TABLE A2D—ALTERNATIVE ENGINE VALIDATION FLIGHT TESTS

Entry No.	Test description		Alternative engine type	Alternative thrust rating [2]
1.b.1., 1.b.4.	Normal take-off/ground acceleration time and distance		X	X
1.b.2.	V_{mcg}, if performed for airplane certification		X	X
1.b.5.	Engine-out take-off	Either test		
1.b.8.	Dynamic engine failure after take-off.	may be performed.	X	
1.b.7.	Rejected take-off if performed for airplane certification		X	
1.d.1.	Cruise performance		X	
1.f.1., 1.f.2.	Engine acceleration and deceleration		X	X
2.a.7.	Throttle calibration [1]		X	X
2.c.1.	Power change dynamics (acceleration)		X	X
2.d.1.	V_{mca} if performed for airplane certification		X	X
2.d.5.	Engine inoperative trim		X	X
2.e.1.	Normal landing		X	

[1] Must be provided for all changes in engine type or thrust rating; see paragraph 13.c.(3).
[2] See paragraphs 13.c.(1) through 13.c.(3), for a definition of applicable thrust ratings.

END QPS REQUIREMENT

BEGIN INFORMATION

14. ACCEPTANCE GUIDELINES FOR ALTERNATIVE AVIONICS (FLIGHT-RELATED COMPUTERS AND CONTROLLERS)

a. Background

(1) For a new airplane type, the majority of flight validation data are collected on the first airplane configuration with a ''baseline'' flight-related avionics ship-set; (see subparagraph b.(2) of this section). These data are then used to validate all flight simulators representing that airplane type.

(2) Additional validation data may be required for flight simulators representing an airplane with avionics of a different hardware design than the baseline, or a different software revision than previously validated configurations.

(3) When a flight simulator with additional or alternate avionics configurations is to be qualified, the QTG should contain tests against validation data for selected cases where avionics differences are expected to be significant.

b. Approval Guidelines for Validating Alternate Avionics

(1) The following guidelines apply to flight simulators representing airplanes with a revised avionics configuration, or more than one avionics configuration.

(2) The baseline validation data should be based on flight test data, except where other data are specifically allowed (e.g., engineering flight simulator data).

(3) The airplane avionics can be segmented into two groups, systems or components whose functional behavior contributes to the aircraft response presented in the QTG results, and systems that do not. The following avionics are examples of contributory systems for which hardware design changes or software revisions may lead to significant differences in the aircraft response relative to the baseline avionics configuration: Flight control computers and controllers for engines, autopilot, braking system, nosewheel steering system, and high lift system. Related avionics such as stall warning and augmentation systems should also be considered.

(4) The acceptability of validation data used in the QTG for an alternative avionics fit should be determined as follows:

(a) For changes to an avionics system or component that do not affect QTG validation test response, the QTG test can be based on validation data from the previously validated avionics configuration.

(b) For an avionics change to a contributory system, where a specific test is not affected by the change (e.g., the avionics change is a Built In Test Equipment (BITE) update or a modification in a different flight phase), the QTG test can be based on validation data from the previously-validated avionics configuration. The QTG should include authoritative justification (e.g., from the airplane manufacturer or system supplier) that this avionics change does not affect the test.

(c) For an avionics change to a contributory system, the QTG may be based on validation data from the previously-validated avionics configuration if no new functionality is added and the impact of the avionics change on the airplane response is small and based on acceptable aeronautical principles with proven success history and valid outcomes. This should be supplemented with avionics-specific validation data from the airplane manufacturer's engineering