

116TH CONGRESS  
1ST SESSION

# S. 2703

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

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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

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## 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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