

As part of the Rulemaking Process, the public has the opportunity to review the proposals and make comments, ask questions, and make recommendations. The following are comments received in response to the NPRM for Part 60, Change 1, and the FAA's responses to those comments, as contained in the Final Rule, made available at the Office of the Federal Register on April 30, 2008 and published in The Federal Register on May 9, 2008.

A. Administrative.

1. The ATA recommended that the FAA make the effective date of the final rule at least 90 days following the publication date.

Part 60 has been available to the public for review for over 1 year. The revisions to the appendices of Part 60 reflect international standards that have been in existence for more than 4 years. Further, when the FAA delayed the effective date to Part 60, we also delayed the compliance dates of certain sections of the rule to provide adequate time for transition. Because of the notice provided and delayed compliance dates of certain sections, the FAA has determined that the standard 30-day period between publication and effective date is appropriate.

2. Several of the comments were beyond the scope of the proposal. For example, CAE and others suggested including objective tests for Heads-Up Displays (HUD) and Enhanced Visual Systems (EVS). Further, several commenters suggested adopting standards currently being developed by the International Working Group (IWG) of the Royal Aeronautical Society (RAeS).

The FAA has not addressed in detail the comments that are beyond the scope of the NPRM. In addition, the FAA has determined it would be premature for the FAA to incorporate into this final rule the standards currently under review by the IWG. Once the RAeS has adopted the IWG's recommendations, the FAA will review them for incorporation in the QPS appendices.

3. Several commenters noted differences between the proposed standards and the current international standards and suggested adopting the international standards. As stated, one of the purposes of this rule is to harmonize with the current international standards documents for simulation issued by the JAA and ICAO. These recommendations are within the scope of the proposal and have been incorporated into this final rule as appropriate.

Some commenters to the proposed rule noted typographical and formatting errors in the proposal. The Office of the Federal Register issued a correction document addressing some of these errors on March 5, 2008 (73 FR 11995). The FAA has addressed the remaining errors in this document.

B. Simulator Qualification and Evaluation.

1. CAE and others noted that the listing of tasks for which an FSTD may be qualified do not correspond to the tasks set forth in the FAA Air Carrier Operations Inspector's Handbook and are not the same as those tasks in the tables that outline the Functions and Subjective tests for which each FSTD may be

evaluated. Commenters also suggested that the objective and subjective tests used to evaluate the FSTD be aligned with the tasks for which the FSTD may be qualified.

The FAA recognizes that the FSTD qualification tasks do not mirror the tasks set forth in the FAA Air Carrier Operations Inspector's Handbook, the "Functions and Subjective tests" tables in Attachment 3 of Appendices A-D, and the "Tasks vs. Simulator Level" tables in Attachment 1 of Appendices A-D. However, there are differences between the tasks used to evaluate the handling, performance, and other characteristics of the FSTD and those tasks for which an FSTD may be qualified for pilot training, testing, or checking activities. Thus, the list of tasks set forth in the "Functions and Subjective tests" tables and "Tasks vs. Simulator Level" tables are not necessarily the same, nor should they be the same.

2. CAE, ATA, Rockwell Collins, and others asked whether the Level B simulator authorizations in Table A1B should be listed as an "X" instead of an "R" for most of the landing tasks.

As the legend in Table A1B indicates, the "R" denotes authorization for Recurrent activities while the "X" denotes authorization for Initial, Transition, Upgrade, and Recurrent activities. The landing tasks for Level B simulators are restricted to Recurrent activities and the "R" in the table at those points is the correct reference. However, the FAA acknowledges that the authorizations for Taxiing and for Normal and Crosswind Takeoffs for the Level B simulator were inadvertently left blank, and the FAA has placed an "R" in those positions in this table, indicating an authorization for Recurrent activities in this level of simulation.

3. American, the ATA, and others stated that the differences between "update" and "upgrade," as used in Appendix A, Paragraph 13, Previously Qualified FFS, subparagraph "h," were not clear. They recommended clarifying the differences and moving the subparagraph from the information section to the QPS Requirements section.

The information in subparagraph "h" allows for Full Flight Simulators (FFS) to be updated without requiring an evaluation under the new standards. Because this language is permissive in nature, we have moved it to the QPS Requirements section as requested. To clarify the meaning of these terms, we have added a definition of "update" that reflects current practice to Appendix F.

4. CAE and others suggested revising the note in Table A1B, entry 3.f, Recovery from Unusual Attitudes, by replacing the statement "supported by applicable simulation validation data" with "supported by the simulation models."

The suggested revised language would allow an individual to go beyond the flight-test-validated flight-envelope in a flight simulator. This is not an acceptable practice because of the lack of information about aircraft performance and handling beyond those limits. Therefore, the FAA has not adopted the recommendation.

5. The ATA, Northwest, and others suggested clarifying that the 24-hour "look back" period for the functional preflight check (Table E1, entry E1.20) is from the

beginning of the scheduled training period. Additionally, commenters questioned whether the FSTD use-period, if started within 24 hours of a functional preflight check, could continue beyond that 24-hour “look-back” period and whether the functional preflight check is required for Level 4 “touch screen” FTDs. Further, commenters questioned whether Level 4 FTDs remain under the responsibility of the Training Program Approval Authority (TPAA).

The proposed requirement for conducting a functional preflight check within 24 hours prior to using the FSTD is to ensure that technical personnel with the requisite preflight training have determined the readiness level of the FSTD. An FSTD use-period does not begin unless a functional preflight check has been completed in the previous 24 hours. If a training session begins near the end of the 24 hours after the functional preflight check was completed, the training session may continue beyond that 24 hours. However, any subsequent training session may not begin until another functional preflight check is conducted. The National Simulator Program Manager (NSPM) is the FAA manager responsible for the evaluation and qualification of all FSTDs qualified under part 60, including Level 4 FTDs. The NSPM will continue to exercise this responsibility through inspectors and engineers assigned to the National Simulator Program (NSP) staff and others to whom the NSPM may delegate that responsibility and authority. This responsibility and authority is not intended to undermine or compromise the duties and responsibilities of the assigned TPAA with regard to the approved use of the FSTD.

6. CAE and others questioned when it would be necessary to complete an additional initial qualification evaluation after a modification to the FSTD. They also asked what principles would be used in determining whether an evaluation for additional authorization(s) is necessary and if an evaluation is necessary, when it must take place.

Whether a modification necessitates an additional initial qualification evaluation, necessitates part of an initial qualification evaluation, or does not necessitate an additional evaluation, depends on 1) the extent of the modification; 2) whether the modification impacts, or is impacted by, other systems or equipment in the FSTD; and 3) whether, as a result of the modification, the FSTD operation is consistent with the airplane system it is simulating. After review of these factors, the FAA will determine on a case-by-case basis whether an evaluation for additional authorizations is required and when it will take place.

7. The ATA, Northwest, and others suggested that the windshear provisions in Table A1A for each Level C and Level D FFS not be required for evaluation and qualification purposes because not all aircraft are required to have windshear equipment and not all pilots are required to train on recovery from inadvertent windshear encounters. Further, the commenters also suggested clarifying the aircraft conditions under which the windshear demonstrations must be conducted. Only operations conducted in accordance with 14 CFR part 121 that use aircraft listed in § 121.358 require windshear training for crewmembers. Accordingly, the FAA has modified Table A1A to address only these operations. We have also clarified the aircraft conditions under which the windshear demonstrations must be conducted.

C. FSTD Testing: Objective and Subjective.

1. General.

- a. The ATA, Rockwell Collins, and others recommended requiring Level A and Level B simulators to meet the standards in Table A2A, entry 1.b.7, Dynamic Engine Failure After Takeoff.

