FSTD Guidance Bulletin 10-03

Class II and Class III Visual Airport Model Evaluation under Flight Simulation Training Device (FSTD) Directive 1

Purpose: This bulletin is intended to provide guidance to FSTD sponsors and FAA Training Program Approval Authorities in the evaluation and use of Class II and Class III airport models as defined in 14 CFR Part 60, FSTD Directive #1.

Scope: All currently qualified FSTDs that are subject to the requirements of FSTD Directive #1.

This Guidance Bulletin provides an acceptable means, but not the only means of compliance with Title 14 Code of Federal Regulations (CFR) Part 60 pertaining to the Evaluation and Qualification of Flight Simulation Training Devices (FSTD) for use in FAA Approved Flight Training Programs. If an applicant chooses to utilize the approach described within this Guidance Bulletin, that applicant must adhere to all methods, procedures, and standards herein. Should an applicant desire to use another means, a proposal must be submitted to the National Simulator Program Manager (NSPM) for review and approval prior to implementation. This Guidance Bulletin does not change regulatory requirements or create additional ones, and does not authorize changes in, or deviations from, regulatory requirements.

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REVISION HISTORY		
Rev	**Description of Change**	**Effective Date**
0	Original	06/17/2010

1. Background Information

1.1. Objective: The objective of this bulletin is to provide guidance on visual airport model evaluation, approval, and usage under 14 CFR Part 60, FSTD Directive 1. This guidance is primarily directed to Flight Simulation Training Device (FSTD) sponsors, certificate holders conducting training under FAA approved training programs, and FAA Training Program Approval Authorities (TPAAs) tasked with the approval of such programs. This objective is accomplished through the consolidation of relevant Part 60 rule requirements, information, and definitions in addition to providing examples that may be of use as a reference in approving Class II and Class III airport models in an FAA approved training program. This guidance is intended only to explain Part 60 rule requirements and information. Final approval of the use of any visual airport model in an FAA approved training program will be determined by the TPAA.

1.2. FSTD Directive Process

1.2.1. The basis for a Flight Simulation Training Device (FSTD) Directive is described in 14 CFR Part 60.23(b).

1.2.2. The purpose of an FSTD directive is to provide a regulatory mechanism to require modifications to qualified FSTDs to address safety of flight issues.

1.2.3. FSTD directives may apply to any currently qualified FSTD, regardless of the qualification standard or grandfather rights retained.

1.2.4. FSTD Directives are contained within the Qualification Performance Standards (QPS) appendices of Part 60.

1.2.5. Changes to or the addition of new FSTD directives require a rulemaking process.

1.3. FSTD Directive 1

1.3.1. FSTD Directive 1 was published concurrently with Change 1 of Part 60 in May 2008.

1.3.2. FSTD Directive 1 is applicable to all qualified Level A to Level D fixed wing and helicopter simulators regardless of the original qualification basis and qualification date.

1.3.3. FSTD Directive 1 was written to specifically address visual airport models used in training, testing, or checking that are not evaluated as part of an initial or continuing qualification evaluation by the National Simulator Program. Qualification criteria under 14 CFR Part 60 and previous standards typically require the evaluation of three qualification models that are primarily intended to assess the capabilities of the visual display system and not necessarily the airport models typically used in training. As a result, most FSTDs in operation had many additional airport models available for use in training that were not required to meet any minimum scene content standards.

1.4. Definitions

1.4.1. **Class I Airport Model** – Whether modeling real world or fictional airports (or landing areas for helicopters), these visual models are those that meet the requirements of Table A3B or C3B, found in attachment 3 of Appendix A or C of Part 60, as appropriate, are evaluated by the NSPM, and are listed on the Statement of Qualification.

1.4.2. **Class II Airport Model** – Whether modeling real world or fictional airports (or landing areas for helicopters), these airport models (or landing areas for helicopters) are those models that are in excess of those used for simulator qualification at a specified level. The FSTD sponsor is responsible for ensuring that these models meet the requirements set out in Table A3C or C3C, found in attachment 3 of Appendix A or C of Part 60, as appropriate.

