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(Original Signature of Member)

118TH CONGRESS
1ST SESSION

H. R. 3559

To provide for Federal Aviation Administration research and development,
and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

M. _____ introduced the following bill; which was referred to the
Committee on _____

A BILL

To provide for Federal Aviation Administration research and
development, 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; TABLE OF CONTENTS.**

4 (a) **SHORT TITLE.**—This Act may be cited as the
5 “FAA Research and Development Act of 2023”.

6 (b) **TABLE OF CONTENTS.**—The table of contents for
7 this Act is as follows:

- Sec. 1. Short title; table of contents.
- Sec. 2. Definitions.
- Sec. 3. Authorization of appropriations.

TITLE I —FAA RESEARCH AND DEVELOPMENT ORGANIZATION

- Sec. 101. Assistant Administrator for Research and Development.
- Sec. 102. Report on implementation; funding for safety research and development.

TITLE II —FAA RESEARCH AND DEVELOPMENT ACTIVITIES

- Sec. 201. Aviation fuel research, development, and usage.
- Sec. 202. Continuous lower energy, emission, and noise (CLEEN).
- Sec. 203. Hydrogen aviation research and development.
- Sec. 204. Air traffic surveillance over oceans and other remote locations.
- Sec. 205. Utilization of space-based assets to improve air traffic control and aviation safety.
- Sec. 206. Aviation weather technology review.
- Sec. 207. Air traffic surface operations safety.
- Sec. 208. Airport and airfield pavement technology research program.
- Sec. 209. Technology review of artificial intelligence and machine learning technologies.
- Sec. 210. Research plan for commercial supersonic research.
- Sec. 211. Electromagnetic spectrum research and development.
- Sec. 212. Aviation structures, materials, and advanced manufacturing research and development.
- Sec. 213. Research plan on the remote tower program.
- Sec. 214. Air traffic control training.
- Sec. 215. Report on aviation cybersecurity directives.

1 **SEC. 2. DEFINITIONS.**

2 In this Act:

3 (1) ADMINISTRATOR.—The term “Adminis-
4 trator” means the Administrator of the Federal
5 Aviation Administration.

6 (2) APPROPRIATE COMMITTEES OF CON-
7 GRESS.—The terms “appropriate committees of Con-
8 gress” means the Committee on Science, Space, and
9 Technology of the House of Representatives and the
10 Committee on Commerce, Science, and Transpor-
11 tation of the Senate.

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

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

3 (5) SECRETARY.—The term “Secretary” means
4 the Secretary of Transportation.

5 **SEC. 3. AUTHORIZATION OF APPROPRIATIONS.**

6 Subsection (a) of section 48102 of title 49, United
7 States Code, is amended—

8 (1) in paragraph (14), by striking “and”;

9 (2) in paragraph (15) by striking the period at
10 the end and inserting a semicolon; and

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

13 “(16) \$255,130,000; for fiscal year 2024

14 “(17) \$261,000,000 for fiscal year 2025;

15 “(18) \$267,000,000 for fiscal year 2026;

16 “(19) \$273,000,000 for fiscal year 2027; and

17 “(20) \$279,000,000 for fiscal year 2028.”.

18 **TITLE I —FAA RESEARCH AND**
19 **DEVELOPMENT ORGANIZATION**

20 **SEC. 101. ASSISTANT ADMINISTRATOR FOR RESEARCH AND**
21 **DEVELOPMENT.**

22 No funds are authorized to be appropriated for the
23 Office of the Administrator for a fiscal year unless the
24 Administrator has implemented section 711 of the FAA

1 Reauthorization Act of 2018 (Public Law 115–254; 49
2 U.S.C. 106 note).

3 **SEC. 102. REPORT ON IMPLEMENTATION; FUNDING FOR**
4 **SAFETY RESEARCH AND DEVELOPMENT.**

5 Not later than one year after the date of the enact-
6 ment of this Act, the Comptroller General of the United
7 States shall submit to the appropriate committees of Con-
8 gress a report on the allocation of funding pursuant to
9 section 48102 of title 49, United States Code, to the Sec-
10 retary of Transportation to conduct civil aviation research
11 and development under sections 44504, 44505, 44507,
12 44509, and 44511 through 44513 of such title, and to
13 assess the implementation of section 48102(b)(2) of such
14 title.

