

116TH CONGRESS
1ST SESSION

S. 2703

To enhance the recognition of, and response to, aircraft failure conditions,
and for other purposes.

IN THE SENATE OF THE UNITED STATES

OCTOBER 24, 2019

Ms. CANTWELL (for herself and Ms. DUCKWORTH) introduced the following
bill; which was read twice and referred to the Committee on Commerce,
Science, and Transportation

A BILL

To enhance the recognition of, and response to, aircraft
failure conditions, 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 “Aviation Automation
5 and Human Factors Safety Act of 2019”.

6 **SEC. 2. ENHANCING PILOT RECOGNITION OF, AND RE-**
7 **SPONSE TO, FAILURE CONDITIONS.**

8 (a) IN GENERAL.—As recommended by the National
9 Transportation Safety Board in Aviation Safety Rec-
10 ommendation Report ASR–19–01 issued on September

1 19, 2019, and titled “Assumptions Used in the Safety As-
2 sessment Process and the Effects of Multiple Alerts and
3 Indications on Pilot Performance”, the Administrator of
4 the Federal Aviation Administration (in this Act referred
5 to as the “Administrator”), shall do the following:

6 (1) 737 MAX.—Require, with respect to 737
7 MAX aircraft, the manufacturer of such aircraft to
8 demonstrate to the satisfaction of the Administrator
9 that—

10 (A) system safety assessments for such air-
11 craft, including those in which immediate and
12 appropriate pilot corrective actions are assumed
13 in response to uncommanded flight control in-
14 puts from systems such as the Maneuvering
15 Characteristics Augmentation System, consider
16 the effect of all possible flight deck alerts and
17 indications on pilot recognition and response;
18 and

19 (B) design enhancements (including flight
20 deck alerts and indications), pilot procedures,
21 and training requirements, are incorporated
22 into such aircraft where needed, to minimize
23 the potential for, and safety impact of, pilot ac-
24 tions that are inconsistent with manufacturer
25 assumptions.

1 (2) OTHER AIRCRAFT.—Require that manufac-
2 turers of all United States type-certificated trans-
3 port-category aircraft (other than 737 MAX air-
4 craft) demonstrate to the satisfaction of the Admin-
5 istrator that—

6 (A) system safety assessments for such air-
7 craft, including those in which immediate and
8 appropriate pilot corrective actions are assumed
9 in response to uncommanded flight control in-
10 puts consider the effect of all possible flight
11 deck alerts and indications on pilot recognition
12 and response; and

13 (B) design enhancements (including flight
14 deck alerts and indications), pilot procedures,
15 and training requirements, are incorporated
16 into such aircraft where needed, to minimize
17 the potential for, and safety impact of, pilot ac-
18 tions that are inconsistent with manufacturer
19 assumptions.

20 (3) INTERNATIONAL REGULATORS.—Notify
21 international regulators that certify transport-cat-
22 egory aircraft type designs (such as the European
23 Union Aviation Safety Agency, Transport Canada,
24 the National Civil Aviation Agency-Brazil, the Civil
25 Aviation Administration of China, and the Russian

1 Federal Air Transport Agency) of the requirements
2 under subparagraphs (A) and (B) of paragraph (2)
3 and encourage such regulators to evaluate the rel-
4 evance of such requirements to their processes and
5 address any changes, if applicable.

6 (4) DEVELOPMENT OF TOOLS AND METHODS
7 FOR VALIDATING ASSUMPTIONS.—

8 (A) DEVELOPMENT.—Develop robust tools
9 and methods, with the input of industry and
10 human factors experts, for use in validating as-
11 sumptions about pilot recognition and response
12 to safety-significant failure conditions as part of
13 the aircraft design certification process.

14 (B) REVISION OF REGULATIONS AND
15 GUIDANCE.—After the tools and methods have
16 been developed as recommended under subpara-
17 graph (A), revise existing Federal Aviation Ad-
18 ministration regulations and guidance to incor-
19 porate the use of such tools and methods and
20 require documentation as part of the aircraft
21 design certification process, including re-exam-
22 ining the validity of pilot recognition and re-
23 sponse assumptions permitted in existing Fed-
24 eral Aviation Administration guidance.

1 (5) DEVELOPMENT AND IMPLEMENTATION OF
2 DIAGNOSTIC TOOLS.—

3 (A) DEVELOPMENT.—Develop design
4 standards, with the input of industry and
5 human factors experts, for aircraft system diag-
6 nostic tools that improve the prioritization and
7 clarity of failure indications (direct and indi-
8 rect) presented to pilots to improve the timeli-
9 ness and effectiveness of their response.