The standards for testing of dynamic engine failures after takeoff were first established by ICAO and were limited to advanced simulators, now referred to as Level C and Level D. One purpose of this final rule is to harmonize FAA standards with current international standards. Because current international standards do not set forth standards for testing dynamic engine failure after takeoff for level A and B simulators, the FAA has not adopted the recommendation.

- b. The ATA, Northwest, Boeing, CAE, and others suggested the FAA review all the references in Appendix A, Attachment 2, Table A2A, Table of Objective Tests, that include references to Computer Controlled Aircraft (CCA) to ensure that the control state testing requirements (i.e., normal control state or non-normal control state) are correctly addressed.

The FAA recognizes that there were errors made in the proposal regarding CCA testing requirements. The FAA has reviewed the CCA testing requirements to address the correct control state and made appropriate revisions.

- c. CAE, Rockwell Collins, ATA, and others submitted several comments on Appendix A, Attachment 1, Table A1A, General Simulator Requirements. CAE suggested that 1) the manual and automatic testing, described in entry 2.f, and simulator control feel dynamics, as described in entry 3.e, apply to Level A and Level B simulators in addition to Level C and Level D simulators; 2) the NSPM should further clarify the number of malfunctions that are required or provide a list of the necessary malfunctions that should be present; and 3) the instructor controls, as described in entry 4.c, either list all the expected environmental conditions over which the instructor should have control or remove the reference to “wind speed and direction.” The ATA and others requested that the statements about additional field-of-view capability for Level A and Level B simulators in entry 6.b of Table A1A be moved to the Information/Notes column.

Automatic testing and control feel dynamics was first required in 1980 with the publication of the FAA’s Advanced Simulation Plan and was limited to advanced simulators, now referred to as Level C and Level D. The FAA is not expanding the requirements for automatic testing and control feel dynamics testing to Level A and Level B simulators because that would result in differing technical requirements for these simulator levels while authorizing the same training, testing, and checking tasks. The additional field-of-view reference in entry 6.b was designed to allow the option of including a larger field-of-view than the provision requires, with the understanding that the minimum fields of view would have to be retained. This reference is more informative than regulatory and the FAA has moved the statements to the Information/Notes column.

- d. The ATA and others suggested defining the term “least augmented state” as used in Appendix A, Attachment 2, paragraph 2.j, and requested confirmation that the “least augmented state” is one that the pilot may select using normal switches found in the airplane flight deck.

The FAA has determined that a general definition of the term “least augmented state” is not appropriate because these states are dependent on the aircraft type involved. Additionally, the least augmented state is not necessarily achieved by the use of switches found in the flight deck. Therefore, the FAA will evaluate FSTDs in accordance with the least augmented state data supplied by the aircraft manufacturer or other data supplier.

- e. The ATA, Rockwell Collins, and others suggested that the primary controls of the simulated aircraft should be tested objectively to verify correct forces and responses whether simulated aircraft parts or actual aircraft parts are used. Further, they recommended that the FAA require a Statement of Compliance and Capability (SOC) that describes how and where the control forces are generated in the aircraft, and lists all hardware required to generate these control forces.

The FAA does not require testing of flight controls in these circumstances because these aircraft controls must be maintained as if they were installed in an aircraft to provide crewmembers the same control feedback as felt in the actual aircraft. The sponsor is required to provide a statement that the aircraft hardware meets the appropriate manufacturer’s specifications for the controls and the sponsor must have information supporting that statement available for NSPM review. Accordingly, the FAA has not adopted the recommendation.

- f. Boeing suggested, with regard to Table A2A, entry 1.c.2, that the test for “One Engine Inoperative” should be named “One Engine Inoperative, Second Segment Climb.”

The test is required for airplanes certificated under both parts 23 and 25. The term “Second Segment Climb” applies only to airplanes certificated under part 25. Therefore, the FAA has not adopted the suggested change.

- g. The ATA, Rockwell Collins, CAE, and others recommended that the tests in entries 1.e.1 and 1.e.2, Stopping Time and Distance, of Table A2A, not apply to Level A and Level B simulators because these simulator levels are not authorized to perform this landing task.

The FAA did not adopt this change because both Level A and Level B simulators are authorized to perform Rejected Takeoff Maneuvers. In addition, Level B simulators are authorized to perform landings in recurrent training and checking. Therefore, these tests are necessary to determine the stopping capabilities of the FSTD.

- h. The ATA, Boeing, CAE, and others expressed concern over how to read the test requirements for Engine Acceleration and Engine Deceleration (Table A2A, entries 1.f.1 and 1.f.2). The commenters recommended various ways of publishing the established tolerances. CAE also recommended defining the terms “T_i” and “T_t.”

The published tolerances for these tests are consistent with international standards documents. As proposed, T_i and T_t were defined in the Tables as well as in the Abbreviations list in Appendix F. For clarification, we have moved these terms to the definitions section of Appendix F and added cross references in the tables to Appendix F.

- i. The ATA, Northwest, and others noted that the Short Period Dynamics test in Table A2A, entry 2.c.10 erroneously did not apply to Level A simulators. They also noted that entry 2.d.7., Dutch Roll (yaw damper off), erroneously applied to all levels of simulators when it should apply only to Levels B, C, and D.

The FAA acknowledges that applicability to Level A simulators for the Short Period test was inadvertently omitted and the Dutch Roll test was inadvertently included, although the correct standards appear in FAA standards documents and international standards documents. The FAA has corrected these errors in this final rule.

- j. CAE suggested the FAA clarify Table A2A, entry 2.d.8, Steady State Sideslip, by stating that this test “may be a series of snapshot test results using at least two rudder positions, one of which should be near maximum allowable rudder.”

The FAA agrees and has clarified the requirement where appropriate.

- k. CAE and others suggested that the definition of the term “snapshot” be modified from “a presentation of one or more variables at a given instant of time” to “a presentation of one or more variables at a given instant of time or from a time-average of a steady flight condition.”

The FAA has determined that the suggested modification would create confusion because of the subjective nature of the phrase “steady flight condition” and has not adopted the suggestion.

- l. The ATA and others suggested a change to Table A2A, entry 2.e.6, All Engines Operating, Autopilot, Go-Around, to require a manual test and, if applicable, an autopilot test.

The FAA currently requires a manual test when performing a one engine inoperative go-around. The all engines operating, autopilot, go-around test applies only when the airplane is authorized to use the autopilot function during a go-around. Because both tests are currently required, the FAA has not adopted the suggested changes.

- m. The ATA, Rockwell Collins, and others suggested that the tests described in entries 2.e.8 and 2.e.9 of Table A2A, should be conducted differently (i.e., with the nosewheel steering disconnected or castering), unless the FAA’s intent was to evaluate overall aircraft response, in which case no change is necessary.

The intent of these tests is to evaluate the aircraft response. Therefore, no change is necessary.

- n. CAE and Boeing recommended substituting the term “mass properties” with the term “fuel slosh” in Appendices A and C, paragraph 8.h(2)(c) because mass properties are rarely, if ever, run in an integrated manner as described.

The FAA does not agree that mass properties are not run in an integrated manner. The FAA has chosen the term mass properties because it is consistent with international standards. Therefore, the FAA has not adopted the suggested change.

- o. CAE and Boeing recommended deleting paragraph 9.b(3) in Appendices A and C because a data provider should not have to demonstrate that data gathered from an engineering simulation (in lieu of a flight test source) has necessary qualities to qualify an FSTD.