15 **TITLE II —FAA RESEARCH AND**
16 **DEVELOPMENT ACTIVITIES**

17 **SEC. 201. AVIATION FUEL RESEARCH, DEVELOPMENT, AND**
18 **USAGE.**

19 (a) ROADMAP.—The Secretary of Transportation
20 shall coordinate with the Administrator of NASA, the Sec-
21 retary of Energy, and the Administrator of the Environ-
22 mental Protection Agency, and consult relevant stake-
23 holders, including those in industry and academia, to pre-
24 pare and submit to the appropriate committees of Con-
25 gress a coordinated research and development roadmap to

1 safely eliminate the use of leaded aviation fuel without ad-
2 versely affecting the existing piston engine fleet. Such
3 roadmap shall consider activities to promote the develop-
4 ment, testing, and certification of safe and lead-free fuel
5 for use in general aviation aircraft, including requisite air-
6 port refueling infrastructure.

7 (b) PARTNERSHIP WITH PRIVATE INDUSTRY.—The
8 Administrator shall coordinate with industry regarding re-
9 search programs for mass production and distribution of
10 unleaded aviation gasoline for market viability, and define
11 criteria to explore incentive programs to reduce lead emis-
12 sions for communities in need.

13 **SEC. 202. CONTINUOUS LOWER ENERGY, EMISSION, AND**
14 **NOISE (CLEEN).**

15 (a) IN GENERAL.—The Administrator shall broaden
16 the CLEEN program to include hydrogen and other alter-
17 native aviation fuel for development, maturation, and test-
18 ing of certifiable continuous, lower energy, emission, and
19 noise (CLEEN) aircraft, engine technologies, and fuels for
20 civil airplanes.

21 (b) SCOPE.—Subsection (a) of section 47511 of title
22 49, United States Code, is amended—

23 (1) by striking “jet”; and

24 (2) by striking “subsonic”.

1 **SEC. 203. HYDROGEN AVIATION RESEARCH AND DEVELOP-**
2 **MENT.**

3 (a) IN GENERAL.—The Administrator, in consulta-
4 tion with the Administrator of NASA and the heads of
5 other relevant Federal agencies, shall lead the develop-
6 ment of a research and development strategy on the safe
7 use of hydrogen as part of a sustainable future for avia-
8 tion. Such strategy shall consider the following:

9 (1) The feasibility, opportunities, challenges,
10 and pathways toward the potential uses of hydrogen
11 in aviation.

12 (2) The use of hydrogen in combination with
13 other research and development efforts for alter-
14 natives to traditional aviation fuel.

15 (b) TRANSMITTAL.—Not later than one year after the
16 date of the enactment of the Act, the Administrator shall
17 transmit to the appropriate committees of Congress the
18 research and development strategy required under sub-
19 section (a).

20 (c) RESEARCH AND DEVELOPMENT.—Based on the
21 results of the research and development strategy under
22 subsection (a), the Administrator, in coordination with the
23 Administrator of NASA, may, using amounts made avail-
24 able under section 48102(a) of title 49, United States
25 Code, conduct research and development activities into the
26 following:

- 1 (1) The qualification of hydrogen aviation fuel.
- 2 (2) The safe transition to such fuel for aircraft.
- 3 (3) The advancement of certification efforts for
- 4 such fuel.

5 **SEC. 204. AIR TRAFFIC SURVEILLANCE OVER OCEANS AND**
6 **OTHER REMOTE LOCATIONS.**

7 (a) AIR TRAFFIC SURVEILLANCE OVER OCEANS.—
8 The Administrator, in consultation with the Administrator
9 of NASA and the heads of other relevant Federal agencies,
10 shall carry out research, development, demonstration, and
11 testing on civilian air traffic surveillance over oceans and
12 other remote locations.

