



**Federal Aviation
Administration**

National Simulator Program

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Airport Model Evaluation

Missing Malfunctioning or Inoperative Reporting Requirements



Federal Aviation
Administration



Objectives

- **NSP Duties and Functions**
- **Flight Simulation Training Devices (FSTD) Standards**
- **Basis of an FSTD Directive**
- **Part 60 Classifications of Airport Models**
 - Class I
 - Class II
 - Class III
- **Background and Intent of FSTD Directive #1**
- **“In-use” runway concept**
- **Airport model update requirements**
- **MMI reporting requirements**

NSP Duties and Functions

Established through FAA Order 8000.48A in 1980, current Order:
8000.48B, 1992

- **Develops and recommends national policy and standards with regards to FSTDs**
- **Conducts initial and continuing qualifications (formerly, recurrent evaluations) of FSTDs**
- **Qualification oversight of ~ 750 active FSTDs worldwide with a total of ~1225**
- **NSP Does Not Approve FSTD usage in training programs.**



FSTD Standards

- **Advisory Circular, AC 121-14 was the first simulator standard published in 1969**
- **Simulator standards updates**
 - AC 121-14A, AC 121-14B, and AC 121-14C (1976 to 1980)
 - AC 120-40A, AC 120-40B, and AC 120-40C (1983 to 1995)
- **14 CFR § 60 (Chg 1) is the most current standard:**
 - Rule, not advisory (Regulation)
 - Paradigm change
 - Allows for grandfather rights

FSTD Evaluation and Standards

- **General Requirements (Initial and continuing qualifications)**
 - Defines minimum FSTD requirements for qualification at a particular level
 - Defines a qualified task list (§ 60)
- Objective Testing
- Functions and Subjective Testing



FSTD Evaluation and Standards

- General Requirements
- **Objective Testing (Qualification Test Guide)**
 - Defines minimum objective testing requirements and associated tolerances
 - Includes performance and handling qualities validated against flight test data collected or other approved data sources
 - Defines tolerances for simulator systems such as visual display systems, motion systems, flight control systems, etc.
- Functions and Subjective Testing

FSTD Evaluation and Standards

- General Requirements
- Objective Testing
- **Functions and Subjective Testing**
 - Provides a basis for evaluating the capability of the simulator over a typical utilization period
 - Determines if the simulator accurately simulates each required maneuver, procedure, or task
 - Covers areas not specifically evaluated by objective testing (motion cueing, flight instruments, automation, etc)



§ 60 Airport Model Classifications

- **§ 60 identifies visual airport models**
 - Class I – Qualification models are intended to demonstrate capabilities of the system and provide a minimum set of visual cueing to allow the completion of the functions and subjective testing.
 - Class II – Additional airport models used in training, beyond the minimum required qualification models.
 - Class III – Special purpose models which may be inaccurate or incomplete if proper restrictions are employed.

Class I Airport Models

- **Evaluated by the NSP as part of initial and continuing FSTD qualification evaluations.**
- **Listed on the NSP Statement of Qualification (SOQ) / T001A and T002**
- **Intended primarily to demonstrate the capability of the device for qualification purposes**
- **Applicable only to FSTDs qualified under § 60 standards**
- **Grandfathered devices are evaluated under standards originally qualified**
- **Standards are in § 60 Table A3B (airplanes) or C3B (helicopters)**

Class II Airport Models

- **Evaluated by the FSTD sponsor/certificate holder conducting training**
- **May be real-world or fictitious airports**
- **Minimum requirements are in § 60 Table A3C (airplanes) or Table C3C (helicopters)**
- **Not listed on the NSP SOQ / T001A or T002**
- **Subject to update requirements of real-world airports (more on this later)**

Class III Airport Models

- **Accepted for use in training by the TPAA (POI or TCPM) through task analysis conducted by the certificate holder**
- **Not listed on the SOQ / T001A or T002**
- **Allows for the use of inaccurate or incomplete airport models (including generic, “anytown” models)**
- **Appropriate restrictions (such as visual restrictions or training limitations) must be placed on the use of Class III models to prevent training with potentially incorrect or inappropriate visual references**

What is an FSTD Directive?

- **Defined in § 60**
- **Modifications to FSTDs (§ 60.23)**
- **Mechanism to require modifications to FSTDs**
- **Intended to address safety of flight issues**
- **Applicable to all qualified FSTDs, regardless of qualification standard and grandfather rights**
- **Similar in nature to an Airworthiness Directive**

FSTD Directive #1

- **Published in conjunction with § 60 (Chg 1) May 2008**
- **Effective May 2009**
- **Retroactive requirement to all FSTDs**
- **Certificate holder to ensure all airport models used in training meet Class II or Class III definitions as defined in § 60**
- **Compliance not required with Class I (qualification) model standards on grandfathered devices. Reference original simulator qualification standard**

FSTD Directive #1 – Why?