The FAA did not intend that an engineering simulation be qualified, or be capable of being qualified, as an FSTD. The data obtained from the engineering simulation would be appropriate as a replacement for flight test data when the data obtained from the engineering simulation is programmed into an FSTD. Therefore, we have clarified the information in paragraph 9.b(3) to state that in these cases, the data provider should submit validation data from an audited engineering simulator / simulation to supplement specific segments of the flight test data.

- p. CAE and Boeing requested that paragraph 11.a(1) not apply to Table A2A, entries 1.f.1 and 1.f.2, objective tests for engine acceleration and deceleration. Rather, they suggested applying 100% of flight test tolerances to these objective tests. CAE also suggested when flight test data for an alternate engine fit is unavailable, the objective testing of engine acceleration and engine deceleration (Table A2A, tests 1.f.1 and 1.f.2) should be exempt from the 20% tolerance for the application of engineering simulator/simulation because the actual tolerance would be less than the simulation iteration rate.

Applying 100% of flight test tolerances to the objective tests results in these entries is not an acceptable routine procedure. Full flight test tolerances are appropriate when comparing FSTD results to airplane data, and 20% of those airplane tolerances are appropriate when comparing FSTD results to flight engineering simulation data because it is easier to match “computer to computer” data than to match “computer to airplane” data. Any circumstance that does not fit within these parameters would likely be acceptable under the “best fit” data selection set forth in Appendix A, Attachment 2, paragraph 2.d. Therefore, the FAA has not adopted these changes.

- q. The ATA and others stated that the Rudder Response test in Table B2A, entry 2.b.6.b is confusing because it would not test the rudder power in the yaw axis. They suggested modifying the tolerance column to read “ $\pm 2^\circ/\text{sec}$ or $\pm 10\%$ yaw rate, OR Roll rate $\pm 2^\circ/\text{sec}$, bank angle $\pm 3^\circ$.”

This test was originally required as a rudder test using roll rate and bank angle for the parameters. However, the FAA agrees that this test may be accomplished using either yaw rate or roll rate and bank angle. Therefore, the FAA has added a note in the Information/Notes column that this test may be accomplished as a yaw response test.

- r. The ATA, Northwest, CAE, and others suggested eliminating the ± 2 degree tolerance on bank angle above stick shaker or initial buffet speeds in Table A2A, entry 2.c.8, Stall Characteristics, to be consistent with international standards.

The FAA acknowledges that the ± 2 degree tolerance on bank angle above stick shaker or initial buffet speeds is not included in the international standards. However, requiring zero tolerance in these instances would be very stringent without appreciable difference in FSTD performance or handling characteristics. Accordingly, the FAA has not eliminated the tolerance.

- s. Boeing, United, and others recommended clarifying paragraph 11.b(5) Validation Test Tolerances, and adding a new paragraph 11.b(6) allowing errors greater than 20% if the simulator sponsor provides an adequate explanation.

The FAA generally agrees with the suggestion and has modified paragraph 11.b(5) to reflect this information. The FAA has determined that adding a new paragraph 11.b(6) is not necessary.

- t. One commenter, citing paragraph 17.a, “Alternative Data Sources, Procedures, and Instrumentation: Level A and Level B Simulators Only,” questioned whether the alternative data collection sources, procedures, and instrumentation listed in Table A2E were the only sources for data collection that the FAA would allow. Appendix A, paragraph 11, Initial (and Upgrade) Qualification Requirements, requires objective data to be acquired through traditional aircraft flight testing. It also allows for the use of “another approved” source. The FAA has included Table A2E to provide alternative sources, procedures, or instrumentation acceptable to the FAA that may be used to acquire the necessary objective data for Level A or Level B simulators. At this time, the alternative data collection sources, procedures, and instrumentation listed in Table A2E are the only alternatives acceptable without prior approval by the NSPM.

- u. The ATA, Rockwell Collins, and others questioned the necessity of having sounds of precipitation and rain removal devices for Level C simulators but not requiring the corresponding visual effect.

The FAA recognizes the error in the proposed language and has made the necessary changes. Level C simulators are required to be subjectively tested for the sound, motion and visual effects of light, medium and heavy precipitation near a thunderstorm and the effect of rain removal devices.

- v. The ATA and others requested that aircraft certified with auto-ice detection coupled with auto-anti-ice or auto-de-ice capabilities be exempt from the effects of airframe and engine icing tests listed in Table A3F, Special Effects. Because it is possible for flight crews to experience the effects of airframe or engine icing if the auto-ice detection systems are inoperative, the flight crews must be trained to recognize and respond to icing situations. Therefore, the FAA has not adopted the recommendation.

2. Visual Systems.

- a. The ATA, Northwest, Rockwell Collins, United, and several others recognized that the definition of an FSTD Directive is “a document issued by the FAA to an FSTD sponsor requiring a modification to the FSTD due

to a safety-of-flight issue and amending the qualification basis for the FSTD.” These commenters asserted that the FAA has not provided any safety analysis to support the issuance of FSTD Directive 1. Further, these commenters asked how the FAA determines what constitutes a safety issue that would warrant the issuance of an FSTD Directive. Some commenters asserted that updating airport modeling is a complicated problem because of the difficulty in removing airport models from the instructor operating station (IOS) in some FSTDs, particularly in those FSTDs not owned or controlled by the sponsor. In addition, some commenters noted the cost of updating an existing airport model and suggested that the FAA continue to allow custom airport models meeting individual training requirements to be used without modification. Further, the commenters requested the FAA extend the timeframe for updating airport models to match any modification to the actual airport.

As proposed, FSTD Directive 1 requires each certificate holder to ensure that each airport model used for training, testing or checking, except those airport models used to qualify the simulator at the designated level, meets the requirements of a Class II or Class III airport model. The FAA acknowledges that FSTD Directives may be issued only for safety-of-flight purposes. These determinations will be made on a case-by-case basis. The FAA has determined that updating airport modeling is a safety-of-flight concern because pilots have landed airplanes on wrong runways, landed on taxiways, landed at the wrong airport, unknowingly taxied across active runways, and taken off from the wrong runway. Many FSTD users have expressed concern regarding the accuracy of these models with respect to real world airports. Training, testing, or checking in an FSTD with incomplete or inaccurate airport models representing real world airports can contribute to incomplete planning or poor decision making by pilots if they subsequently operate into or out of that real world airport. While these potentially disastrous occurrences happen infrequently, inaccurate airport modeling is a safety-of-flight issue that warrants the issuance of this FSTD Directive.

The proposed FSTD Directive is designed to address qualified FSTDs that contain airport models that were not evaluated. The FSTD Directive ensures that each model used in an FSTD for training, testing, or checking activities meets the acceptable minimum standards. Although the FAA is responsible for ensuring that these standards are met, the FSTD sponsor is responsible for maintaining the FSTD, and each certificate holder using the FSTD is responsible for ensuring that all of the FSTD components are in compliance with these standards and report any deficiencies.