13 (b) REQUIREMENTS.—In carrying out the research,
14 development, demonstration, and testing under subsection
15 (a), the Administrator shall—

16 (1) consider the need for international inter-
17 operability of technologies, data, operations, and air
18 traffic control systems;

19 (2) examine the status of using air traffic sur-
20 veillance technologies, including space-based Auto-
21 matic Dependent Surveillance-Broadcast, to facili-
22 tate the implementation of minimal separation
23 standards over United States-controlled oceanic air-
24 space;

1 testing of air traffic Space-Based Automatic Dependent
2 Surveillance-Broadcast (ADS-B) data.

3 (b) RESEARCH ACTIVITIES.—In carrying out the re-
4 search, development, demonstration, and testing under
5 subsection (a) the Administrator shall focus on the fol-
6 lowing:

7 (1) Monitoring and automatically reporting air
8 turbulence events.

9 (2) Providing space-based multilateration sur-
10 veillance.

11 (3) Identifying global positioning system (GPS)
12 and global navigation satellite system (GNSS) dis-
13 ruptions affecting air traffic services and assessing
14 the impact of such events on the safety of air traffic
15 and the National Airspace System.

16 (4) Evaluating the feasibility of implementing
17 and using aviation safety technologies and systems
18 using space-based Automatic Dependent Surveil-
19 lance-Broadcast data.

20 (c) REPORT.—Not later than 180 days after the date
21 of the enactment of this Act, the Administrator shall pro-
22 vide to the appropriate committees of Congress a report
23 on the research and development program under sub-
24 section (a) and the information obtained pursuant to the
25 activities researched pursuant to subsection (b).

1 **SEC. 206. AVIATION WEATHER TECHNOLOGY REVIEW.**

2 (a) REVIEW.—The Administrator, in consultation
3 with the Administrator of the National Oceanic and At-
4 mospheric Administration, shall conduct a review of cur-
5 rent and planned research, modeling, and technology capa-
6 bilities that have the potential to more accurately detect
7 and predict weather impacts to aviation, inform how ad-
8 vanced predictive models can enhance aviation operations,
9 and increase national airspace system safety and effi-
10 ciency.

11 (b) REPORT.—Not later than one year after the date
12 of the enactment of this Act, the Administrator shall sub-
13 mit to the appropriate committees of Congress a report
14 containing the results of the review conducted under sub-
15 section (a).

16 **SEC. 207. AIR TRAFFIC SURFACE OPERATIONS SAFETY.**

17 (a) RESEARCH.—The Administrator, in consultation
18 with the Administrator of NASA and the heads of other
19 appropriate Federal agencies, shall continue to carry out
20 research on technologies and operations to enhance air
21 traffic surface operations safety.

22 (b) REQUIREMENTS.—The research program under
23 subsection (a) shall examine the following:

24 (1) The safety of current air traffic control op-
25 erations.

1 (2) Emerging in-cockpit technologies to enhance
2 ground situational awareness.

3 (3) Emerging technologies to enhance air traffic
4 control situational awareness.

5 (4) Air traffic surface operations safety for di-
6 verse advanced air mobility operations.

7 (5) Safety and operational data needed to in-
8 form current and future safety programs on ad-
9 vanced air mobility vehicles.

10 (c) REPORT.—Not later than 18 months after the
11 date of the enactment of this Act, the Administrator shall
12 submit to the appropriate committees of Congress a report
13 on the research carried out under this section, including
14 regarding the transition into operational use of such re-
15 search.

16 **SEC. 208. AIRPORT AND AIRFIELD PAVEMENT TECH-**
17 **NOLOGY RESEARCH PROGRAM.**

18 Section 744 of the FAA Reauthorization Act of 2018
19 (Public Law 115–254; 49 U.S.C. 44505 note) is amend-
20 ed—

21 (1) in paragraph (3), by striking “and”;

22 (2) in paragraph (4), by striking “durable air-
23 field pavements.” and inserting “resilient and sus-
24 tainable airfield pavements; and”; and

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

3 “(5) develop sustainability and resiliency guide-
4 lines to improve long-term pavement performance
5 and reduce carbon emissions.”.