- **Simulator standards only require evaluation of three qualification models**
- **Most FSTDs contain many additional models used in training**
- **Intent was to define minimum standards for all airport models used in training.**
- **NSP unable to evaluate all models**
- **Requirement was directed to the certificate holders to verify compliance**





“In-use” Runways

- **“In-use” Runway – the runway that is currently selected, able to be used for takeoffs and landings, and has the surface lighting and markings required by § 60**
- **§ 60 Table A3B (Class I) and A3C (Class II) requires full modeling only on runways declared as “In-use”**
- **It is not necessary for all runways at an airport model to be declared as “In-use”**
- **Sponsor should ensure FSTD users are properly informed**

§ 60 Model Update Requirements

Appendix A, Attachment 3, Paragraph 1.f.

- (1) For a new or modified approach light system:
 - **45 days**
- (2) For a new runway, a runway extension, a new taxiway, a taxiway extension, or a runway or taxiway closure:
 - **90 days**
- (3) For other facility or structural changes on the airport (e.g., new terminal, relocation of Air Traffic Control Tower):
 - **180 days**

RUNWAYS MAY BE DECLARED AS NOT “IN-USE” BY THE SPONSOR IF UNABLE TO BE UPDATED AS REQUIRED

Evaluation Guidance Material

- **Information and requirements for Class II and Class III airport models are spread out all over the § 60 regulation**
 - Main Rule
 - Qualification Performance Standards (QPS) Requirements (Appendix A and Appendix C tables and text)
 - Definitions (Appendix F)
- **To consolidate the information and requirements within the rule, the NSP will publish guidance material for use by industry and FAA training approval authorities**
- **Expect updates to publications on the NSP web site**



Missing, Malfunctioning, or Inoperative Components



MMI Requirements

- Discussed in § 60.25
- Applicable to all qualified devices
- Requires reporting of discrepancies that affect the completion of training tasks, qualification level, or performance and handling qualities of the device
- Only applicable to items uncorrected for 30 days or more.
- Should be determined by persons knowledgeable in the training programs being conducted in the FSTD
- Requirement may be relieved if the sponsor has an NSP approved discrepancy prioritization system (DPS), (§ 60, Appendix A, Section 18.d.)
- See NSP guidance bulletin #08-01 for further information

MMI Requirements

A discrepancy is “reportable” ... IF...

1, 2, or 3 are answered “yes”...

- 1. Does the discrepancy affect or require a change to the FSTD SOQ?**
- 2. Does the discrepancy affect the performance or handling qualities of the FSTD?**
- 3. Does the discrepancy affect the accomplishment of required training, checking, or testing tasks in the FSTD in accordance with the FAA approved training program(s) being conducted in the FSTD?**

... AND ...

The repair or replacement of the MMI component will take longer than 30 days (§ 60.25b).

For further information, see NSP Guidance Bulletin 08-01

MMI Requirements

- § 60.20 requires that all discrepancies, including MMIs, be logged appropriately:

§ 60.20 Logging FSTD discrepancies.

Each instructor, check airman, or representative of the Administrator conducting training, evaluation, or flight experience, and each person conducting the preflight inspection who discovers a discrepancy, including any missing, malfunctioning, or inoperative components in the FSTD, must write or cause to be written a description of that discrepancy into the discrepancy log at the end of the FSTD preflight or FSTD use session.

Simulator Quality Management Systems

- **§ 60.5**
- **A sponsor must establish and follow an NSP approved basic QMS program**
- **Defined in Appendix E of § 60**
- **Guidance on NSP web site including a fully written sample basic SQMS program**
- **Submitted to the NSP Manager**
- **Currently all sponsors have submitted their QMS programs and site assessments are being conducted**

Additional questions or comments?

National Simulator Program at...

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<http://www.faa.gov/about/initiatives/nsp/>

ORDER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

8000.48B

1/23/92

SUBJ: NATIONAL SIMULATOR PROGRAM

1. **PURPOSE.** This order describes the National Simulator Program (NSP) and identifies responsibilities, authorities, and procedures related thereto.
2. **DISTRIBUTION.** This order is distributed to the director level in the Washington headquarters and the centers; to all Regional Administrators; to branch level in the Flight Standards Service and the Office of Aviation System Standards; to the Flight Standards Division in the Europe, Africa, and Middle East Office; to branch level in the regional Flight Standards Divisions and to the Flight Standards Branch at the FAA Academy; and to all Flight Standards field offices and Flight Inspection field offices.
3. **CANCELLATION.** Order 8000.48A, National Simulator Evaluation Program, dated January 20, 1983, is cancelled.
4. **BACKGROUND.** In order to evaluate simulators for use in approved training programs, the National Simulator Evaluation Program (NSP) was established by the Federal Aviation Administration (FAA) in June 1980. Responsibility for the program was originally assigned to the Flight Standards Service (formerly the Office of Flight Operations), and subsequently was shared with the Southern Region. Although FAA has encouraged the expanded use of simulation in pilot training and checking, there remains a need for still broader application of the available technology within the aviation community. In addition, flight training devices (FTD's) that complement simulator use have been identified and authorizations have been developed for their use. These devices are less complex than simulators, and provide limited pilot training and checking capability. The technical quality of simulators and FTD's, and the substantial amount of training and checking which may be authorized in FTD's, require development and maintenance of consistent criteria and systematic evaluation by the NSF Staff.