Upon review of the comments, however, we have clarified the language of the FSTD Directive. The FSTD Directive still requires each certificate holder to ensure that, by May 30, 2009, except for the airport model(s) used to qualify the FSTD at the designated level, each airport model used by the certificate holder’s instructors or evaluators for training, testing, or checking under 14

CFR Chapter I in an FFS, meets the definition of a Class II, or Class III airport model as defined in part 60, Appendix F. We originally proposed to require removal of all airport models that did not meet the standards of a Class II or Class III model. In light of comments regarding the expense of such removal and issues regarding the sponsorship and leasing of FSTDs, FSTD Directive 1 now requires only the airport models used for training, testing or checking to meet the appropriate requirements; it does not require removal of other airport models. Additionally, we have revised the definition of a generic airport model in Appendix F to clearly describe a Class III airport model that combines correct navigation aids for a real world airport with an airport model that does not depict that real world airport. Use of such an airport model may require some limitations on that use. The clarified language in the FSTD Directive and the revised definitions may mitigate the actual cost of updating airport models. In addition, the FAA recognizes that it takes time to design, construct, and implement changes to computer programming. The FAA has decided to modify the time requirements in paragraph 1(f) of Attachment 3, Appendix A, and clarify the process for requesting an extension for the update in paragraph 1(g) of Attachment 3, Appendix A.

- b. Further, the ATA and others suggested adding a statement in the Information/Notes column of Table B1A regarding visual systems that FSTD Directive 1 does not apply to Level A standards for an FTD visual system.

If a visual system installed in any level of FTD is not being used to acquire additional training credits, FSTD Directive 1 does not apply. However, if the visual system is being used to acquire training credits, the visual system must meet the requirements of at least a Level A FFS visual system. In these circumstances, FSTD Directive 1 could affect the airport models used in that system. Therefore, the FAA has not added the suggested statement.

- c. The ATA, Rockwell Collins, and others noted that the terms visual scenes, visual models, and airport models, appear to be used interchangeably in the NPRM.

The FAA has adopted the term “airport model” instead of the terms “visual scene” or “visual model” throughout this final rule. We also have deleted the definition of “visual model” from Appendix F and changed the definition of “visual database” to “a display that may include one or more airport models” for consistency. Since there are three classes of airport models, we clarified the differences between Class I, Class II, and Class III in the definition of airport model.

- d. ATA, Rockwell Collins, and others questioned the need for 16 moving models as well as the training tasks that would be able to be met by having these moving models. The commenters also requested clarification regarding what constitutes gate clutter.

The primary goal of the NPRM was to harmonize with international standards. The intent of the 16 moving objects requirement, which is an international standard, is to enhance the “realism” of the displayed visual scene. The FAA has added a definition of gate clutter in Appendix F, as described in entry 2.f in Table A3B.

- e. The ATA, Rockwell Collins, and others stated that the Class II airport model requirements are excessive, especially for areas other than the “in-use” runway itself and noted that there are no model content requirements for “generic airport models.”

The Class II airport model requirements mirror the long-standing guidance in AC 120-40B, Airplane Simulator Qualification, Appendix 3, and are consistent with international standards. The FAA has determined that providing specific model content requirements for “generic airport models” would restrict unnecessarily the capability and flexibility that currently exists. Accordingly, the FAA has not made any changes to the Class II airport model requirements or created any specific requirements for “generic airport models.”

- f. The ATA, Rockwell Collins, CAE, and others questioned whether “ambient lighting” in Daylight Visual Scenes is required.

Ambient lighting is not required in daylight visual scenes because of its distorting effects on the visual scene and inside the flight deck. The FAA has removed the requirement for ambient flight deck lighting where appropriate.

- g. The ATA and others requested that the FAA clarify the Surface Movement Guidance and Control System (SMGCS) as referenced in Table A3B, entry 2.j.

Entry 2.j requires that a low visibility taxi route must be demonstrated for qualification of a Level D simulator. A low visibility taxi route could be satisfied, according to the Table A3B, by a depiction of one of the following means: an SMGCS taxi route, a follow-me truck, or low visibility daylight taxi lights. For further information on SMGCS, see AC 120-57A (December 19, 1996).

- h. The ATA, Rockwell Collins, and others questioned the language in the preamble of the NPRM describing the visual system proposal as requiring a “field of view and system capacity requirements ... increased by 20 percent over the present requirement.” The commenters asserted that the proposed surfaces and light point requirements are “considerably in excess of a 20% increase.”

The 20% increase, as described in the NPRM preamble, should have applied only to the field-of-view requirements. However, the actual requirements stated in the proposed rule language for field-of-view and system capacity for generating surface and light points are consistent with current international standards. Further, the metrics simulator manufacturers are currently using to

construct their equipment correspond to the proposed system capacity for generating surface and light points. Therefore, no changes to the rule language are necessary.

- i. The ATA, Rockwell Collins, and others objected to the larger field-of-view requirements for FSTDs previously built but not evaluated by the FAA for qualification, and for FSTDs previously evaluated and qualified, but returning to service after a 2-year inactive interval. The concern is that these FSTDs would be required to meet the new field-of-view requirements.

The first time an FSTD is evaluated by the FAA for qualification, the FSTD is evaluated in accordance with the set of standards current at that time. An FSTD placed into an inactive status for 2 or more years will not necessarily be evaluated under any new criteria in effect at the time of re-entry into service. The NSPM, however, considers a full range of factors before deciding whether to require an FSTD coming out of an inactive period to be evaluated in accordance with its original qualification basis or in accordance with the set of standards current at that time.

- j. CAE and others recommended modifying in Table A1A, entry 6.p, to require the visual system be free from apparent and distracting quantization, instead of only apparent quantization.

Eliminating the slightest traces of quantization cannot be technically accomplished. However, because distracting quantization can be minimized to such a level that it does not affect the performance of the visual system, the FAA has made this change.

- k. CAE, ATA, Rockwell Collins, and others questioned why realistic color and directionality of all airport lighting is not a requirement for Level A, Level B, and Level C simulators in addition to Level D simulators.

As proposed, the airport lighting requirements for Level A and B simulators are consistent with international standards. Therefore, the FAA has not made the requested change.

- l. The ATA, Northwest, and others suggested including a test in Table A2A, entry 4.b.3, for Level C simulators to evaluate visual systems with 150° horizontal and 30° vertical field-of-view or a monitor-based system.

The primary goal of the NPRM was to harmonize with international standards. The current international standard, as reflected in the NPRM, for Level C simulators is 180° horizontal by 40° vertical field-of-view. Therefore, the FAA has not adopted the change.

- m. The ATA, Rockwell Collins, and others stated that the test in Table A2A, entry 4.f, Surface Resolution, does not reflect current practice for runway markings. Commenters recommended that this test mirror the current

practice and international standards that runway stripes and spaces be 5.75 feet wide.

The FAA has modified this language where appropriate to reflect current practice and international standards.

- n. The ATA, Rockwell Collins, CAE, and others questioned why the tolerances allowed in entry 4.i, Visual Ground Segment (VGS), of Table A2A are different from the current international standards. They also suggested that the Qualification Test Guide (QTG) contain calculations to compare the altitude used against the altitude specified when performing this test and questioned whether the test must be performed manually.

They also requested deleting or correcting the conversion of feet to meters. The international standards prescribe the application of the VGS tolerance to the far end of the VGS with no tolerance provided at the near end of the VGS. To ensure harmonization, the FAA has made the appropriate changes to the application of this VGS tolerance. The requirements for the QTG contain provisions regarding the calculation of altitude references. The FAA has stated that the altitude calculations are computed with the aircraft at 100 ft (30 m) above the runway touchdown zone and centered on the Instrument Landing System (ILS) electronic glide slope. The typical reference for modern turbojet aircraft operations for height above touchdown is the height of the main landing gear above that touchdown zone reference plane, with the aircraft at a specified weight and landing configuration. To clarify these calculations, the FAA has modified the Flight Conditions column for entry 4.i of Table A2A to reflect this information. The distances expressed in metric units are not direct conversions to U.S. customary units, nor were they intended to be. Rather, these are the appropriate standards depending on which system is being used. Therefore, the FAA has not removed the metric references.