6 **SEC. 209. TECHNOLOGY REVIEW OF ARTIFICIAL INTEL-**
7 **LIGENCE AND MACHINE LEARNING TECH-**
8 **NOLOGIES.**

9 (a) REVIEW.—The Administrator shall conduct a re-
10 view of current and planned artificial intelligence and ma-
11 chine learning technologies to improve airport efficiency
12 and safety.

13 (b) SUMMARIES.—The review conducted under sub-
14 section (a) shall include examination of the application of
15 artificial intelligence and machine learning technologies to
16 the following:

17 (1) Jet bridges.

18 (2) Airport service vehicles on airport move-
19 ment areas.

20 (3) Aircraft taxi.

21 (4) FAA air traffic control operations.

22 (5) Airport security.

23 (6) Any other areas the Administrator deter-
24 mines necessary to help improve airport efficiency
25 and safety.

1 (c) REPORT.—Not later than one year after the date
2 of the enactment of this Act, the Administrator shall sub-
3 mit to the appropriate committees of Congress a report
4 containing the results of the review conducted under sub-
5 section (a).

6 **SEC. 210. RESEARCH PLAN FOR COMMERCIAL SUPERSONIC**
7 **RESEARCH.**

8 Not later than one year after the date of the enact-
9 ment of this Act, the Administrator, in consultation with
10 the Administrator of NASA and industry, shall submit to
11 the appropriate committees of Congress a comprehensive
12 research plan to build on research and development and
13 identify any further research and development needed to
14 support establishment of Federal and international poli-
15 cies, regulations, standards, and recommended practices
16 relating to the certification and safe and efficient oper-
17 ation of civil supersonic aircraft and supersonic overland
18 flight.

19 **SEC. 211. ELECTROMAGNETIC SPECTRUM RESEARCH AND**
20 **DEVELOPMENT.**

21 (a) IN GENERAL.—The Administrator shall conduct
22 research, engineering, and development related to the ef-
23 fective and efficient use and management of radio fre-
24 quency spectrum in the civil aviation domain, including for
25 aircraft, unmanned aircraft systems, and advanced air

1 mobility. Such research, engineering, and development
2 shall, at a minimum, address the following:

3 (1) How reallocation or repurposing of radio
4 frequency spectrum adjacent to spectrum allocated
5 for communication, navigation, and surveillance may
6 impact the safety of civil aviation.

7 (2) The effectiveness of measures to identify
8 risks, protect, and mitigate against spectrum inter-
9 ference in frequency bands used in civil and commer-
10 cial aviation operations to ensure public safety

11 (3) The implications, including risks, of new or
12 emerging technologies or other factors on the envi-
13 ronment for radio frequency spectrum interference;
14 and

15 (4) How various new or emerging technologies
16 may enable improvements in the prevention of, miti-
17 gation of, or resilience to interference.

18 (b) REPORT.—Not later than one year after the date
19 of the enactment of this Act, the Administrator shall sub-
20 mit to the appropriate committees of Congress a report
21 containing the results of the research, engineering, and de-
22 velopment conducted under subsection (a).

1 **SEC. 212. AVIATION STRUCTURES, MATERIALS, AND AD-**
2 **VANCED MANUFACTURING RESEARCH AND**
3 **DEVELOPMENT.**

4 (a) IN GENERAL.—Using the amounts available
5 under section 48102(a) of title 49, United States Code,
6 the Administrator, in coordination with the Director of the
7 National Institute of Standards and Technology, shall
8 carry out a research and development program for advanc-
9 ing aviation structures, materials, and manufacturing for
10 the safe use in and on aircraft.