1.4.3. **Class III Airport Model** – This is a special class of airport model (or landing area for helicopters), used for specific purposes, and includes models that may be incomplete or inaccurate when viewed without restriction, but when appropriate limits are applied (e.g., “valid for use only in visibility conditions less than ½ statue mile or RVR 2400 feet,” “valid for use only for approaches to runway 22L and 22R”), those features that may be incomplete or inaccurate may not be able to be recognized as such by the crewmember being trained, tested, or checked. Class III airport models used for training, testing, or checking activities under this Chapter require the certificate holder to submit (to the TPAA) an appropriate analysis of the skills, knowledge, and abilities necessary for competent performance of the task(s) for which this

particular model is to be used. TPAA acceptance of each Class III model is required.

1.4.4. **Qualification Airport Model** – Those visual airport models required to qualify a simulator at a specific level and are evaluated by the NSPM under simulator standards prior to Part 60. Similar to a Class I airport model as defined for simulators qualified under the Part 60 standard.

1.4.5. **Fictional Airport Model** – A visual model of an airport that is a collection of "non-real world" terrain, instrument approach procedures, navigation aids, maps, and visual modeling detail sufficient to enable completion of an Airline Transport Pilot Certificate or Type Rating.

1.4.6. **Generic Airport Model** – A Class III visual model that combines correct navigation aids for a real world airport with a visual model that does not depict that same airport.

1.4.7. **"In-Use" Runway** – as used in this part, the runway that is currently selected, able to be used for takeoffs and landings, and has the surface lighting and markings required by this part. Also known as the "active" runway.

1.4.8. **Training Program Approval Authority (TPAA)** – A person authorized by the Administrator to approve the aircraft flight training program in which the FSTD will be used.

2. Evaluation Information

2.1. Class I Airport Models

2.1.1. Class I qualification standards are contained within Table A3B or Table C3B in Part 60 and are applicable only to those FSTDs that are qualified under Part 60 standards. Qualification airport models on FSTDs qualified under previous standards will be evaluated against the standards that they were initially qualified under.

2.1.2. The National Simulator Program is tasked with evaluating Class I or Qualification airport models as part of the FSTD initial or continuing evaluation process.

2.1.3. Class I models are not required to have all airport runways fully modeled. At the discretion of the simulator sponsor, only certain runways may be classified as "in-use" runways for training. Only

runways considered as "in-use" are required to meet the airport model content requirements in Table A3B, section 5. All other runways are only required to be visually depicted sufficiently for airport and runway recognition purposes. The sponsor/operator of the simulator should have a method to ensure the users are notified as to which runways in their Class I models are designated as "in-use" for training.

2.1.4. All Class I or qualification models evaluated by the NSP will be indicated on the FSTD's most recent Statement of Qualification (NSP Form T001A) or FSTD Evaluation Report (NSP form T002).

2.2. Class II Airport Models

2.2.1. Class II airport model standards are contained within Table A3C or Table C3C of Part 60 (see attachment 1). These standards apply to any airport model used for FAA training, testing, or testing that has not been evaluated as a Class I or Class III model as described below.

2.2.2. As described in FSTD Directive 1, the certificate holder conducting the training on the FSTD is responsible for ensuring that any airport model used for training, testing, or checking meets the definition of a Class II or Class III airport as defined in Part 60.

2.2.3. The certificate holder is also responsible for ensuring that instructors and evaluators using the FSTD are apprised of which airport models meet Class II or Class III requirements.

2.2.4. Class II models may be representations of real-world operational airports or representations of fictional airports. If fictional airport models are utilized, all associated visual modeling, instrument approach procedures, navigational aids, maps, etc. must not represent a real-world airport environment.

2.2.5. Class II models are not required to have all airport runways fully modeled. At the discretion of the simulator sponsor, only certain runways may be classified as "in-use" runways for training. Only runways considered as "in-use" are required to meet the airport model content requirements in Table A3C, section 3. All other runways are only required to be visually depicted sufficiently for airport and runway recognition purposes. The sponsor/operator

of the simulator should have a method to ensure the users are notified as to which runways in their Class II models are designated as "in-use" for training.

2.2.6. Class II models are subject to the update requirements as described in Part 60, Appendix A, Attachment 3, paragraph 1.f.. These requirements place time limits on updating simulator models with real-world airport changes such as new runways, taxiways, approach lighting systems, etc. Lighting or signage changes to specific runway/taxiways that are not "in-use" may be deferred indefinitely or the model is reclassified as a Class III models (see below). Note that new runways/taxiways, regardless of "in-use" status, must be modeled sufficiently for airport recognition purposes as described in 2.2.5 above.