10 (B) IMPLEMENTATION.—After the design
11 standards have been developed under subpara-
12 graph (A), require implementation of system di-
13 agnostic tools on transport-category aircraft to
14 improve the timeliness and effectiveness of pi-
15 lots' response when multiple flight deck alerts
16 and indications are present.

17 (b) ANNUAL REPORT ON PROGRESS.—Not later than
18 1 year after the date of the enactment of this Act, and
19 annually thereafter, the Administrator shall submit to
20 Congress a report on the progress of the Administrator
21 in carrying out the requirements under subsection (a).
22 Such report shall also include recommendations for such
23 legislation and administrative action as the Administrator
24 determines appropriate.

1 **SEC. 3. ENHANCING THE ABILITY OF THE FAA TO ENSURE**
2 **THAT AIR CARRIERS SUFFICIENTLY ADDRESS**
3 **PILOT MONITORING AND MANUAL FLYING**
4 **SKILLS.**

5 As recommended by the Inspector General of the De-
6 partment of Transportation in audit report AV–2016–013
7 issued on January 7, 2016, and titled “Enhanced FAA
8 Oversight Could Reduce Hazards Associated With In-
9 creased Use of Flight Deck Automation”, the Adminis-
10 trator, in order to enhance the ability of the Federal Avia-
11 tion Administration to ensure that air carriers sufficiently
12 address pilot monitoring and manual flying skills, shall,
13 not later than 1 year after the date of enactment of this
14 Act—

15 (1) issue guidance defining pilot monitoring
16 metrics that air carriers may use to train and evalu-
17 ate pilots, including metrics or measurable tasks
18 that air carriers can use to evaluate pilot monitoring
19 proficiency; and

20 (2) establish and disseminate standards to de-
21 termine whether pilots receive sufficient training op-
22 portunities to develop, maintain, and demonstrate
23 manual flying skills necessary to ensure pilots can
24 recover from an unexpected event or failures with
25 highly automated cockpit systems.

1 **SEC. 4. REQUIREMENT THAT DESIGN AND PRODUCTION**
2 **ORGANIZATIONS HAVE IN PLACE A SAFETY**
3 **MANAGEMENT SYSTEM.**

4 (a) RULEMAKING.—The Administrator shall conduct
5 a rulemaking proceeding to require that design and pro-
6 duction approval holders for aviation products have in
7 place a safety management system (SMS) that is con-
8 sistent with the standards established by the International
9 Civil Aviation Organization for such systems.

10 (b) FINAL RULE.—Not later than 1 year after the
11 date of enactment of this Act, the Administrator shall
12 issue a final rule pursuant to the rulemaking conducted
13 under subsection (a).

14 (c) SURVEILLANCE AND AUDIT REQUIREMENT.—
15 Under the final rule issued pursuant to subsection (b), the
16 Administrator shall implement documented surveillance
17 processes by defining and planning inspections, audits,
18 and monitoring activities on a continuous basis, to ensure
19 that design and production approval holders for aviation
20 products continue to meet the established requirements
21 under the rule.

22 **SEC. 5. FAA CENTER FOR EXCELLENCE FOR FLIGHT AUTO-**
23 **MATION AND HUMAN FACTORS IN COMMER-**
24 **CIAL AIRCRAFT.**

25 (a) CENTER.—

1 (1) IN GENERAL.—The Administrator shall de-
2 velop a Center for Excellence focused on flight auto-
3 mation and human factors in commercial aircraft.

4 (2) DUTIES.—The Center for Excellence
5 shall—

6 (A) promote and facilitate collaboration
7 among academia, the Federal Aviation Adminis-
8 tration, and the commercial aircraft and airline
9 industries, including aircraft manufacturers,
10 commercial air carriers, and representatives of
11 the airline pilot community; and

12 (B) establish goals for research and con-
13 tinuing education in areas of study relevant to
14 advancing technology, improving engineering
15 practices, and facilitating better understanding
16 of human factors concepts in the context of the
17 growing development and reliance on automa-
18 tion in commercial aircraft.

19 (b) AUTHORIZATION OF APPROPRIATIONS.—There is
20 authorized to be appropriated to the Administrator such
21 sums as may be necessary to carry out this section.

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