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(Original Signature of Member)

114<sup>TH</sup> CONGRESS  
2<sup>D</sup> SESSION

**H. R.** \_\_\_\_\_

To ensure that Federal research and development in support of civil aviation remains at the forefront of addressing challenges confronting the Nation's air transportation system, and for other purposes

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IN THE HOUSE OF REPRESENTATIVES

Ms. EDDIE BERNICE JOHNSON of Texas introduced the following bill; which was referred to the Committee on \_\_\_\_\_

\_\_\_\_\_  
**A BILL**

To ensure that Federal research and development in support of civil aviation remains at the forefront of addressing challenges confronting the Nation's air transportation system, and for other purposes

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 "Federal Aviation Re-  
5 search and Development Reauthorization Act of 2016".

1 **SEC. 2. AMENDMENTS TO TITLE 49, UNITED STATES CODE.**

2 Except as otherwise expressly provided, whenever in  
3 this Act an amendment or repeal is expressed in terms  
4 of an amendment to, or a repeal of, a section or other  
5 provision, the reference shall be considered to be made to  
6 a section or other provision of title 49, United States  
7 Code.

8 **SEC. 3. DEFINITIONS.**

9 In this Act:

10 (1) ADMINISTRATOR.—The term “Adminis-  
11 trator” means the Administrator of the Federal  
12 Aviation Administration.

13 (2) FAA.—The term “FAA” means the Fed-  
14 eral Aviation Administration.

15 (3) NASA.—The term “NASA” means the Na-  
16 tional Aeronautics and Space Administration.

17 (4) NEXTGEN.—The term “NextGen” means  
18 the Next Generation Air Transportation System.

19 (5) SECRETARY.—The term “Secretary” means  
20 the Secretary of Transportation.

21 **TITLE I—AUTHORIZATION OF**  
22 **APPROPRIATIONS**

23 **SEC. 11. AUTHORIZATION OF APPROPRIATIONS.**

24 Section 48102(a) is amended—

25 (1) by striking “and” at the end of paragraph  
26 (8);

1 (2) by striking paragraph (9); and

2 (3) by adding at the end the following new  
3 paragraphs: the following:

4 “(9) \$428,050,000 for fiscal year 2016, of  
5 which—

6 “(A) \$166,000,000 shall be for Research,  
7 Engineering, and Development;

8 “(B) \$216,050,000 shall be for Facilities  
9 and Equipment; and

10 “(C) \$46,000,000 shall be for Grants-in-  
11 Aid for Airports;

12 “(10) \$490,200,000 for fiscal year 2017, of  
13 which—

14 “(A) \$169,000,000 shall be for Research,  
15 Engineering, and Development;

16 “(B) \$275,200,000 shall be for Facilities  
17 and Equipment; and

18 “(C) \$46,000,000 shall be for Grants-in-  
19 Aid for Airports; and

20 “(11) \$536,270,400 for fiscal year 2018, of  
21 which—

22 “(A) \$173,346,000 shall be for Research,  
23 Engineering, and Development;

24 “(B) \$316,832,400 shall be for Facilities  
25 and Equipment; and

1                   “(C) \$46,092,000 shall be for Grants-in-  
2                   Aid for Airports.”.

3                   **TITLE II—STRATEGIC**  
4                   **DIRECTION FOR FAA RESEARCH**

5                   **SEC. 21. DECADAL SURVEY ON FAA’S CIVIL AVIATION RE-**  
6                   **SEARCH.**

7                   (a) IN GENERAL.—The Secretary shall enter into an  
8                   arrangement with the National Academies for a com-  
9                   prehensive research survey and strategy for FAA’s civil  
10                  aviation activities, including NextGen, over the next dec-  
11                  ade. The survey shall encompass research activities in  
12                  FAA’s Research, Engineering, and Development, Facili-  
13                  ties and Equipment, and Grants-in-Aid for Airports ac-  
14                  counts, as well as any other research or emerging research  
15                  areas that will enhance FAA’s civil aviation activities. The  
16                  survey shall—

17                  (1) prioritize FAA civil aviation research needs  
18                  and align such research needs with the mission of  
19                  FAA;