Distribution: A-WXYZ-1; A-W(FS/VN)-3; AEU-200 (2 cys);
A-X(FS)-3; AAC-950 (20 cys); A-FFS-0 (MAX)

Initiated By: AFS-200





ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION

SUBJECT: AIRCRAFT SIMULATOR EVALUATION AND APPROVAL

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1. **PURPOSE.** This circular sets forth one means that would be acceptable to the Administrator for approval of aircraft simulators or other training devices requiring approval under 121.407.
 2. **BACKGROUND.** Factors such as safety and aircraft traffic congestion strongly point to the increased use of simulation. The increasing size, complexity and operating cost of the modern turbojet transport and its operating environment point to greater use of the highly sophisticated technology now available in aircraft simulators and aircraft simulation devices.
 3. **SCOPE OF APPROVAL.** Approval procedures which follow apply to specific maneuvers, procedures and crewmember functions for which the user requests approval.
 4. **DEFINITIONS.**
 - a. **Simulator Data** includes the various types of data used by the simulator manufacturer and the applicant to design, manufacture and test the flight simulator. Normally the aircraft manufacturer will provide the aircraft data to the aircraft simulator manufacturer, which in the case of aircraft not yet flying will be predicted data. In the case of aircraft already flying, data obtained from the Airplane Flight Manual, Aircraft Type Inspection Report, or flight tests in the applicant's aircraft may be used. The data must be applicable to the specific aircraft and must be acceptable to the Administrator.
 - b. **Customer Acceptance Test Guide** is a test guide used by the applicant to verify that the simulator complies with contractual specifications. This is an extensive engineering flight test of all areas of performance and systems operation.
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Initiated by: FS-426



§ 60.23 Modifications to FSTDs.

(a) *Description of a modification.* For the purposes of this part, an FSTD is said to have been modified when:

(1) Equipment or devices intended to simulate aircraft appliances are added to or removed from FSTD, which change the Statement of Qualification or the MQTG; or

(2) Changes are made to either software or hardware that are intended to impact flight or ground dynamics; changes are made that impact performance or handling characteristics of the FSTD (including motion, visual, control loading, or sound systems for those FSTD levels requiring sound tests and measurements); or changes are made to the MQTG.

(b) *FSTD Directive.* When the FAA determines that FSTD modification is necessary for safety of flight reasons, the sponsor of each affected FSTD must ensure that the FSTD is modified according to the FSTD Directive regardless of the original qualification standards applicable to any specific FSTD.

**Attachment 6 to Appendix A to Part 60—
FSTD Directives Applicable to Airplane
Flight Simulators**

**Flight Simulation Training Device (FSTD)
Directive**

FSTD Directive 1. Applicable to all Full Flight Simulators (FFS), regardless of the original qualification basis and qualification date (original or upgrade), having Class II or Class III airport models available.

Agency: Federal Aviation Administration (FAA), DOT.

Action: This is a retroactive requirement to have all Class II or Class III airport models meet current requirements.

Summary: Notwithstanding the authorization listed in paragraph 13b in Appendices A and C of this part, this FSTD Directive requires each certificate holder to ensure that by May 30, 2009, except for the airport model(s) used to qualify the simulator at the designated level, each airport model used by the certificate holder's instructors or evaluators for training, checking, or testing under this chapter in an FFS, meets the definition of a Class II or Class III airport model as defined in 14CFR part 60. The completion of this requirement will not require a report, and the method used for keeping instructors and evaluators apprised of the airport models that meet Class II or Class III requirements on any given simulator is at the option of the certificate holder whose employees are using the FFS, but the method used must be available for review by the TPAA for that certificate holder.

Dates: FSTD Directive 1 becomes effective on May 30, 2008.

Federal Aviation Administration AFS-205 404.832.4700	National Simulator Program Flight Simulation Training Device Qualification Guidance	Guidance Bulletin Number: 10-##	Revision (0)
Title: Class II and Class III Airport Model Evaluation		Effective Date: [DRAFT]	Page 1 of 12

FSTD Guidance Bulletin 10-##

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 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.

Approval: Harlan G. Sparrow III
National Simulator Program Manager

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Summary – Airport Model Classification

- **Class I Airport Models are:**
 - Evaluated by the NSP on initial and continuing qualification evaluations (Table A3B for § 60 qualified devices). Typically three models are required
 - Not applicable to grandfather devices under previous standards (use guidance in original qualification standard).
 - Intended to demonstrate visual system capabilities and are available for use in training
 - Listed on the Statement of Qualification
 - Not typically evaluated by the TPAA
- **Class II Airport Models are:**
 - Evaluated by the simulator sponsor (Table A3C of § 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”.
- **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 (including generic, “anytown” models).
 - Appropriately restricted to prevent negative training.