- o. The ATA and others requested clarification regarding the term “in-use runway” in Tables A3B and A3C. The commenters stated that using the general term “in-use runway” would require modeling all taxiways rather than the primary one used which may overload the visual system and negatively impact training.

Each “in-use” runway is a single, one-direction runway, used for takeoffs and landings, that has the required surface lighting and markings. New visual systems are capable of generating substantially more detail than required by this final rule. However, because of the concern raised regarding associated taxiways, the FAA has modified the language in Appendices A, C, and D regarding airport model content to require the use of only the primary taxi route from parking to the end of the runway instead of requiring the modeling of all potential taxi routes.

- p. One commenter requested the FAA provide a definition of the term “dynamic response programming,” to clarify the requirements in Table

A1A, entry 6.h. CAE and others questioned the use of the terms “correlate with integrated airplane systems, where fitted,” and “dynamic response programming,” as they are used in Tables A3B and A1A. Commenters also noted that Table A3B, entry 6.d erroneously applied the requirements for “correlate with integrated airplane systems” to all level of simulators rather than just Levels C and D.

The term “dynamic response” is used in its typical engineering context. As used in Tables A1A (entry 6.h) and C1A (entry 6.i) “dynamic response programming” requires the visual system display to respond with the continuous movement of the simulated aircraft. We have clarified the language in Tables A3b (entry 6.d), C3b (entry 6.d) and D3B (entry 5.d) by removing the phrase “where fitted.” The requirement that the visual scene correlate with the integrated aircraft systems is to ensure that all installed integrated aircraft systems correctly respond to what appears in the visual scene. This visual correspondence requirement applies to only Level C and D simulators and the FAA has corrected this error in Tables A3B and C3B.

q. The ATA, Rockwell Collins, and others suggested there should be no difference between entries 6.e and 8.g in Table A3B.

These two entries are designed to test separate conditions. Entry 6.e tests the external lights to ensure correlation with the airplane and associated equipment while entry 8.g tests the environmental effects of the external lights in the visual system. Because of the separate, distinct purposes of these entries, they should not be the same, and the FAA has not adopted the recommendation.

r. The ATA, Rockwell Collins, and others objected to the inclusion of several visual, sound, or motion systems features (e.g., the effect of rain removal devices; sound of light, medium, and heavy precipitation; and nosewheel scuffing) in the airport model presentations because they are not airport model functions.

These features are a function of the visual, sound, or motion systems. These features must be available and operate correctly in conjunction with the airport models presented during training, testing, or checking activities. These features are meaningful only when they are presented as part of the airport model. Therefore, the FAA has not removed these features from the airport model requirements.

s. The ATA, Northwest, Rockwell Collins, and others expressed concern that the discussion of entry 10 in Table A3B regarding the combination of two airport models to achieve two “in-use” runways at one airport, may impede control of the radio aids and terrain elevation and create distracting effects in the visual scene display.

The discussion in entry 10 of Table A3B is an authorization, not a requirement. If an FSTD has limitations such that this combination would impede control or create distracting effects, this particular authorization is not

applicable. The FAA has added clarifying language in entry 10 to address this concern.

- t. The ATA, Rockwell Collins, and others stated the requirement that “slopes in runways, taxiways, and ramp areas must not cause distracting or unrealistic effects” in entry 4.b in Table A3C implies that Level A and Level B simulators are required to have sloping terrain modeling, making the Class II airport models more stringent than Class I airport models. Level A and B simulators are not required to have sloping terrain modeling. This provision, however, sets forth the requirements for such modeling if a sponsor elects to incorporate sloping terrain modeling in the FSTD. The FAA has clarified this requirement by adding the qualifier “if depicted in the visual scene,” in the appropriate tables in Appendices A, C, and D.
- u. CAE and others requested the FAA establish a list of individuals or corporations who work as visual modelers and can provide detailed information about airports without creating national security concerns. Anyone with a legitimate need for the acquisition of detailed airport information for accurate modeling of any U.S. airport for simulation modeling purposes should contact the NSPM for assistance.

3. Motion or Vibration Requirements.

- a. Rockwell Collins, CAE, the ATA, and others stated that Motion Cueing Performance Signature tests can provide an objective means of determining loss in motion system performance. The commenters were concerned that if these tests were conducted only during the Initial Qualification Evaluation, sponsors would not have objective information available to determine the continuing status of the motion system. The proposal required the results of these tests to be included in the MQTG. Because sponsors are required to run the complete quarterly MQTG inspections, these tests are not intended to be one-time-only tests. The sponsor and NSPM regularly review these tests. The FAA agrees that the statement “this test is not required as part of continuing qualification evaluations” is misleading and has deleted this statement where appropriate.
- b. The ATA, Rockwell Collins, and others questioned whether Level B simulators must be subjectively tested for nosewheel scuffing motion effects when this level of simulator was not authorized for the taxi task. Level B simulators are authorized for Rejected Takeoff Maneuvers. At higher speeds, the movement of the nosewheel steering mechanism can be more sensitive and may cause the nosewheel to be turned beyond smooth tracking angles, resulting in nosewheel scuffing during Rejected Takeoff Maneuvers. Therefore, the FAA has determined that subjective testing for nosewheel scuffing motion effects is necessary and did not make any change.

4. Sound Requirements.

- a. The ATA, Rockwell Collins, and others suggested that in Table A2A, entry 5, Sound Requirements, the tests listed should have a defined frequency spectrum within which the tests should be conducted similar to that set forth in international standards.

Because the text in the proposal describes these processes and similar statements appear in international standards, the FAA has added language similar to the international standards to the sound test requirements of entry 5, Table A2A.

- b. The ATA, Rockwell Collins, and others suggested requiring all levels of FTDs to be able to represent all the flight deck aural warning sounds and sounds from pilot actions instead of limiting this standard to level 6 FTDs, as it currently appears in entry 7.a of Table B1A.

A Level 6 FTD is the only level of FTD that is required to have all aircraft systems installed and operational. This requirement has been in effect for over 16 years and is consistent with current international standards. The suggested requirement is also outside the scope of this rulemaking. Accordingly, the FAA has not adopted the change.

- c. CAE and others suggested entry 7.c, Accurate Simulation of Sounds, in Table A1A, address abnormal operations in addition to the sound of normal operations and the sound of a crash.

The current international standards contain a requirement for sounds addressing abnormal operations, which include the sound of a crash, and normal operations. To harmonize with international standards the FAA has made the change.

D. Helicopters.

1. CAE and others noted that an SOC is not necessary for entries 1.a, 1.b, and 2.a in Table C1A. Thales also suggested that the language in entry 2.a be modified to reflect helicopter operations.

The FAA has removed the SOC requirement in entries 1.a and 1.b because it is not necessary. The SOC for entry 2.a is necessary because it describes a flight dynamics model that must account for combinations of drag and thrust normally encountered in flight. However, the FAA has modified the language in entry 2.a to better reflect helicopter operations.

2. Thales and others stated that the motion onset requirements in Table C1A, entry 2.e, are new requirements for helicopter simulation.

The FAA included the requirements in this entry in the October 30, 2006, final rule (71 FR 63426), and again in the NPRM for this rule. These requirements codify existing practice (e.g., AC 120-63, Helicopter Simulator Qualification).

3. CAE and others suggested that the Information/Notes column in Table C1A, entry 2.f, include “roll” as well as “pitch,” “side loading,” and “directional control characteristics,” when simulating brake and tire failure dynamics.

