

The House Committee on Transportation & Infrastructure

Chairman Peter A. DeFazio

H.R. ____ "Aircraft Certification Reform and Accountability Act"

Introduced by T&I Committee Chair Peter DeFazio (D-OR) and Ranking Member Sam Graves (R-MO); Aviation Subcommittee Chair Rick Larsen (D-WA) and Ranking Member Garret Graves (R-LA) September 28, 2020

EXECUTIVE SUMMARY

A bipartisan bill, H.R. _____ makes significant reforms to the Federal Aviation Administration's (FAA) aircraft certification process and ensures transparency, accountability, and integrity in FAA regulation of U.S. manufacturers of aircraft, parts, and components. The bill includes a comprehensive set of provisions that mandate rigorous FAA review and oversight of manufacturers; restore and enhance FAA certification authorities ceded to industry over time; impose civil penalties on manufacturers that fail to disclose safety-critical information on aircraft designs to the FAA; require manufacturers to adopt imperative safety management and reporting systems and meet heightened design standards; and ensure the FAA has the technical expertise, staff, and resources necessary to carry out its critical mission and manage growing and increasingly complex aircraft certification projects. Through these provisions and others, H.R. _____ will ensure U.S.-manufactured aircraft flown across the globe remain the safest in the world.

BACKGROUND

On October 29, 2018, an almost brand-new Boeing 737 MAX operating Lion Air flight 610 dove into the Java Sea after a harrowing 13-minute flight that involved horrific pitch oscillations as the plane careened out of control. Less than five months later, on March 10, 2019, a 737 MAX operating Ethiopian Airlines flight 302 crashed into the earth at more than 700 miles per hour just six minutes after takeoff from Addis Ababa. The accidents led to the combined deaths of 346 people, including eight Americans, and resulted in an ongoing worldwide grounding of the 737 MAX: the longest grounding of a transport-category airplane in civil aviation history. The tragic accidents laid bare serious deficiencies in the design and approval of new airliners, each one of which transports hundreds of millions of people each year. Multiple investigations, including the <u>Committee's own 18-month investigation</u> that concluded earlier this month, exposed inexcusable safety lapses in the 737 MAX's design, development, and certification, and have resulted in numerous recommendations to address those lapses—within both the FAA and Boeing.

In the aftermath of the accidents, the public learned that the 737 MAX's maneuvering characteristics augmentation system (MCAS)—a new software system in the airplane's flight control computer—applied nose-down control forces without pilot input, ultimately putting the airplane into dives that the pilots were unable to counteract. MCAS was triggered in both cases by failure of a single angle-of-attack (AOA) sensor, which measures the angle between the airplane's wings and oncoming air and erroneously detected a high AOA, triggering an aggressive and erroneous MCAS activation. Although all 737 MAX have two AOA sensors, MCAS was, in contradiction to long-standing tenants of aviation engineering principles and an FAA requirement, designed to rely on the data from a *single* AOA sensor.

Moreover, Boeing never appropriately addressed numerous technical concerns during the design of the 737 MAX and concealed information about the airplane from the FAA and the company's airline customers. For instance, Boeing failed to inform the FAA that in a 2012 simulator test it took a Boeing test pilot 10 seconds to respond to an MCAS activation resulting in "catastrophic" consequences, when the company's own design assumptions required a pilot response time of four seconds to identify and correct such an event. And Boeing intentionally omitted references to MCAS from pilots' operating manuals for the 737 MAX. As a result, pilots did not know the system was part of the airplane—and the crew of Lion Air flight 610, the first flight to crash, were completely overwhelmed by a cacophony of alerts and warnings as they fought in vain against the unknown force that was pushing their aircraft's nose toward the Java Sea.

T&I COMMITTEE INVESTIGATION AND KEY FINDINGS

Following the Ethiopian Airlines flight 302 accident in March 2019, under the leadership of Committee Chair Peter DeFazio (D-OR) and Aviation Subcommittee Chair Rick Larsen (D-WA), the Committee launched an investigation into the design, development, and certification of the 737 MAX and related matters that led to the two crashes. The Committee's comprehensive investigation uncovered numerous acts and omissions within both Boeing and the FAA that culminated in the two tragic 737 MAX accidents.

"Jedi mind tricks." Undisputed evidence, both widely reported in the press as well as provided to the Committee, establishes that, during development of the 737 MAX, Boeing changed MCAS so that, instead of activating only in steep turns at high speeds as originally intended, it would be triggered any time the nose of the airplane was pointed dangerously upward at a high angle of attack. Additionally, activation of this safety-critical system would be triggered by a single data input—an angle-of-attack sensor—leaving the airplane susceptible to loss of control if that single sensor failed. No one in the FAA fully appreciated the possibility that the angle-of-attack sensors represented a single point of failure that could lead to an accident caused by MCAS—and Boeing went to great lengths to ensure existing 737 pilots would undergo only minimal training to qualify on the 737 MAX. In November 2016, Mark Forkner, then Boeing's chief technical pilot for the 737 program, boasted in an e-mail that he would be "jedi-mind tricking [sic] regulators into accepting the training that I got accepted by FAA."

