to oper-  
16                  ational capabilities for the warfighter.

17                  “(G) Acquisition transition plans for  
18                  hypersonics.

19                  “(4) SUBMITTAL TO CONGRESS.—The Secretary  
20                  of Defense shall submit to the congressional defense  
21                  committees—

22                  “(A) at the same time as the submittal to  
23                  Congress of the budget for fiscal year 2018 (as  
24                  submitted pursuant to section 1105 of title 31,

1 United States Code), the roadmap developed  
2 under paragraph (1); and

3 “(B) at the same time as the submittal to  
4 Congress of the budget for each even-numbered  
5 fiscal year after 2018, the roadmap updated  
6 under paragraph (1).

7 “(e) ANNUAL REVIEW AND CERTIFICATION OF  
8 FUNDING.—

9 “(1) ANNUAL REVIEW.—The joint technology  
10 office established under subsection (a) shall conduct,  
11 on an annual basis, a review of—

12 “(A) the funding available for research, de-  
13 velopment, test, and evaluation programs and  
14 demonstration programs within the Department  
15 of Defense for hypersonics, in order to deter-  
16 mine whether or not such funding is consistent  
17 with the roadmap developed under subsection  
18 (d); and

19 “(B) the hypersonics demonstration pro-  
20 grams of the Department of Defense, in order  
21 to determine whether or not such programs  
22 avoid duplication of effort and support the  
23 goals of the Department in a manner consistent  
24 with the roadmap developed under subsection  
25 (d).

1           “(2) CERTIFICATION.—The joint technology of-  
2           fice established under subsection (a) shall, as a re-  
3           sult of each review under paragraph (1), certify to  
4           the Secretary of Defense whether or not the funding  
5           and programs subject to such review are consistent  
6           with the roadmap developed under subsection (d).

7           “(3) TERMINATION.—The requirements of this  
8           subsection shall terminate after the submittal to  
9           Congress of the budget for fiscal year 2021 pursu-  
10          ant to section 1105 of title 31, United States Code.

11          “(f) REPORTS TO CONGRESS.—If, as a result of a  
12          review under subsection (e), funding or a program on  
13          hypersonics is certified under that subsection not to be  
14          consistent with the roadmap developed under subsection  
15          (d), the Secretary of Defense shall submit to the congres-  
16          sional defense committees, at the same time as the sub-  
17          mittal to Congress of the budget (as submitted pursuant  
18          to section 1105 of title 31, United States Code), a report  
19          on such funding or program, as the case may be, describ-  
20          ing how such funding or program is not consistent with  
21          the roadmap, together with a statement of the actions to  
22          be taken by the Department of Defense.

23          “(g) HEAD OF OFFICE.—The Secretary of Defense  
24          shall appoint an individual who is a recognized authority  
25          in the field of hypersonics to serve as the Director of the



1 joint technology office established under subsection (a).  
2 The Director shall serve as the head of the office and as  
3 the principal adviser to the Office of the Secretary of De-  
4 fense on all matters related to hypersonics, reporting di-  
5 rectly to the Deputy Secretary of Defense.

6 “(h) STAFF.—Secretary of Defense shall fix the com-  
7 pensation of the Director and shall appoint and fix the  
8 compensation of such other personnel as may be necessary  
9 to enable the joint technology office established under sub-  
10 section (a) to carry out its functions.”.

11 (d) INTERAGENCY RESEARCH, DEVELOPMENT,  
12 TESTING, AND EVALUATION COORDINATION.—The Direc-  
13 tor of the Office of Science and Technology Policy,  
14 through the National Science and Technology Council,  
15 shall ensure that Federal hypersonics research, develop-  
16 ment, testing, and evaluation activities are coordinated  
17 and executed pursuant to a disciplined investment plan.  
18 In doing so, the Director shall—

19 (1) develop and maintain a strategic plan to ad-  
20 vance the United States hypersonics research, devel-  
21 opment, test and evaluation goals in an efficient,  
22 sustained manner;

23 (2) identify test and evaluation infrastructure  
24 critical to hypersonics research, development, test-  
25 ing, and evaluation and make recommendations to

1 the President for upgrading those facilities as nec-  
2 essary;

3 (3) promote policies for a robust hypersonics  
4 workforce; and

5 (4) encourage Federal agencies conducting  
6 hypersonics research, development, testing, and eval-  
7 uation to develop and promote policies that sustain  
8 their respective agencies' efforts in implementing the  
9 coordinated Federal hypersonics agenda.

10 (e) AIR FORCE HYPERSONICS CAPABILITIES ACQUI-  
11 SITION.—The Secretary of the Air Force shall consider  
12 findings from all Federal research, development, and dem-  
13 onstration projects that relate to hypersonics in making  
14 and executing acquisition plans for the Air Force.

15 (f) CIVILIAN HYPERSONICS REPORT.—Not later than  
16 120 days after the date of enactment of this Act, NASA  
17 shall transmit to Congress a report that—

18 (1) collects broad civilian input identifying ben-  
19 efits to the private sector and universities from  
20 NASA support for precompetitive hypersonics  
21 science; and

22 (2) contains a list of proposed research and  
23 technology investments, prioritized on the basis of  
24 the national interest that will be served, potential

1 economic impact, and cost of each such technology  
2 investment proposal.