2.3. Class III Airport Models

2.3.1. Class III airport models are intended to enable the use of models which represent real-world airports, but may lack the scene content required to meet Class I or Class II model standards. Examples of this may be:

- Generic airport models aligned to real-world instrument procedures and navigational aids.
- Airport models lacking the detail requirements of Class I or Class II models such as correct taxiway routes, surface markings, airport facility structural changes, etc.

2.3.2. The use of Class III airport models in FAA approved training programs requires acceptance of the model by the TPAA. This acceptance is based upon the certificate holder providing the TPAA with an appropriate task analysis justifying the use of the model and declaration that any inaccuracies of the model have been mitigated to minimize the possibility of providing negative training. Documentation of approved Class III models must be maintained that clearly indicates any training restrictions associated with the use of the model. Additionally, this documentation must be made available to the users of the FSTD to avoid the possibility of improper use of the Class III model. Some typical examples of Class III model approvals are:

- A generic airport model with one properly modeled runway aligned to the navigational aids and approach procedures for a real-world airport. Training restrictions may be considered which limit the use of the model to tasks which do not require the identification of the surrounding airport environment (such as limited visibility approaches/go-arounds).
- An airport model specifically intended for tasks which require fully detailed modeling in very limited areas, such as low visibility taxi training. A Class III model may be approved only for those designated areas within the model to conduct the intended training tasks when viewed with appropriate restrictions (e.g., airport model approved only for use for low visibility taxi training on taxiway xx).
- A visual model where other scene content features are not required to conduct the intended training task. Examples of this would include missing visual landing aids (not required or visible in an IMC approach) or approach lighting systems (not typically active in VMC approaches) in the particular meteorological conditions and tasks being trained.

2.3.3. Specific review/observation of each Class III model by the TPAA is not explicitly required for acceptance if the simulator sponsor can provide the TPAA with an acceptable description of the process for determining the acceptability of a specific airport model, outlines the conditions under which such an airport model may be used, and adequately describes what restrictions will be applied to each resulting airport or landing area model.

2.4. Summary

2.4.1. Class I Airport Models are:

- Evaluated by the NSP on initial and continuing qualification evaluations (Table A3B for Part 60 qualified devices). Typically three models are required
- Not applicable to grandfather devices under previous standards (use the original qualification standard).
- Intended to demonstrate visual system performance and capabilities and are available for use in training
- Listed on the Statement of Qualification

- Not evaluated by the TPAA

2.4.2. Class II Airport Models are:

- Evaluated by the simulator sponsor (Table A3C of Part 60)
- Not listed on the Statement of Qualification
- Real-world or fictitious airports
- Intended to meet basic airport model content requirements used in training, checking, and testing.
- Not required to have all airport runways fully modeled. Incomplete or inaccurately modeled runways/taxiways may be designated as "not in-use".

2.4.3. Class III Airport Models are:

- Accepted for use in training by the TPAA (POI or TCPM) through task analysis conducted by the certificate holder.
- Not listed on the Statement of Qualification
- Allowed to be inaccurate or incomplete airport models when viewed with appropriate restrictions (including generic or "anytown" models).
- Appropriately restricted to prevent negative training.