20                  (2) examine the status of research methods and  
21                  tools, including modeling and simulation, data anal-  
22                  ysis, and technology demonstration capabilities, that  
23                  can contribute to FAA civil aviation research;

24                  (3) examine the status of FAA-owned research  
25                  facilities and equipment, the extent to which their

1 availability and accessibility is coordinated across  
2 FAA's research programs, and their ability to sup-  
3 port FAA civil aviation research over the next dec-  
4 ade;

5 (4) identify workforce skills, workforce develop-  
6 ment, and training needed to support research prior-  
7 ities over the next decade;

8 (5) examine the process and issues related to  
9 translating research advances into operational use,  
10 including the process required for the certification,  
11 operational approval, and implementation of new  
12 technologies and resulting operations into the Na-  
13 tional Airspace System, and identify the best prac-  
14 tices used by other United States or non-United  
15 States organizations in transitioning such research  
16 into operations;

17 (6) examine issues related to the dissemination  
18 of relevant research to the broader aviation commu-  
19 nity;

20 (7) consider the research contributions of FAA  
21 Centers of Excellence, NASA, and other United  
22 States Government or nongovernment entities to  
23 civil aviation; and

24 (8) make prioritized recommendations on the  
25 areas described in paragraphs (1) through (7).

1 (b) TRANSMITTAL.—Not later than 2 years after the  
2 date of enactment of this Act, the Secretary shall transmit  
3 the results of the National Academies decadal survey to  
4 the Committee on Science, Space, and Technology of the  
5 House of Representatives and the Committee on Com-  
6 merce, Science, and Transportation of the Senate.

7 **SEC. 22. 5-YEAR STRATEGIC AND INTEGRATED RESEARCH**  
8 **PLAN.**

9 (a) PLAN.—Not later than 9 months after the date  
10 of transmittal of the decadal survey under section 21(b),  
11 the Secretary shall transmit to the Committee on Science,  
12 Space, and Technology of the House of Representatives  
13 and the Committee on Commerce, Science, and Transpor-  
14 tation of the Senate a Strategic and Integrated Research  
15 Plan that establishes a program of research and develop-  
16 ment activities that reflects the results of such decadal  
17 survey. The plan shall—

18 (1) describe how FAA’s research and develop-  
19 ment activities and associated projects, including  
20 those related to—

- 21 (A) NextGen-associated research;  
22 (B) research, engineering, and development  
23 and facilities and equipment;  
24 (C) grants-in-aid for airports research; and

1 (D) other research areas recommended in  
2 the decadal survey,  
3 will be interlinked to address common themes and  
4 contribute to making progress on the priorities iden-  
5 tified in the decadal survey transmitted under sec-  
6 tion 21(b);

7 (2) provide integrated research objectives, mile-  
8 stones, and timelines for achieving those priorities  
9 over the next 5 years; and

10 (3) describe research activities that will lead to  
11 procedures for the certification and operational ap-  
12 proval of new technologies for their timely and cost-  
13 effective introduction into the National Airspace  
14 System.

15 (b) REVIEW.—Not later than 3 years after the trans-  
16 mittal of the Strategic and Integrated Research Plan  
17 under subsection (a), the Secretary shall enter into an ar-  
18 rangement with the National Academies to review FAA's  
19 progress on implementing the Strategic and Integrated  
20 Research Plan.

21 (c) TRANSMITTAL OF REVIEW.—Not later than 12  
22 months after the Secretary enters into the arrangement  
23 required under subsection (b), the Secretary shall transmit  
24 the results of the National Academies' review to the Com-  
25 mittee on Science, Space, and Technology of the House

1 of Representatives and the Committee on Commerce,  
2 Science, and Transportation of the Senate.