The FAA has clarified the Information/Notes column by adding the phrase “in the appropriate axes,” which includes roll, pitch, yaw, heave, sway (side loading), and surge.

4. Thales, CAE, and others suggested that the requirements in Table C1A, entry 2.g.1, regarding ground effect should apply to Level B simulators as it appears in table C1A, entry 2.c.1.

The FAA has separated these two requirements because helicopter simulator Levels B, C, and D may be required to perform running takeoffs and running landings, as described in entry 2.c.1. However, only Level C and D simulators are required to perform takeoffs or landings to or from a hover, as noted in entry 2.g, thus requiring separate table entries. Accordingly, the FAA has not adopted the recommendation.

5. CAE and others requested clarification regarding the kinds of aircraft system variables and environmental conditions as listed in Table C1A, entry 4, that must be used in simulation. Commenters suggested removing the reference to “wind speed,” including other environmental controls, and including “water spray” when hovering over water.

There is no specific list of system variables that must be available in a helicopter simulator. The requirement is that the instructor or evaluator be able to control all the system variables and insert all abnormal or emergency conditions into the simulated helicopter systems as described in the sponsor’s FAA-approved training program, or as described in the relevant FSTD operating manual. The FAA has reviewed the entries for environmental controls and has included additional examples of environmental conditions that may be available in the FSTD. We also have included “water vapor” as an example of what may be expected to be re-circulated when hovering above the surface, as suggested by the commenters.

6. CAE, Thales, and others suggested including vortex ring and high-speed rotor vibrations for motion effects programming requirements in Table C1A, entry 5.e. Commenters also suggested requiring Level B and C simulators to demonstrate air turbulence models.

As proposed, entry 5.e included requirements for buffet due to settling with power and rotor vibrations. As the commenters noted, these terms are better expressed as buffet due to vortex ring, and high-speed rotor vibrations. The FAA has clarified the requirements as requested. The FAA also has clarified the statement in the Information/Notes column regarding the use of air turbulence models. Further changes regarding air turbulence modeling are beyond the scope of the NPRM.

7. Thales and others recommended adjusting surface resolution from the currently proposed three (3) arc-minutes to two (2) arc-minutes in Table C1A, entry 6.i.(4). Additionally, Thales recommended the FAA add “helipad” or “heliport” lighting effects specific to helicopter operations for subjective testing.

As noted by the commenter, the two (2) arc-minutes requirement is the current international standard. Therefore, the FAA has made the recommended change. However, there are specific requirements for both airport and helicopter landing area

models for training, testing, and checking purposes in attachment 3, and the FAA has not included the “helipad” or “heliport” lighting effects in Table C1A.

8. CAE, Thales, and others suggested that the tolerance of ± 3 knots, in Table C2A, entry 1.c, Takeoff, and entry 1.j, Landing, be applied to either airspeed or ground speed, because data collected at airspeeds below 30 – 40 knots are often unreliable. Thales suggested that for entries 1.c.2 and 1.c.3, the specific type of takeoff (Category A, Performance, Confined area, etc.) be recorded so proper comparisons can be made.

The FAA recognizes the difficulties in applying tolerances to airspeeds when the airspeed value itself may not be accurate and has added a general authorization for Takeoff tests and Landing tests. Also, the FAA has added a note in the Information/Notes column to address the differing types of takeoff profiles used for each of these tests.

9. CAE and others stated that in helicopter simulation, flight test data containing all the required parameters for a complete power-off landing is not always available. CAE recommended modifying the language in Tables C2A and D2A, entry 1.j.4, Autorotational Landing, to state that in those cases where data are not available, and other qualified flight test personnel are not available to acquire this data, the sponsor must coordinate with the NSPM to determine if it is appropriate to accept alternative testing means.

The FAA agrees that, in certain circumstances, the sponsor must coordinate with the NSPM to determine if it is appropriate to accept an alternative testing means. The FAA has made the appropriate changes.

10. CAE and others stated that Table C2A, entry 1.h.2, Autorotation Performance, requires data be recorded for speeds from 50 knots, ± 5 knots, through at least maximum glide distance airspeed. However, the maximum allowable autorotation airspeed is often slower than the maximum glide distance airspeed, which would prevent accurate data for autorotation entry.

The FAA has modified the test details to include maximum allowable autorotation airspeed.

11. CAE and others suggested reducing the tolerance for control displacement to ± 0.10 inches in Table C2A, entry 2.a.6, Control System Freeplay. The commenters also suggested harmonizing the tolerance requirements for FTDs in Table D2A, entry 2.a.6.

The FAA agrees and has made the appropriate changes, which reflect current international standards.

12. CAE and others suggested that the proposed $\pm 10\%$ tolerances on pitch and airspeed for non-periodic responses, in Table C2A, entry 2.c.3.a, Dynamic Stability, Long Term Response, be relaxed because the proposal is too restrictive. They noted non-periodic Augmentation-On responses generally exhibit less than 5 degrees peak pitch attitude change from trim. Further, commenters

recommended adding a statement to the Information/Notes column to clarify the relationship between non-periodic responses and flight-test data. The rationale for these recommendations is to avoid requirements that are unduly restrictive with divergent results, while ensuring that the non-periodic responses are accurately reproduced.

The FAA agrees with the commenters' suggestions and rationale and has made the appropriate changes in Table C2A for FFSs and in Table D2A for FTDs.

13. CAE and others suggested relaxing the proposed tolerances in Table C2A, entry 2.d.3.a, Dynamic Lateral and Directional Stability, Lateral-Directional Oscillations test. The commenters stated that the non-periodic responses may be divergent, weakly convergent, or deadbeat. The commenters stated that the proposed tolerances may be too restrictive for deadbeat responses. Additionally, the commenters stated that oscillatory responses that satisfy the period and damping ratio tolerances would not necessarily meet the proposed time history tolerances because of the non-periodic nature of the response. The rationale for these recommendations is to avoid requirements that are unduly restrictive with divergent results while ensuring that the non-periodic responses are reproduced with sufficient accuracy.

The FAA agrees with the commenters' suggestions and rationale and has made the appropriate changes in Table C2A for FFSs and in Table D2A for FTDs.

14. Thales, CAE, and others were concerned that there are no tolerances specified for the tests listed in Table C2A, entry 3.a, Frequency Response, 3.b, Leg Balance, and 3.c, Turn Around Check.

Because of the way the tests are used, the FAA has determined it is appropriate that these specific tests do not have a specified tolerance other than the performance as established by the FSTD manufacturer in coordination with the sponsor. These tests are conducted during the initial evaluation and made part of the MQTG. While the sponsor is not required to run these tests again during continuing qualification evaluations, the test results are available if a question arises about the performance of the motion system hardware or the integrity of the motion set-up at any time subsequent to the initial qualification evaluation. The test results recorded during the initial qualification evaluation provide a benchmark against which subsequent comparisons can be made.

15. CAE and others questioned whether a motion signature (Table C2A, entry 3.e, Motion Cueing Performance Signature) is required for a test that only requires a snapshot test result or a series of snapshot test results, and if a sponsor may submit a result of their choice if multiple results are available for a specific test. The specific motion cueing performance signature tests have specifically associated tests that are indicated in the Information/Notes column. When these tests are conducted, the sponsor records the motion system as an additional parameter, providing a cross-sectional benchmark for the motion system performance. When the test authorizes the result to be provided as "a series of snapshot tests," the sponsor

may choose to record the motion cueing performance signature tests as a time history or as a series of snapshot tests.

16. Thales, HAI, and others requested that sponsors be allowed to use alternative data sources for Helicopter FTDs, as authorized for Airplane FTDs.