3. Part 60 References

Description	**14 CFR Part 60 Reference**
FSTD Directive, definition	§60.23, Modifications to FSTDs
Class II and Class III model QPS requirements, general	Appendix A, Attachment 3 (Simulator Subjective Evaluation), Paragraph 1.a. (QPS Requirement)
Fictional airport usage	Appendix A, Attachment 3 (Simulator Subjective Evaluation), Paragraph 1.b. (QPS Requirement)
Airport model usage for training, checking, or testing purposes	Appendix A, Attachment 3 (Simulator Subjective Evaluation), Paragraph 1.c. (QPS Requirement)
Airport model maintenance in an FSTD maintained by a non U.S. certificate holder	Appendix A, Attachment 3 (Simulator Subjective Evaluation), Paragraph 1.d. (QPS Requirement)
Class II and Class III airport models – FSTD user notifications	Appendix A, Attachment 3 (Simulator Subjective Evaluation), Paragraph 1.e. (QPS Requirement)
Real world airport update requirements	Appendix A, Attachment 3 (Simulator Subjective Evaluation), Paragraphs 1.f. and 1.g. (QPS Requirement)
Class III airport models – training task analysis to demonstrate acceptability of a Class III model to the TPAA	Appendix A, Attachment 3 (Simulator Subjective Evaluation), Paragraphs 2.g. (Information)
Class III airport models – process for determining acceptability, example situations of Class III models designations	Appendix A, Attachment 3 (Simulator Subjective Evaluation), Paragraphs 2.h. (Information)
Exceptions for previously qualified simulators due to image generator limitations.	Appendix A, Attachment 3 (Simulator Subjective Evaluation), Paragraphs 2.i. (Information)
Class I airport model requirements	Appendix A, Attachment 3 (Simulator Subjective Evaluation), Table A3B (QPS Requirement)
Class II airport model requirements	Appendix A, Attachment 3 (Simulator Subjective Evaluation), Table A3C (QPS Requirement)
FSTD Directive #1	Appendix A, Attachment 6
Definitions - Airport Model (Class I, Class II, and Class III), Fictional Airport, Generic Airport Model, “In-Use” Runway, Real-World Airport, Training Program Approval Authority (TPAA)	Appendix F, Section 2, Definitions (QPS Requirement)

Attachment 1 – Class II Airport Model Requirements (Part 60 Table A3C)

Functions and Subjective Tests QPS REQUIREMENTS					
Entry Number	**Additional Airport Models Beyond Minimum Required for Qualification Class II Airport Models**	**Simulator Level**			
		A	**B**	**C**	**D**
This table specifies the minimum airport model content and functionality necessary to add airport models to a simulator's model library, beyond those necessary for qualification at the stated level, without the necessity of further involvement of the NSPM or TPAA.					
	Begin QPS Requirements				
1.	**Airport model management.** The following is the minimum airport model management requirements for simulators at Levels A, B, C, and D.				
1.a.	The direction of strobe lights, approach lights, runway edge lights, visual landing aids, runway centerline lights, threshold lights, and touchdown zone lights on the "in-use" runway must be replicated.	**X**	**X**	**X**	**X**
2.	**Visual feature recognition.** The following are the minimum distances at which runway features must be visible for simulators at Levels A, B, C, and D. Distances are measured from runway threshold to an airplane aligned with the runway on an extended 3° glide-slope in simulated meteorological conditions that recreate the minimum distances for visibility. For circling approaches, all requirements of this section apply to the runway used for the initial approach and to the runway of intended landing.				
2.a.	Runway definition, strobe lights, approach lights, and runway edge white lights from 5 sm (8 km) from the runway threshold.	**X**	**X**	**X**	**X**
2.b.	Visual Approach Aid lights (VASI or PAPI) from 5 sm (8 km) from the runway threshold.			**X**	**X**
2.c.	Visual Approach Aid lights (VASI or PAPI) from 3 sm (5 km) from the runway threshold.	**X**	**X**		
2.d.	Runway centerline lights and taxiway definition from 3 sm (5 km) from the runway threshold.	**X**	**X**	**X**	**X**
2.e.	Threshold lights and touchdown zone lights from 2 sm (3 km) from the runway threshold.	**X**	**X**	**X**	**X**
2.f.	Runway markings within range of landing lights for night scenes and as required by the surface resolution requirements on day scenes.	**X**	**X**	**X**	**X**
2.g.	For circling approaches, the runway of intended landing and associated lighting must fade into view in a non-distracting manner.	**X**	**X**	**X**	**X**