3 (g) 21ST CENTURY HYPERSONICS WORKFORCE.—

4 (1) RESEARCH AND DEVELOPMENT CAPABILI-  
5 TIES.—

6 (A) IN GENERAL.—In order to build and  
7 prepare the workforce for hypersonics develop-  
8 ment, the Air Force Office of Scientific Re-  
9 search, the Office of Naval Research, and the  
10 appropriate Department of the Army science  
11 and technology entities, in consultation with the  
12 Director of the Office of Science and Tech-  
13 nology Policy, through the National Science and  
14 Technology Council, shall expand, intensify, and  
15 coordinate programs and activities with re-  
16 search institutions to strengthen their capabili-  
17 ties for research and development of  
18 hypersonics technology and related education  
19 and training.

20 (B) GRANTS.—To carry out subparagraph  
21 (A), the Air Force Office of Scientific Research,  
22 the Office of Naval Research, and the appro-  
23 priate Department of the Army science and  
24 technology entities may make grants to re-  
25 search institutions. Each such grant shall be for

1 a period of not to exceed 3 years, and may be  
2 extended for one or more additional periods not  
3 exceeding 3 years if—

4 (i) the recipient's program has been  
5 reviewed and approved by an appropriate  
6 technical and scientific peer review group  
7 established by the Director of the Air  
8 Force Office of Scientific Research, the Of-  
9 fice of Naval Research, or the appropriate  
10 Department of the Army science and tech-  
11 nology entity; and

12 (ii) such group has recommended to  
13 the appropriate Director that such grant  
14 period should be extended.

15 (2) PILOT PROGRAMS.—Not later than 180  
16 days after the date of enactment of this Act, the Di-  
17 rector of the Office of Science and Technology Pol-  
18 icy, through the National Science and Technology  
19 Council, shall recommend to the Air Force Office of  
20 Scientific Research, the Office of Naval Research,  
21 and the appropriate Department of the Army science  
22 and technology entities a series of hypersonics tech-  
23 nology prototype projects to be completed over the  
24 next 2-5 years that meet research objectives speci-  
25 fied in the joint technology office hypersonics road-

1 map developed under section 218(d) of the John  
2 Warner National Defense Authorization Act for Fis-  
3 cal Year 2007, as added by subsection (c) of this  
4 section or the civilian hypersonics report transmitted  
5 under subsection (f).

6 **SEC. 6. 21ST CENTURY AERONAUTICS RESEARCH CAPABILI-**  
7 **TIES INITIATIVE.**

8 (a) ESTABLISHMENT.—The Administrator shall es-  
9 tablish a 21st Century Aeronautics Capabilities Initiative,  
10 within the Construction of Facilities Account, to ensure  
11 that NASA possesses the infrastructure capabilities nec-  
12 essary to conduct proposed flight demonstration projects  
13 across the range of NASA aeronautics interests. As part  
14 of such Initiative, the Administrator shall carry out the  
15 following activities:

16 (1) Any investments necessary to upgrade and  
17 create facilities for civil and national security aero-  
18 nautics research to support advancements in long-  
19 term foundational science and technology, advanced  
20 aircraft systems, air traffic management systems,  
21 fuel efficiency, system-wide safety assurance, autono-  
22 mous aviation, and supersonic and hypersonic air-  
23 craft design and development.

24 (2) Any measures supporting flight testing ac-  
25 tivities, to include continuous refinement and devel-

1       opment of free-flight test techniques and methodolo-  
2       gies, upgrades and improvements to real-time track-  
3       ing and data acquisition, and any other measures re-  
4       lated to aeronautics research support and mod-  
5       ernization as the Administrator may consider appro-  
6       priate to carry out the scientific study of the prob-  
7       lems of flight, with a view to their practical solution.

8       (b) AUTHORIZATION OF APPROPRIATIONS.—For the  
9       purpose of carrying out this section, there are authorized  
10      to be appropriated to NASA \$40,000,000, to be derived  
11      from amounts otherwise authorized to be appropriated to  
12      NASA.

13      (c) REPORT.—

14           (1) REPORT REQUIRED.—Not later than 60  
15      days after the date of enactment of this Act, the Ad-  
16      ministrator shall transmit to Congress a report con-  
17      taining a 5-year plan for the implementation of the  
18      21st Century Aeronautics Research Capabilities Ini-  
19      tiative.

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

22                   (A) a description of proposed projects;

23                   (B) a description of how the projects align  
24      with the ARMD Strategic Implementation Plan  
25      or the roadmap developed by the joint tech-

1           nology office on hypersonics under section  
2           218(d) of the John Warner National Defense  
3           Authorization Act for Fiscal Year 2007, as  
4           added by section 5(c) of this Act; and  
5           (C) a timetable for carrying out activities  
6           and initiatives authorized under this section.