At this time, alternative data source information has not been developed for Helicopter FTDs. The FAA developed the alternative data source information for airplanes in coordination with industry prior to this rulemaking. Anyone interested in researching and developing alternatives for helicopter FTDs for future rulemakings should contact the NSPM.

17. The HAI and others suggested expanding the vertical field-of-view requirements for level 7 helicopter FTDs to at least 70° in paragraph 24 of Appendix D, Helicopter Flight Training Devices. CAE further noted that the field-of-view requirements for Level 7 FTDs appear to be more stringent than the requirements for a Level B simulator.

Peripheral vision is a critical cue in helicopter operations. Therefore, the FAA determined that the field-of-view standards for Level C helicopter simulators, which have been in effect since 1994, provide the adequate peripheral cues for the new level 7 helicopter FTD. Because peripheral vision is the critical cue, the FAA has not expanded the vertical field-of-view requirement.

18. CAE and others suggested revising the requirements for handling qualities for the level 7 helicopter FTD listed in Table D1A, given the list of tasks that may be authorized for the FTD.

Although the tasks listed in the referenced table may seem extensive for a device that is not an FFS, the FAA does not intend that a student would be completely trained or trained to proficiency in any of the tasks authorized for that FTD. In each case, the task requires additional training, either in an aircraft or in a higher level FSTD, and a proficiency test in an aircraft or in a higher level FSTD upon completion of such training. Therefore, the FAA has not revised the handling qualities for the level 7 helicopter FTD.

19. CAE and others suggested modifying Table D1A, entries 1.a and 1.b, to clarify the location of bulkheads and the location and operation of circuit breakers. The FAA has included clarifying language in entry 1.a of Table D1A.

20. CAE and others suggested removing the statement “An SOC is required” from Table D1A, entries 1.a, 1.b, 2.a, 6.a.1, 6.a.2, 6.a.3, 6.a.4, 6.a.5, 6.a.6, and 6.b. The FAA agrees with the commenters with respect to entries 1.a and 1.b and has removed the SOC statement because a visual observation is sufficient. However, for the remainder of the entries, the SOC statements are still necessary because a visual observation will not reveal the data necessary to demonstrate and explain compliance with the specific requirements.

21. CAE and others suggested including a requirement for an SOC to explain how the computer will address the delay timing requirements for relative responses in Table D1A, entry 2.c.

The entry preceding 2.c sets forth the requirement to have a computer (analog or digital) with the capabilities necessary to meet the qualification level sought. At this point, an SOC is required. The SOC will supply the information about the delay timing tests. Therefore, an additional SOC requirement in entry 2.c is not necessary.

22. CAE, HAI, and others suggested requiring in Table D1A, entry 5, Motion system, that all FTD levels have a motion system instead of allowing an open authorization with the limitation that, if installed, it may not be distracting.

The current training equipment for helicopter FTDs is not designed to include motion systems. The FAA recognizes, however, that some sponsors may wish to include these systems as part of their training equipment. If a sponsor elects to install a motion system, the system must not be distracting. Further, if the system will be used for additional training, testing, or checking credits, it must meet certain other requirements outlined in Appendix C. Accordingly, the FAA has not required helicopter FTDs to have motion systems. However, as proposed, all level 7 FTDs are required, at the very least, to have a vibration system.

23. HAI and others questioned why “mast bumping” was not authorized for Level 6 FTDs, as it is for Level 7 FTDs.

As noted in entry 5.b of Table D1A, only Level 7 FTDs are required to have a vibration system. Because the primary cue that would alert the pilot to the onset of mast bumping would be an increase in the vibration felt from the rotor system, this task is only authorized for Level 7 FTDs.

24. CAE stated that in Table D2A, entry 2.b.3.d, Vertical Control Response, the augmentation condition under the flight condition column is not specified, which is different from the previous three tests for control response in that table.

The FAA agrees with the commenter and has amended the referenced flight condition column to indicate that the augmentation condition for the test is both on and off, as it is for the preceding three control response tests in Table D2A.

25. CAE and others questioned whether the requirements of FSTD Directive 1 should be extended to helicopter FTDs.

The provisions of FSTD Directive 1 are applicable to those FSTD airport models currently in existence. Currently, there are no helicopter FTDs that have required visual systems. Therefore, there is no need to extend the requirements set out in FSTD Directive 1 to helicopter FTDs. The requirements for airport models are included in attachment 3 of Appendix D and are applicable to newly qualified Level 7 helicopter FTDs.

26. HAI and others questioned the necessity and cost of requiring Table D3B, entry 5.f, Effect of Rain Removal Devices.

The visual system requirement for the Level 7 helicopter FTD was designed to mirror the Level C helicopter FFS visual system requirement, which includes rain removal devices. This requirement is necessary to ensure that the FTD adequately reflects the actual helicopter being simulated. If the actual helicopter does not have rain removal devices, the FTD is not required to demonstrate the effect of rain removal devices. The FAA notes that these devices are not always a “windshield wiper,” but may be high-pressure air or an application of rain-repelling fluid.

E. Quality Management System (QMS).

1. Federal Express, ATA, and others questioned which Quality Management System (QMS) would apply when an FSTD (including FSTDs owned by foreign entities), is installed in a Training Center with a different QMS, or if the FSTD is maintained by a contractor with a different QMS.

The system and processes outlined in the QMS should enable the sponsor to monitor compliance with all applicable regulations and ensure correct maintenance and performance of the FSTD in accordance with part 60. Thus, the sponsor’s QMS must include provisions to ensure that the FSTD will only be used when it is in compliance with the sponsor’s own QMS and the regulatory requirements of part 60.

2. The ATA, Rockwell Collins, and others requested that the voluntary elements for the QMS, as published on October 30, 2006 (71 FR 63426), be included in Appendix E of the final rule. One commenter suggested that the concept of a “basic” and a “voluntary” QMS be removed and a single QMS be required. As noted in the NPRM (72 FR 59604), the FAA removed the voluntary QMS from Appendix E. As proposed, Appendix E sets forth the basic requirements for a QMS. Although commenters requested that we include in part 60 the voluntary program, the voluntary program does not expand, further explain, or correspond to specific regulatory requirements. Therefore, the FAA has not included the voluntary program in the final rule.

3. The ATA, Northwest, and others questioned the inspection responsibilities of the NSPM in evaluating the QMS as opposed to FAA entities conducting ATOS audits.

The NSPM is responsible for evaluating the FSTD, including the QMS associated with the FSTD. The ATOS inspections determine whether the incorporation of the FSTD into an FAA-approved flight training program provides the necessary tool(s) to complete the required training program activities. The FAA has determined that the ATOS inspections will not include review of the actual FSTD or the QMS associated with that FSTD.

4. Federal Express and others questioned whether only the Management Representative (MR) should receive Quality System training and brief other personnel on procedures and suggested that the wording be changed to allow others, besides the MR, to brief other personnel. They were also concerned that

the MR, in most cases, is the Director of Operations. They also questioned what would be considered “appropriate” quality system training.

The FAA does not require that the MR be the Director of Operations or hold any other specific position for a certificate holder. The MR, as determined by the sponsor, may delegate his or her responsibilities so long as the delegation does not compromise the QMS. If the MR delegates his or her responsibilities, the MR must ensure that the person to whom the MR delegates his or her responsibilities is capable of adequately briefing other personnel on QMS procedures. Further, anyone can receive QMS training. The FAA, however, is requiring only that the MR receive QMS training. The FAA agrees that the word “appropriate” is not necessary in this context and has removed it.

