ACT ARC Recommendation 21-8
Flight Standardization Board Assessment of Pilot Intervention Requirements

I. Submission

The recommendations below are submitted by the Flight Standardization Board Workgroup (FSB WG) for consideration by the Air Carrier Training Aviation Rulemaking Committee (ACT ARC) Steering Committee at its April 28, 2021, meeting. The ACT ARC Steering Committee adopted the recommendations, and they are submitted to the Federal Aviation Administration (FAA) as ACT ARC Recommendation 21-8.

II. Statement of the Issue

FAA Advisory Circular (AC) 120–53B, Change 1 (AC 120–53), Guidance for Conducting and Use of Flight Standardization Board (FSB) Evaluations, provides guidance for evaluating newly manufactured or modified aircraft to determine pilot training and qualification requirements, as well as guidance to determine training and qualification requirements between related aircraft. AC 120–53 and other current FAA certification guidance do not formally specify an objective and systematic requirement for the certification processes to interact with the FSB to address and validate aircraft and system failure analysis from an operational perspective, when appropriate. The result is there is not a documented policy for the certification process to inform the FSB about the specific areas of required flight crew intervention that are of significant importance to the safe outcome of flight, and therefore require closer FSB operational evaluation of design assumptions versus real-world outcomes. Currently, these interventions are evaluated during the aircraft certification process conducted by the FAA Aircraft Certification Service (AIR). However, these assumptions and the associated training are not required to be evaluated from an operational perspective by the FSB. Specifically, AC 120–53 and other FAA certification guidance do not address the FSB's role in evaluating, when appropriate, instances where the original equipment manufacturer (OEM) takes credit for flight crew interventions into system anomalies or failures that have a critical impact on the safety of the flight. Although many of these flight crew interventions are well understood from decades of operational data and human performance studies, it is important that novel and critical assumptions made in development of new or modified system designs be highlighted to the FSB to ensure proper validation of those assumptions and the development of applicable training requirements, if not already developed.

III. Recommendations

The ACT ARC recommends the FAA consider the following actions:

The members were unable to reach full consensus on this recommendation. Therefore, the portion with consensus is followed by two additional options and their associated rationale for consideration by the FAA. The organizations supporting each option are listed after each rationale.[1]

[1] The listed supporters do not comprise the full FSB WG membership. Some members abstained from alignment with some or all options.

Consensus Recommendation:

The FAA should consider reviewing the interactions between the certification processes addressing aircraft and system failure analysis and the FSB, to ensure that certain, critical pilot actions are adequately validated in an operational context (pilot competencies and training) when appropriate.

Option A:

This review should be conducted using recommendations from industry groups such as the Flight Test Harmonization Working Group (FTHWG) and the FSB WG (or other industry group dealing with FSB matters). Pilot actions that should be specifically addressed are those actions that are new for a specific aircraft type and having a possible critical impact on the safety of the flight.

The FAA could develop guidance on the selection, documentation, and control of "Certification Operational Requirements" consistent with the management of Certification Maintenance Requirements (CMR) in accordance with AC 25–19A. This would provide the information needed by the FSB for operational evaluation.

Option B:

The FAA should consider revising AC 120–53 and other guidance, as necessary, to address FSB evaluation and consideration of potential training requirements related to pilot interventions. Pilot interventions that should be specifically addressed are those that the manufacturer takes credit for within their Fault Hazards Analysis that result in a hazard downgrade from catastrophic to hazardous or hazardous to major, when that pilot intervention is in response to a system or sub-system failure that has not previously been proven or studied through historic operational data. It is suggested that such FSB evaluations are for the purpose of determining the effectiveness of the proposed training and whether or not specific information regarding the training should be included in the FSB report.

IV. Rationale and Discussion

During initial certification of new or derivative aircraft, manufacturers are required to conduct a Fault Hazard Analysis, which includes investigation of potential system or automation errors or failures. It is not uncommon for manufacturers to take credit for expected intervention of the flight crew as a means to reduce the risk associated with failures. However, current FAA certification guidance and AC 120–53 do not specifically address the interaction between the aircraft being certified and any training required for the flight crew to meet or exceed the assumptions made during the certification process.