11 (b) INCLUSION.—The program under subsection (a)
12 shall, to the extent practicable, include research and devel-
13 opment relating to the following:

14 (1) Metallic and non-metallic based additive
15 materials and processes, composites, and other ad-
16 vanced materials.

17 (2) Process development for the development of
18 design and manufacturing standards for aviation
19 structures, materials, and additive manufacturing.

20 (3) Improving certification efficiency of aviation
21 structures, materials, and additively manufactured
22 aviation products and components.

23 (4) Evaluating long-term material and struc-
24 tural behavior and associated maintenance, including
25 support for fatigue life determination, structural
26 changes related to fatigue, thermal, corrosive envi-

1 ronments, and expected maintenance of such mate-
2 rials, including recommended repair techniques.

3 (5) Partnering with commercial entities to ma-
4 ture and certify, as appropriate, metal additive man-
5 ufacturing, including large-scale additive manufac-
6 turing, aviation structures, and advanced materials
7 capabilities, including the development and qualifica-
8 tion of new material chemistries, to be used in the
9 manufacture of aircraft.

10 (c) REPORT.—Not later than 180 days after the date
11 of the enactment of this Act, the Administrator shall pro-
12 vide to the appropriate committees of Congress a report
13 on the findings of the research under subsection (a).

14 **SEC. 213. RESEARCH PLAN ON THE REMOTE TOWER PRO-**
15 **GRAM.**

16 (a) IN GENERAL.—Not later than 180 days after the
17 date of the enactment of this Act, the Administrator shall
18 submit to the appropriate committees of Congress a com-
19 prehensive plan for research, development, testing, and
20 evaluation needed to mature remote tower technology and
21 provide a strategic roadmap to support standards develop-
22 ment, validation, and operational certification of such
23 technology.

24 (b) CONSIDERATIONS.—As part of the plan required
25 under subsection (a), the Administrator should consider

1 the use of remote tower technologies for advanced air mo-
2 bility operations.

3 **SEC. 214. AIR TRAFFIC CONTROL TRAINING.**

4 (a) RESEARCH.—Using amounts made available
5 under section 48102(a) of title 49, United States Code,
6 the Administrator shall carry out a research program to
7 evaluate opportunities to modernize, enhance, and stream-
8 line training time to become a Certified Professional Con-
9 troller.

10 (b) REQUIREMENTS.—The research under subsection
11 (a) shall—

12 (1) assess the use of advanced technologies,
13 such as artificial intelligence, machine learning,
14 adaptive computer-based simulation, virtual reality,
15 or augmented reality, to enhance controller knowl-
16 edge retention, improve performance, and improve
17 the effectiveness of training time; and

18 (2) develop a timeline to deploy proven ad-
19 vanced technologies and associated processes for ac-
20 creditation in training programs and training facili-
21 ties within the national airspace system.

22 (c) REPORT.—Not later than one year after the date
23 of the enactment of this Act, the Administrator shall sub-
24 mit to the appropriate committees of Congress a report
25 on the findings of the research under subsection (a).

1 **SEC. 215. REPORT ON AVIATION CYBERSECURITY DIREC-**
2 **TIVES.**

3 Not later than 180 days after the date of enactment
4 of this Act, the Administrator shall submit to the appro-
5 priate committees of Congress a report on the status of
6 the FAA's implementation of section 2111 of the FAA Ex-
7 tension, Safety, and Security Act of 2016 (Public Law
8 114–190; 49 U.S.C. 44903 note; relating to the develop-
9 ment of a comprehensive and strategic aviation cybersecu-
10 rity framework and establishment of a research and devel-
11 opment plan to mitigate cybersecurity risks in the Na-
12 tional Airspace System). The report, at minimum, shall
13 include the following:

14 (1) A description of the FAA's progress in de-
15 veloping, implementing, and updating such frame-
16 work.

17 (2) A description of prioritized research and de-
18 velopment activities for the most needed improve-
19 ments with target dates to safeguard the National
20 Airspace System.

21 (3) An explanation for any delays or challenges
22 in so implementing such section.