3 **SEC. 23. CYBERSECURITY RESEARCH ACTION INITIATIVE.**

4 (a) IN GENERAL.—The Secretary shall ensure that  
5 FAA’s research and development on cybersecurity and its  
6 application across FAA is dynamic and constantly updated  
7 to reflect the evolving nature of cyber risks and threats,  
8 and that cybersecurity research and development is ap-  
9 proached in an integrated fashion consistent with the find-  
10 ings and analyses of both the Government Accountability  
11 Office and the National Academies report, “A Review of  
12 the Next Generation Air Transportation System: Implica-  
13 tions and Importance of a System Architecture”, which  
14 states that “Cybersecurity requires a system-wide ap-  
15 proach that is managed architecturally and cannot be ad-  
16 dressed piecemeal by each contractor (or program) sepa-  
17 rately. Nor can security be added to the system later.  
18 Safety properties themselves are dependent on a resilient,  
19 trustworthy, secure system, so careful integration of  
20 cybersecurity models and processes into safety analyses  
21 will become increasingly important. Finally, cybersecurity  
22 itself is an ongoing challenge in many domains and the  
23 subject of ongoing research; it will be important to track  
24 and integrate relevant results as the field continues to  
25 evolve.”. Development of an agency-wide threat model will



1 facilitate FAA in taking an integrated approach to  
2 cybersecurity.

3 (b) THREAT MODEL DEVELOPMENT.—The Secretary  
4 shall develop an agencywide threat model to strengthen  
5 cybersecurity defense across FAA. The threat model  
6 shall—

7 (1) be continuously updated;

8 (2) be capable of describing the landscape of se-  
9 curity risks to FAA’s operational systems, including  
10 those potentially caused by manned and unmanned  
11 aircraft operation in the National Airspace System;  
12 and

13 (3) enable FAA to—

14 (A) identify known threats, including in-  
15 sider threats;

16 (B) align cybersecurity efforts and re-  
17 sponses commensurate with the identified  
18 threats; and

19 (C) implement any additional actions need-  
20 ed to respond to threats and security weak-  
21 nesses that have not been addressed.

22 (c) TRANSMITTAL.—Not later than 6 months after  
23 the date of enactment of this Act, the Secretary shall  
24 transmit a classified threat model and an unclassified ex-  
25 ecutive summary to the Committee on Science, Space, and

1 Technology and the Committee on Commerce, Science and  
2 Transportation of the Senate.

3 **TITLE III—MAINTAINING SAFETY**  
4 **AND ENVIRONMENTAL RE-**  
5 **SPONSIBILITY IN A CHANG-**  
6 **ING AVIATION ENVIRONMENT**

7 **SEC. 31. REVIEW OF RESEARCH SYNERGY OF UNMANNED**  
8 **AIRCRAFT SYSTEMS TEST SITES AND CENTER**  
9 **OF EXCELLENCE.**

10 (a) REVIEW.—Not later than 3 months after the date  
11 of enactment of this Act, the Comptroller General shall  
12 initiate a review of the effectiveness of the 6 FAA un-  
13 manned aircraft system test sites and the opportunities  
14 for coordinating and integrating the research conducted  
15 at the test sites with that conducted by the Center of Ex-  
16 cellence on Unmanned Aircraft Systems. The review shall  
17 include input from stakeholders and users of the test sites  
18 and participants of the Center of Excellence.

19 (b) ISSUES.—The review shall address—

20 (1) FAA’s plans for the utilization of research  
21 carried out at the test sites and the Center of Excel-  
22 lence on Unmanned Aircraft Systems and any rela-  
23 tionship of such research to the plan required under  
24 section 22(a);

1           (2) the coordination of the research carried out  
2           at the test sites and the Center of Excellence; and  
3           (3) the mechanism by which FAA will exchange  
4           information and communications with both the test  
5           sites and the Center of Excellence on potential op-  
6           portunities for them to address FAA’s research and  
7           development needs and on potential opportunities for  
8           FAA to facilitate potential partnerships within and  
9           among the test sites, the Center of Excellence, and  
10          other relevant entities to help address FAA’s re-  
11          search and development needs.

12          (c) **TRANSMITTAL.**—The Comptroller General shall  
13          transmit the review under this section to the Committee  
14          on Science, Space, and Technology of the House of Rep-  
15          resentatives and the Committee on Commerce, Science,  
16          and Transportation of the Senate not later than 12  
17          months after the date of enactment of this Act.