5. Federal Express and others questioned the proposed requirement to notify the NSPM within 10 working days of the sponsor becoming aware of an addition to, or revision of, flight-related data or airplane systems-related data used to program or operate a qualified FSTD. The commenters are concerned because systems data may not be provided to the sponsor in a timely manner. They requested the notification time be changed to 10 working days of performing a modification, an addition, or a revision of FSTD software that affects the flight or system operations of a qualified FSTD.

The requirement that the sponsor must submit notification within 10 calendar days is only a statement that the sponsor is aware that an addition to, amendment of, or a revision of data that may relate to FFS performance or handling characteristics is available. This notification does not require any information regarding how the change is to be accomplished, nor does it commit the sponsor to implementing the particular change. Rather, information regarding the sponsor’s proposed course of action must be submitted within 45 calendar days of the sponsor becoming aware of the data. Therefore, the FAA did not change the notification time requirement as requested by the commenters.

6. The ATA and others suggested the FAA set forth the minimum requirements for a discrepancy prioritization system or include a note in Appendix E (QMS Systems) that a prioritization system is a required element in an acceptable QMS.

There is no requirement for the development or the implementation of a discrepancy prioritization system for the correction of FSTD discrepancies. Such a system is completely voluntary. If the sponsor elects to develop such a system, the NSPM must approve the system. As stated in Note 1 to entry E1.31.b of Appendix E, if a sponsor has an approved prioritization system, the QMS must describe how discrepancies are prioritized, what actions are taken, and how the sponsor will notify the NSPM if a missing, malfunctioning, or inoperative component (MMI) has not been repaired or replaced within the specified timeframe. Because this prioritization system is voluntary, the FAA has not adopted the changes.

F. Miscellaneous.

1. United, the ATA, and others suggested that the FAA clarify and confirm that elements of the QPS appendices that go beyond current requirements not apply to

FSTDs qualified before May 30, 2008. Also, the commenters recommended continuing to allow currently qualified FSTDs to be updated under the guidance effective when the simulator was initially qualified.

Except for FSTD Directive 1, the rule as proposed does not require currently qualified FSTDs to meet the requirements of the QPS Appendices A-D, attachments 1, 2, and 3, as long as the FSTD continues to meet the test requirements of its original qualification (see paragraph 13, subparagraph b of Appendices A-D). In response to comments, the FAA has clarified that FSTD updates will continue to be allowed under the standards in the current Master Qualification Test Guide (MQTG) for that FSTD.

2. CAE and others noted that the statement “a subjective test is required” in Table C1A is inconsistent with international standards.

The references to “a subjective test is required” and “an objective test is required” in Tables A1A, B1A, C1A, and D1A were redundant of the requirements in Attachments 2 and 3 in Appendices A-D. Therefore, we have removed these references. The objective and subjective test requirements in Attachments 2 and 3 in Appendices A-D are consistent with international standards.

3. The ATA, Northwest, Boeing, CAE, and others recommended adding references to the Airplane Flight Manual (AFM) in the regulatory requirements sections of the QPS appendices.

The FAA is not referencing the AFM as requested because the AFM provides specific standards based on aircraft type. Where the AFM provides helpful data, it may be used as guidance and as an additional data source, if appropriate.

4. CAE and others expressed concern that correcting known data calibration errors may not be permitted because of the language contained in Appendix A, Attachment 2, paragraph 9, (FSTD) Objective Data Requirements, subparagraph b(5).

The FAA acknowledges that the correction of recognized data calibration errors is often accomplished in data collection and reduction exercises. Therefore, the FAA has added language where appropriate in Appendices A-D to permit the correction of known data calibration errors provided that an explanation of the methods used to correct the errors appears in the QTG.

5. CAE requested the FAA explain how percentages are calculated when tolerances are expressed as a percentage in attachment 2, paragraph 2.b, of Appendices A-D. The FAA has included an explanation of how these percentages are calculated in Appendices A-D, attachment 2, paragraph 2.b.

6. The ATA, Northwest, and others expressed concern over the submission of an FSTD modification notification to the NSPM as described in Appendix A, Paragraph 17, subparagraph a. The commenters were concerned that the results of the modification might not be known until after the notice of the modification is submitted to the NSPM.

The notification is not intended to be a detailed summary of each specific result. The notification must simply include a plan of action and a general description of the expected results.

7. The ATA, Rockwell Collins, and others requested clarification of the use of the term MMI component. Some sought clarification as to whether an MMI component was a hardware component, a software component, or a component that directly affected the training mission of the FSTD. In addition, some commenters requested an inclusive list of components such as: flight deck hardware, a system line replaceable unit (LRU) of hardware or software, or a major FSTD system. Further, commenters asked who is responsible for determining whether an MMI component is necessary for a particular maneuver, procedure, or task.

The FAA has determined it is unnecessary to further clarify the meaning of missing, malfunctioning, or inoperative component. These words have their typical dictionary meanings. In this rule, an FSTD component could be a piece of hardware, a piece of software that performs as a piece of hardware (e.g., software functioning as an autopilot), or a piece of software that is used in the operation of the simulated aircraft or of the FSTD itself. Each FSTD component is present to serve a purpose – whether that purpose is to allow the simulation to work or to simulate a component of the aircraft being simulated. Since an FSTD is used to train, test, or check flight crewmembers, if one or more component of the FSTD becomes missing, is not working, or is not working correctly, there would be some impact on the function of the FSTD. Developing an inclusive list of components that are necessary for a particular maneuver, procedure, or task is impractical because of the unique characteristics of each FSTD and unnecessary because of the obvious nature and effect of an MMI component on the overall operation of the FSTD. We have added language to the information in paragraph 18, Operation with Missing, Malfunctioning, or Inoperative Components (§ 60.25) in Appendices A-D to clarify that it is the responsibility of the instructor, check airman, or representative of the administrator conducting training, testing, or checking, to exercise reasonable and prudent judgment to determine whether an MMI component is necessary for a particular maneuver, procedure, or task.

8. Boeing and others commented on the repetition of the definitions of the weight ranges (near maximum, medium, and light). In addition to appearing in Appendix F, the definitions also appear in Attachment 2 of Appendices A-D. The commenters are concerned that the repetition may cause confusion in the application of these ranges. Further, CAE stated that the terms may not apply to light-class helicopters.

The FAA has removed the definitions of these terms from the QPS Requirement in Appendices A-D because they are defined in Appendix F. In some cases, these gross weight ranges are not within the appropriate ranges for light-class helicopters. Therefore, in Appendices C and D, we have added a statement that these terms may not be appropriate for light-class helicopters.

Prior coordination with the NSPM is required to determine the acceptable gross weight ranges for light-class helicopters.

9. The ATA, Northwest, and others questioned how the FAA could use Personally Identifiable Information (PII) for investigation, compliance, or enforcement purposes and then bring enforcement action against a person, not certificated by the FAA, who may have worked on an FSTD.

The FAA must ensure that FSTDs used by flight crewmembers for training, testing, and checking purposes are maintained and used properly and in accordance with all regulatory requirements. If the FAA finds grounds for investigation or enforcement action, the FAA may request, administratively subpoena, or seek a court order for the sponsor's records, which may contain PII. The FAA may use those records, and any PII contained therein, in the course of inspection, investigation, and enforcement. Furthermore, if, for example, the FAA discovered during the course of such an investigation that an individual made false or misleading statements, the FAA could use its statutory and regulatory authority to issue a cease and desist order to prohibit the individual from conducting any future maintenance on any FSTD, regardless of whether he or she holds an FAA certificate.