

BOEING 737 MAX TIMELINE

Certification Activities

Grounding Order – The FAA issued an Emergency Order or Prohibition grounding the Boeing 737 MAX on March 13, 2019.

Interim Work – The FAA engaged with Boeing, operators, international civil aviation regulators, and independent review panels investigating the crashes of Lion Air Flight 610 and Ethiopian Airlines Flight 302. This work resulted in the identification of seven safety issues that played a role in the two accidents.

Evaluation of Failure Conditions (1301/1309) Testing – Multiple tests of software for failure conditions were conducted after Boeing submitted a new software architecture that relied on the simultaneous use of two Flight Control Computers. Initial testing was completed in November 2019, and the final evaluation was completed on August 13, 2020.

Crew Workload/Human Factors Testing – Crew Workload/Human Factors 1302 testing with flight crews from Southwest Airlines, American Airlines, United Airlines, and Aeromexico was conducted during the week of December 2, 2019.

Software Audits – Audit of the software development process was completed to verify safety requirements were appropriately coded into the software. The FAA completed an initial audit during the week of June 15, 2020, and the final audit on September 14, 2020.

FAA Certification Flight Test – The FAA and Boeing conducted the certification flight test to evaluate Boeing's proposed changes to the automated flight control system on the 737 MAX during the week of June 29, 2020. All conditions flown were satisfactory.

Notice of Proposed Rulemaking (NPRM) – The FAA issued the NPRM for an Airworthiness Directive to collect public comments on the design changes to the 737 MAX flight control computer. The comment period closed on September 21, 2020.

Joint Operations Evaluation Board (JOEB)/Flight Standardization Board (FSB) – To support the review of proposed training for the Boeing 737 MAX and carry out the functions of the FSB, a JOEB was established. The JOEB was comprised of the FAA, and the civil aviation authorities of Brazil (ANAC), Canada (TCCA), and Europe (EASA). The JOEB conducted training sessions with global pilots (with varied experience in the 737 MAX) to validate proposed training requirements. The JOEB completed its work on September 22, 2020.

Administrator's Flight – FAA Administrator Steve Dickson took the recommended pilot training, including academic and simulator training on September 29, 2020. He followed that training with a familiarization flight on September 30, 2020, during which he piloted the aircraft for two hours to evaluate its handling qualities and the functionality of the flight control system.

Draft Flight Standardization Board (FSB) Report –The FAA posted the draft FSB Report to collect public comments on the changes to minimum pilot training requirements. The comment period closed on November 2, 2020.

Consideration of Boeing’s Final Design Documentation – Boeing submitted its final design documentation to the FAA on October 16, 2020. The FAA reviewed the documentation, made a finding of compliance with the applicable regulations, and issued the design approval to Boeing on November 17, 2020.

FAA Approves Boeing’s Service Bulletin – Boeing proposed a Service Bulletin with instructions for operators to modify their aircraft. The FAA approved it for issuance on November 17, 2020.

FSB Final Report – The FAA issued the 737 FSB Report, which sets minimum pilot training requirements, on November 18, 2020.

Airworthiness Directive (AD) – The FAA issued an Airworthiness Directive on November 18, 2020, which applies to 737 MAX airplanes that received FAA airworthiness certificates and export certificates of airworthiness prior to the date of issuance of the Rescission of Emergency Order of Prohibition (November 18, 2020). The AD mandates actions to correct the unsafe condition. This AD takes effect once the Federal Register officially publishes it.

FAA Rescinds Grounding Order – On November 18, 2020, FAA Administrator Steve Dickson signed a rescission of the grounding order issued in March 2019. This marks the FAA’s official ungrounding of the aircraft, pending operators’ completion of the work specified in the AD, along with any required training.

Return to Service Activities

Certificates of Airworthiness – The FAA will retain its authority to issue airworthiness certificates and export certificates of airworthiness for all new 737 MAX airplanes manufactured since the grounding. The FAA will perform in-person, individual reviews of these aircraft.

Operator Training Programs – The FAA will review and approve training programs for all U.S. air carriers.

ADDITIONAL INFORMATION

Independent Expert Reviews & Investigations

Technical Advisory Board (TAB)

- The FAA commissioned a TAB to independently review Boeing's proposed corrective actions. The TAB is made up of experts with no involvement in the initial certification of the 737 MAX, including members from the National Aeronautics and Space Administration, the United States Air Force, the Volpe National Transportation Systems Center, and the FAA.
- The TAB originally met in Spring 2019 and reviewed proposed MCAS changes at that time. Since that time, they reviewed all proposed modifications and made recommendations throughout the process. The FAA addressed all return to service recommendations prior to rescinding the grounding order. The TAB delivered its final report to the FAA on November 17, 2020.

Joint Authorities Technical Review (JATR)

- The FAA established the JATR to conduct a review of the FAA's certification of the automated flight control system of the 737 MAX, determine compliance with all applicable regulations, and identify any future enhancements that may be necessary. The JATR was chaired by former NTSB Chairman Christopher Hart and included technical experts in a variety of disciplines from the FAA, NASA, and the civil aviation authorities of Australia, Brazil, Canada, China, the European Union, Indonesia, Japan, Singapore, and the United Arab Emirates.
- The JATR concluded its work and submitted its recommendations on October 11, 2019. The FAA addressed all recommendations that applied to the 737 MAX prior to approving the aircraft for return to service.

Special Committee to Review FAA's Aircraft Certification Process

- On March 25, 2019, Secretary Elaine L. Chao established a Special Committee to review the FAA's Aircraft Certification Process. It was co-chaired by Air Force General (Ret.) Darren McDew, former head of the U.S. Transportation Command, and Captain Lee Moak, former President of the Air Line Pilots Association.
- The *Official Report of the Special Committee to Review the Federal Aviation Administration's Aircraft Certification Process* was delivered to the Secretary on January 16, 2020.
- The FAA laid out a path forward in its *Response to the Official Report of the Special Committee on the Federal Aviation Administration's Aircraft Certification Process*. The plan, released in May 2020, documented the agency's efforts—both planned and underway—to address issues identified in the report.

Department of Transportation (DOT) Office of the Inspector General (OIG)

- On March 19, 2019, Secretary Chao directed the DOT OIG to conduct an audit to compile an objective and detailed factual history of the activities that resulted in the certification of the Boeing 737 MAX. The OIG's initial timeline of certification of the Boeing 737 MAX was published on June 29, 2020. This will be followed by recommendations in the coming weeks, as well as a report on the continued operational safety process later this year.

Accident Investigations

- The FAA has also reviewed recommendations from the September 19, 2019 National Transportation Safety Board (NTSB) report, October 29, 2019 Republic of Indonesia Komite Nasional Keselamatan Transportasi (KNKT) Lion Air accident investigation report, and March 9, 2020 Ethiopia Aircraft Accident Investigation Bureau (EAIB) Ethiopian Airlines interim accident investigation report. The EAIB's ET302 accident investigation is ongoing.