Pilots uninformed about MCAS. The unions representing pilots at American Airlines and Southwest Airlines, both of which operate the 737 MAX, allege their members were not made aware of MCAS and the system's ability to command the 737 MAX into a dive before the Lion Air accident. The then-president of the American Airlines pilot union testified before the Aviation Subcommittee in June that "[t]he huge error of omission was the fact that Boeing failed to disclose the existence of the MCAS system to the pilot community around the world."

Moreover, information on MCAS was disjointed both within Boeing and in Boeing's disclosures to the FAA. The National Transportation Safety Board reported that Boeing never performed a complete assessment of how an erroneous MCAS activation would present itself to pilots, and Boeing certainly never informed the FAA about the airplane-level effects of MCAS activation in a manner that would have prompted FAA staff to ask probing questions about the safety of the system as Boeing designed it.

Conflicted FAA deputies. Boeing holds authority granted by the FAA to select employees who will effectively act as the FAA Administrator's deputies and determine whether or not a particular new system or component meets FAA requirements. This authority is called an "organization designation authorization," or "ODA," and the Boeing employees who wield the power of the FAA are called "ODA unit members." At multiple junctures, ODA unit members at Boeing either raised questions about the safety of MCAS that went unanswered or were not able to communicate effectively with FAA technical

specialists because they were required to channel their communications through Boeing management. More troublingly, 39 percent of the ODA unit members at Boeing responded in an internal Boeing survey that they felt "undue pressure" from Boeing management to make decisions in the company's interest.

Captive regulator. Finally, the Committee's investigation uncovered instances displaying Boeing's influence over the FAA and more generally, a regulator held captive by private industry. For example, on several occasions, senior FAA officials overruled the agency's own technical specialists when the specialists determined a Boeing aircraft design to be unsafe. A recent survey of FAA employees in the agency's Office of Aviation Safety found an alarming level of frustration with the FAA oversight structure and industry influence over the agency's safety-related decisions. When asked what prevents them from reporting safety concerns, 49 percent of the FAA employees surveyed said they believed safety concerns/incidents would not be addressed even if they did and another 54 percent of employees in the agency's certification office said the FAA does not appropriately delegate certification activities to external FAA designees. Even more troubling, 56 percent of these certification employees believed there was too much external influence on the agency and that such influence was having an impact on the FAA's safety decisions. This shows a clear need for strengthened FAA oversight of manufacturers and for the FAA to reinforce its position and standing as the safety regulator.

H.R. XXXX, AIRCRAFT CERTIFICATION REFORM AND ACCOUNTABILITY ACT

To strengthen the FAA's oversight and certification process for new aircraft, and the safety of global air travel, H.R. ____, the "Aircraft Certification Reform and Accountability Act":

- Requires U.S. aircraft and aerospace industry manufacturers to adopt safety management systems, which include non-punitive, confidential safety reporting programs for their employees;
- Requires an expert review panel to evaluate Boeing's safety culture and to make recommendations for improvements;
- Requires that manufacturers complete system safety assessments for significant design changes of previously FAA-certificated aircraft that account for the airplane-level effects of failures and that assess risk based on realistic assumptions of pilot response time;
- Requires the FAA to impose limitations on the agency's practice of amending type certificates
 of older airplane designs to add new derivatives, which in some cases limits the amount of
 analysis that the FAA conducts with respect to design changes;
- Prohibits a manufacturer's failure to disclose, to pilots and the FAA, detailed information on systems like MCAS that can alter an airplane's flightpath without pilot command and other augmentation and autoflight systems;
- Prohibits delivery of airplanes that do not conform to their FAA-approved type designs except under limited circumstances, including that the nonconformity must have been unintentional and must not reduce safety by any measure;
- Extends airline whistleblower protections to U.S. manufacturing employees so these employees can report safety concerns without fear of reprisal by their employers;
- Requires FAA approval of ODA unit members engaged in the design of airplanes pursuant to ODAs, and imposes a civil penalty against those individuals within a company who interfere with an unit member's performance of their FAA-authorized duties, including by harassment or threat;
- Authorizes appropriations for recruiting new and retaining FAA certification-related personnel and directs the FAA to provide professional development and skills enhancement opportunities for agency engineers, inspectors, and other certification employees; and more.

A full section-by-section description of H.R. ____ can be found <u>here</u>.