3.	**Airport model content.** The following prescribes the minimum requirements for what must be provided in an airport model and identifies other aspects of the airport environment that must correspond with that model for simulators at Levels A, B, C, and D. The detail must be developed using airport pictures, construction drawings and maps, or other similar data, or developed in accordance with published regulatory material; however, this does not require that airport models contain details that are beyond the designed capability of the currently qualified visual system. For circling approaches, all requirements of this section apply to the runway used for the initial approach and to the runway of intended landing. Only one "primary" taxi route from parking to the runway end will be required for each "in-use" runway.				
3.a.	**The surface and markings for each "in-use" runway:**				
3.a.1.	Threshold markings.	**X**	**X**	**X**	**X**
3.a.2.	Runway numbers.	**X**	**X**	**X**	**X**
3.a.3.	Touchdown zone markings.	**X**	**X**	**X**	**X**
3.a.4.	Fixed distance markings.	**X**	**X**	**X**	**X**
3.a.5.	Edge markings.	**X**	**X**	**X**	**X**
3.a.6.	Centerline stripes.	**X**	**X**	**X**	**X**
3.b.	The lighting for each "in-use" runway.				
3.b.1.	Threshold lights.	**X**	**X**	**X**	**X**
3.b.2.	Edge lights.	**X**	**X**	**X**	**X**
3.b.3.	End lights.	**X**	**X**	**X**	**X**
3.b.4.	Centerline lights.	**X**	**X**	**X**	**X**
3.b.5.	Touchdown zone lights, if appropriate.	**X**	**X**	**X**	**X**
3.b.6.	Leadoff lights, if appropriate.	**X**	**X**	**X**	**X**
3.b.7.	Appropriate visual landing aid(s) for that runway.	**X**	**X**	**X**	**X**
3.b.8.	Appropriate approach lighting system for that runway.	**X**	**X**	**X**	**X**
3.c.	The taxiway surface and markings associated with each "in-use" runway:				
3.c.1.	Edge.	**X**	**X**	**X**	**X**
3.c.2.	Centerline.	**X**	**X**	**X**	**X**
3.c.3.	Runway hold lines.	**X**	**X**	**X**	**X**
3.c.4.	ILS critical area markings.	**X**	**X**	**X**	**X**
3.d.	The taxiway lighting associated with each "in-use" runway:				
3.d.1.	Edge.			**X**	**X**
3.d.2.	Centerline.	**X**	**X**	**X**	**X**
3.d.3.	Runway hold and ILS critical area lights.	**X**	**X**	**X**	**X**
4.	**Required model correlation with other aspects of the airport environment simulation.** The following are the minimum model correlation tests that must be conducted for simulators at Levels A, B, C, and D.				
4.a.	The airport model must be properly aligned with the navigational aids that are associated with operations at the "in-use" runway.	**X**	**X**	**X**	**X**
4.b.	Slopes in runways, taxiways, and ramp areas, if depicted in the	**X**	**X**	**X**	**X**

	visual scene, must not cause distracting or unrealistic effects.				
5.	**Correlation with airplane and associated equipment.** The following are the minimum correlation comparisons that must be made for simulators at Levels A, B, C, and D.				
5.a.	Visual system compatibility with aerodynamic programming.	**X**	**X**	**X**	**X**
5.b.	Accurate portrayal of environment relating to flight simulator attitudes.	**X**	**X**	**X**	**X**
5.c.	Visual cues to assess sink rate and depth perception during landings.		**X**	**X**	**X**
5.d.	Visual effects for each visible, own-ship, airplane external light(s).		**X**	**X**	**X**
6.	**Scene quality.** The following are the minimum scene quality tests that must be conducted for simulators at Levels A, B, C, and D.				
6.a.	Surfaces and textural cues must be free of apparent and distracting quantization (aliasing).			**X**	**X**
6.b.	Correct color and realistic textural cues.			**X**	**X**
6.c.	Light points free from distracting jitter, smearing or streaking.	**X**	**X**	**X**	**X**
7.	**Instructor controls of the following:** The following are the minimum instructor controls that must be available in simulators at Levels A, B, C, and D.				
7.a.	Environmental effects, e.g., cloud base (if used), cloud effects, cloud density, visibility in statute miles/kilometers and RVR in feet/meters.	**X**	**X**	**X**	**X**
7.b.	Airport selection.	**X**	**X**	**X**	**X**
7.c.	Airport lighting including variable intensity.	**X**	**X**	**X**	**X**
7.d.	Dynamic effects including ground and flight traffic.			**X**	**X**
End QPS Requirements					
Begin Information					

8.	Sponsors are not required to provide every detail of a runway, but the detail that is provided must be correct within the capabilities of the system.	**X**	**X**	**X**	**X**
End Information					