It should be noted that this recommendation is not meant to address all flight crew interventions, as many have been well studied and verified throughout the history of operation of base or similar aircraft. Aircraft standardization has helped to ensure that assumptions made from one aircraft may be transferred to another of similar design. This recommendation seeks to specifically address those areas where a flight crew intervention to a system has a critical impact on the safety of the flight, and where the intervention is in response to a system anomaly or failure associated with design changes that have not previously been studied through this process.

It should also be noted that in order to implement this recommendation, the FSB will need to be informed of the flight crew interventions meeting the threshold for evaluation. The ACT ARC recommends that the FAA investigate the most efficient and achievable process by which this recommendation may be adopted; whether through coordination between Certification Flight Test and the FSB during design certification activities or through coordination with the design approval holder applicant early in the current FSB process. It is expected that this recommendation will highlight areas where more in-depth review and testing by the FSB is needed.

Option A:
Option A is a recommendation that the FAA consider requesting *ad hoc* or existing industry working groups to develop guidance that would ensure adequate interactions between the Title 14 Code of Federal Regulations (14 CFR) § 25.1309 certification processes and the FSB.

Option A supporters note that the Flight Test Harmonization Working Group (FTHWG) has created a specific task: FAME (Failure Assessment: Methodology & Evaluation), the objective of which is to "create harmonized guidance material for the certification of airplane-level failures which affect the pilots' ability to fly the airplane and which provides a consistent standard among key disciplines, and is harmonized for the promotion of airplane safety." Option A supporters recommend that the FAA rely on the combined expertise of the FTHWG and the FSB WG (or other industry group dealing with FSB matters) to develop the guidance that will be recognized and used by both the certification and FSB domains.

Option A supporters emphasize that the existing Certification Maintenance Requirements (CMR) process, as described in the AC 25–19A, is an example of a process that ensures an adequate interface between the § 25.1309 certification processes and an operational process. A similar process applied to the § 25.1309 and FSB processes would ensure the selection, documentation, and control of "Certification Operational Requirements".

The following organizations support Option A:

- Airbus
- Boeing
- Bombardier
- Dassault Aviation
- Embraer
- General Aviation Manufacturers Association (GAMA)

Option B:
Option B is a recommendation that the FSB conduct an operational evaluation of the training for critical pilot interventions, and determine if information regarding such training should be included in the FSB report. FAA Flight Test currently participates in the certification process addressing aircraft and system failure analysis, which is critical. This recommendation seeks to add an operational perspective to the evaluation of the described pilot interventions, particularly when pilot training is required. As a result, the FSB may determine that it is necessary to include information regarding the training of specific pilot interventions in the FSB report to inform training providers and air carriers for the creation of their training programs. Option B supporters believe the FAA should determine the best means to coordinate internally with Flight Test and Flight Standards, and to develop the necessary criteria to implement this recommendation.

The following organizations support Option B:

- Airlines for America (A4A)
- Air Line Pilots Association, International (ALPA)
- CAE
- Regional Airline Association (RAA)

V. Background Information

Recommendation 21-8 addresses Items 1, 3.a-c, and 4 in the FSB WG Scope of Work and ACT ARC Initiative #43 (see below):

FSB WG Scope of Work:

1. Examine whether the FAA should reconsider its current process of an FAA operational evaluation.
   a. If the WG decides that the FAA should reconsider, the WG should examine the possible alternatives to the current process.

   * * *

3. In developing proposed recommendations responsive to (1) and (2), consider, at minimum, the following:
   a. Would the new or improved operational evaluation include some or all of the elements that are currently included in an FAA operational evaluation?
   b. Would the new or improved operational evaluation include elements that are not included in a current FAA operational evaluation?
   c. What standards should be used to ensure the consistent conduct of operational evaluations?

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4. Examine how the FAA could improve Advisory Circular (AC) 120-53B, *Guidance for Conducting and Use of Flight Standardization Board Evaluations*.

ACT ARC Initiatives:

- Initiative #43: Examine how the FAA could improve its current Flight Standardization Board (FSB) Process and product (FSB Report) to meet the interests of all stakeholders.

References

- FAA AC 25–19A
- FAA AC 120–53B, Change 1
- FAA Order 8900.1
- 14 CFR § 25.1309