

AVIATION AUTOMATION AND HUMAN FACTORS SAFETY ACT OF 2019

The Aviation Automation and Human Factors Safety Act would implement recommendations from the National Transportation Safety Board (NTSB), U.S. Department of Transportation's Office of Inspector General (DOT IG), and the International Civil Aviation Organization (ICAO). These recommendations seek to address challenges related to increased automation in commercial aircraft cockpits, as well as how pilots respond to flight deck alerts and uncommanded flight control inputs. The bill would also create an FAA Center of Excellence dedicated to studying flight automation and human factors in commercial aircraft.

In September 2019, the NTSB released seven safety recommendations related to the two 737 MAX crashes in October 2018 and March 2019. Previously, in 2016 the DOT IG released recommendations aimed at helping airlines and aerospace manufacturers address the challenge of a growing reliance on automatic in commercial aircraft. In 2013, ICAO recommended civil aviation authorities require aerospace manufacturers to adopt safety management systems (SMS) to identify and control risks.

SUMMARY OF LEGISLATION

Implementation of NTSB Recommendations

For the Boeing 737 MAX aircraft specifically, FAA would direct Boeing to:

- Ensure that system safety assessments for the 737 MAX in which it assumed immediate and appropriate pilot corrective actions in response to uncommanded flight control inputs, from systems such as the MCAS, consider the effect of all possible flight deck alerts and indications on pilot recognition and response; and
- Incorporate design enhancements (including flight deck alerts and indications), pilot procedures, and training requirements, where needed, to minimize the potential for and safety impact of pilot actions that are inconsistent with manufacturer assumptions.

For all other US type-certificated transport-category airplanes, FAA would require that manufacturers:

- Ensure that system safety assessments for which they assumed immediate and appropriate pilot corrective actions in response to uncommanded flight control inputs consider the effect of all possible flight deck alerts and indications on pilot recognition and response; and
- Incorporate design enhancements (including flight deck alerts and indications), pilot procedures, and training requirements, where needed, to minimize the

potential for and safety impact of pilot actions that are inconsistent with manufacturer assumptions.

FAA communication with international regulators:

- FAA would be required to notify other international regulators that certify transport-category airplane type designs (for example, the European Union Aviation Safety Agency, Transport Canada, the National Civil Aviation Agency-Brazil, the Civil Aviation Administration of China, and the Russian Federal Air Transport Agency) of these recommendations and encourage them to evaluate the relevance to their processes and address any changes, if applicable.

Development of tools and methods for validating assumptions:

- FAA would be required to develop robust tools and methods, with the input of industry and human factors experts, for use in validating assumptions about pilot recognition and response to safety-significant failure conditions as part of the design certification process.
- Once the tools and methods have been developed as recommended, FAA would be required to revise existing FAA regulations and guidance to incorporate their use and documentation as part of the design certification process, including re-examining the validity of pilot recognition and response assumptions permitted in existing FAA guidance.

Development and implementation of diagnostic tools:

- FAA would be required to develop design standards, with the input of industry and human factors experts, for aircraft system diagnostic tools that improve the prioritization and clarity of failure indications (direct and indirect) presented to pilots to improve the timeliness and effectiveness of their response.
- Once the design standards have been developed as recommended, FAA would be required to implement system diagnostic tools on transport-category aircraft to improve the timeliness and effectiveness of pilots' response when multiple flight deck alerts and indications are present.

Inspector General Recommendations – Flight Deck Automation Hazards

The bill would mandate FAA compliance with 2016 recommendations from the DOT Inspector General intended to ensure appropriate standards and methodologies are in

place to manage the challenge of growing reliance on automation in complex aircraft. FAA would be required to:

- Provide guidance defining standards that airlines can use to train and evaluate pilots in the use of automation; and
- Establish standards to determine whether pilots receive sufficient training opportunities to develop and maintain manual flying skills.

Safety Management Systems for Aircraft Manufacturers

The bill would mandate an FAA rulemaking requiring that each design and production approval holder for aviation products must establish a safety management system (or “SMS”) consistent with the standards of the International Civil Aviation Organization. FAA initiated and then suspended such a rulemaking project in 2014. The legislation would direct FAA to reengage and expedite the rulemaking to help enhance the safety management process and FAA’s surveillance of the design and manufacturing of aviation products.

Center of Excellence for Flight Automation and Human Factors in Commercial Aircraft

The bill would create an FAA “Center of Excellence” focused on flight automation and human factors in commercial aircraft. The new Center of Excellence would be tasked with promoting and facilitating collaboration among academia, the Federal Aviation Administration, and the commercial aircraft and airline industries – including aircraft manufacturers, commercial air carriers, and representatives of the airline pilot community.