18          **SEC. 32. RESEARCH AND DEVELOPMENT STRATEGY IN SUP-  
19                                  PORT OF THE SAFE INTEGRATION OF UN-  
20                                  MANNED AIRCRAFT SYSTEMS INTO THE NA-  
21                                  TIONAL AIRSPACE SYSTEM.**

22          (a) **IN GENERAL.**—The Secretary shall develop a re-  
23          search and development strategy to provide the research  
24          basis for informing any potential regulatory action regard-

1 ing the safe integration of evolving unmanned aircraft sys-  
2 tems into the National Airspace System.

3 (b) STRATEGY.—Not later than 9 months after the  
4 date of enactment of this Act, the Secretary shall transmit  
5 a research and development strategy for the integration  
6 of unmanned aircraft systems into the National Airspace  
7 System.

8 (c) ISSUES.—The strategy shall address the research  
9 needed to ensure—

10 (1) the safe integration of unmanned aircraft  
11 systems of all sizes and categories, operating alti-  
12 tudes, and degree of autonomy of operation; and

13 (2) the utilization of other relevant Federal and  
14 federally sponsored research and development activi-  
15 ties on the safe integration of unmanned aircraft  
16 systems into the National Airspace System.

17 **SEC. 33. GENERAL AVIATION SAFETY.**

18 (a) WORKSHOPS.—The Secretary shall hold at least  
19 one workshop to discuss the status of research and devel-  
20 opment focused on enhancing general aviation safety. The  
21 workshop or workshops shall—

22 (1) identify research and development that has  
23 had a measurable impact on enhancing general avia-  
24 tion safety, and the extent to which those research

1 results are disseminated to the general aviation com-  
2 munity;

3 (2) identify what further research is needed to  
4 address factors affecting general aviation safety; and

5 (3) include a broad range of experts from the  
6 Federal Government, the National Transportation  
7 Safety Board, not for profit organizations, industry,  
8 academia, and the general aviation user community.

9 (b) PLAN.—Using the results of the workshop or  
10 workshops held under subsection (a), the Secretary shall  
11 develop a plan that includes future research goals and ob-  
12 jectives and a roadmap for achieving them.

13 (c) TRANSMITTAL.—Not later than 18 months after  
14 the date of enactment of this Act, the Secretary shall  
15 transmit the plan required under subsection (b) to the  
16 Committee on Science, Space, and Technology of the  
17 House of Representatives and the Committee on Com-  
18 merce, Science, and Transportation of the Senate.

19 **SEC. 34. REVIEW OF AIRCRAFT NOISE RESEARCH AND ITS**  
20 **USE IN SUPPORTING STANDARDS.**

21 (a) IN GENERAL.—The Comptroller General shall  
22 carry out a review of Federal Government research pro-  
23 grams on aircraft noise levels and the use of such research  
24 to inform the Department of Transportation's noise eval-  
25 uation processes, adjustments to noise metrics, and devel-

1 opment of noise abatement procedures. The review shall  
2 include the research and development activities of other  
3 Federal agencies and international bodies and shall iden-  
4 tify any barriers to the application of the research to up-  
5 dating noise evaluation processes and metrics.

6 (b) TRANSMITTAL.—Not later than 1 year after the  
7 date of enactment of this Act, the Comptroller General  
8 shall transmit the review required under subsection (a) to  
9 the Committee on Science, Space, and Technology of the  
10 House of Representatives and the Committee on Com-  
11 merce, Science, and Transportation of the Senate.

12 **SEC. 35. RESEARCH TO ENHANCE AIRPORT SAFETY-RE-**  
13 **LATED DESIGN STANDARDS.**

14 (a) PLAN AND PROCESS.—The Secretary shall de-  
15 velop a plan for research on safety risk assessment meth-  
16 ods related to the development of airport design stand-  
17 ards. The plan shall also establish a process for applying  
18 risk assessment methods to the development of standards.

19 (b) REVIEW.—The Secretary shall enter into an ar-  
20 rangement with the Transportation Research Board of the  
21 National Academies to carry out a review of the plan.

22 (c) TRANSMITTAL.—Not later than 18 months after  
23 the date of enactment of the Act, the Secretary shall  
24 transmit the results of the National Academies' review to  
25 the Committee on Science, Space, and Technology and the

1 Committee on Commerce, Science, and Transportation of  
2 the Senate.

3 **SEC. 36. RESEARCH COORDINATION TO INFORM POTEN-**  
4 **TIAL AVIATION REGULATIONS ON GREEN-**  
5 **HOUSE GAS EMISSIONS.**

6 (a) RESEARCH COORDINATION.—The Director of the  
7 Office of Science and Technology Policy, in cooperation  
8 with the Secretary and other relevant Federal agencies,  
9 shall coordinate research that can inform the development  
10 of potential regulations on limiting greenhouse gas emis-  
11 sions from aircraft.

12 (b) RESEARCH TO INFORM POTENTIAL REGULA-  
13 TIONS.—The Director shall ensure that the research co-  
14 ordinated under subsection (a) is provided to the relevant  
15 Federal agencies and international bodies to help inform  
16 the development of international standards and potential  
17 United States regulations that would seek to reduce green-  
18 house gas emissions from aircraft.

19 **SEC. 37. RESEARCH TO INFORM THE ESTABLISHMENT OF**  
20 **CONTAMINANT STANDARDS FOR AIRCRAFT**  
21 **CABIN AIR CONTAMINANTS.**

22 (a) IN GENERAL.—Taking into consideration the rec-  
23 ommendations from the report to Congress submitted  
24 under section 917 of the FAA Modernization and Reform

1 Act of 2012 (42 U.S.C. 44504 note), the Secretary shall,  
2 in collaboration with relevant stakeholders—

3 (1) develop a plan, and timeline for any nec-  
4 essary research and development leading to the im-  
5 plementation of contaminant standards for aircraft  
6 cabin air contaminants; and

7 (2) facilitate commercial development and im-  
8 plementation of advanced contaminant detection and  
9 cleaning technologies.

10 (b) PLAN.—Not later than 6 months after the date  
11 of enactment of this Act, the Secretary shall transmit a  
12 copy of the plan and timeline developed under subsection  
13 (a)(1) to the Committee on Science, Space, and Tech-  
14 nology of the House of Representatives and the Committee  
15 on Commerce, Science, and Transportation of the Senate.

16 **SEC. 38. REVIEW OF THE RESEARCH, ENGINEERING, AND**  
17 **DEVELOPMENT ADVISORY COMMITTEE.**

18 (a) REVIEW.—The Comptroller General shall carry  
19 out a review of—

20 (1) the role of FAA’s Research, Engineering,  
21 and Development Advisory Committee in advising  
22 FAA on the effectiveness of the organization, man-  
23 agement, and budgetary structure of research and  
24 development programs across FAA and on both  
25 near-term budget planning and long-term strategic



1 planning for the comprehensive FAA research and  
2 development portfolio, including research included in  
3 the Research, Engineering, and Development; Facili-  
4 ties and Equipment; and Grants-in-Aid for Airports  
5 budget accounts; and

6 (2) FAA's implementation of the advice and  
7 recommendations provided by the Research, Engi-  
8 neering, and Development Advisory Committee.

9 (b) BEST PRACTICES.—The review shall consider  
10 best practices of Federal agency research and development  
11 advisory committees and make any recommendations that  
12 would strengthen the Research, Engineering, and Develop-  
13 ment Advisory Committee in its advisory role to FAA.

14 (c) TRANSMITTAL.—Not later than 1 year after the  
15 date of enactment of this Act, the Comptroller General  
16 shall transmit the review, including recommendations, to  
17 the Committee on Science, Space, and Technology of the  
18 House of Representatives and the Committee on Com-  
19 merce, Science, and Transportation of the Senate.

20 **SEC. 39. RESEARCH ON NONGOVERNMENT AIR TRAFFIC**  
21 **CONTROL OPERATIONS.**

22 (a) INDEPENDENT STUDY.—The Secretary shall  
23 enter into an arrangement for an independent external  
24 study to identify the implications that a potential non-  
25 government United States air traffic control system could

1 have on FAA's research and development activities as well  
2 as what organizational changes would be required under  
3 a nongovernmental air traffic control system for over-  
4 seeing such research and development activities.

5 (b) REPORT.—Not later than 12 months after the  
6 date of enactment of this Act, the Secretary shall transmit  
7 the results of the study to the Committee on Science,  
8 Space, and Technology of the House of Representatives  
9 and the Committee on Commerce, Science, and Transpor-  
10 tation of the Senate.