



February 3, 2003

231512

DEPT. OF TRANSPORTATION  
SECURITY

03 FEB 13 11:12:43

Docket Management System  
U.S. Department of Transportation  
Room Plaza 401  
400 Seventh Street, SW  
Washington, D.C. 20590-0001

RE: Federal Registry, Part II  
Department of Transportation  
Federal Aviation Administration  
1 CFR Parts 1, 60, 61, 63, 141, 142  
[Docket Number FAA-2002-12461] -27  
RIN 2120-AH07  
Flight Simulation Device Initial and Continuing Qualification and Use; Proposed Rule

Attached, please find the comments of United Airlines to the FAA Notice of Proposed Rulemaking (NPRM) relating to the Federal Register Docket Number FAA-2002-12461 (*Flight Simulation Device Initial and Continuing Qualification and Use*).

While United Airlines has commented on a broad range of issues raised in this proposed rule, there are seven areas of particular concern. These are listed below:

- United Airlines uses its flight simulation devices (FSD) up to 200% more than the assumed average FSD use contained in the annual burden estimates. The National Simulator Program (NSP) office is currently not set up to support a FSD sponsor operating 24 hours a day, 7 days a week, 363 days a year given the proposed reporting and approval requirements of this Part.
- This Part proposes that a FSD must be used 600 hours in the sponsor's approved training program. Any hour-based requirement could prevent United Airlines from selling time on several FSDs representing aircraft that we no longer fly.
- The NSP continues to place the sponsor between the FAA and the FSD data provider. This Part codifies the FAA's ability to withhold FSD qualification because of poor data from the data provider.
- This Part decouples the functional and subjective test requirements from the FSD qualification level and proposes to require a FSD qualification task list without offering any criteria against which such tasks would be approved. This is a break from past FAA practice, from the current practice of the Joint Aviation Authorities (JAA), and from the FAA-endorsed recommendations contained in the International Civil Aviation Organization (ICAO) document, *Manual of Criteria for the Qualification of Flight Simulators*, 2<sup>nd</sup> edition.
- Proposed is the requirement that a pilot qualified in the airplane represented by a FSD attest by signature that a broad range of regulatory requirements has been met prior to the

initial acceptance or subsequent modification of a FSD. Further, the FAA is given the authority to approve the pilot for this duty. While it is prudent to require the FSD sponsor to have a qualified pilot attest to the subjective handling qualities and performance of the FSD, requiring this pilot to also be knowledgeable in simulation engineering places an unnecessary financial burden on the sponsor.

- Modifications to FSDs and modification reporting and approval requirements as stated in this Part are difficult to understand. The modification recordkeeping requirements, if taken literally, would require excessive administrative effort and extensive storage space for no perceived value.
- The FAA endorsed and participated in a recent effort by regulators and industry representatives from around the world to revise simulation qualification standards. This effort resulted in the FAA-endorsed (ICAO) document, *Manual of Criteria for the Qualification of Flight Simulators*, 2<sup>nd</sup> edition. These new standards must be incorporated into Appendices A and B of this Part, or the provision must be added to allow FSD manufacturers to build devices to these ICAO standards until such time as this regulation can be amended.

Questions concerning United Airlines' input should be addressed to:

Michael D. Brown  
Manager, Simulator Flight Test  
United Airlines Flight Center  
7401 Martin Luther King Blvd.  
Denver, CO 80207  
Tel: 303.780.5593



Captain Stephen A. Forte  
Sr. Vice President, Flight Operations  
United Airlines  
World Headquarters  
1200 E. Algonquin Rd.  
Elk Grove Township, IL 60007

cc: Chuck Guy, DENTK  
Mike Brown, DENTK

Attachment: Comments to Proposed Rule: 14 CFR Part 60

**Comments to Proposed Rule: 14 CFR Part 60  
Flight Simulation Device Initial and Continuing Qualification and Use  
Docket Number FAA-2002-12461  
September 25, 2002**

---

## **Docket Number FAA-2002-12461**

### **Paperwork Reduction Act**

#### *Annual Burden Estimates*

##### General Comments

The NSPM asserts under the section-by-section discussion of §60.19, *Inspection, Maintenance, and Recurrent Evaluation* that:

1. 70% of the qualified FSDs are used an average of 4 days each week for 42 weeks of the year and are used not more than once each week for the remainder of the 10 weeks each year;
2. 30% of the qualified FSDs are used an average of 6 days each week for 26 weeks, 3 days each week for 13 weeks, and not more than once each week for the remainder of the 13 weeks each year.

The FSD usage estimated in Case 1 is 178 days each year. Case 2 yields the most days a FSD is in use each year at 208. Each of United Airlines' over 40 flight simulation devices (FSD) are in use 363 days each year, 204% of the case 1 estimated use and 175% of the case 2 estimate. It appears that a number of the FSD maintenance and reporting requirements [e.g., §60.25(b) and (c)] are designed for a sponsor who operates their FSDs at a pace estimated in either of these "average" cases and not for a large sponsor, such as United Airlines, operating around the clock, 363 days each year. Since this appears to be a one-size-fits-all regulation, were all the reporting and recordkeeping requirements of this Part to stand unchanged, in order that a large sponsor such as United Airlines be able to continue to operate unencumbered, the NSPM must be prepared to sufficiently staff their office around the clock all year long or must immediately move to grant Designee authority to large sponsors.

### **§60.1 Applicability**

#### *Paragraph (a)*

##### Discussion

This rule provides regulatory information and further guidance to those who wish to become sponsors of one or more FSDs and how a sponsor must act to qualify and maintain the qualification of a FSD. In addition, it provides the technical requirements for a FSD to be awarded a specific level of qualification. This rule does not and should not address how a FSD is used. That information is contained within other parts of this Chapter and should be between the Training Program Approval Authority (TPAA), the sponsor, and the user.

##### Proposal

Remove the words "and use" from the title of this rule and from this paragraph.

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

## **§60.5 Quality assurance program**

### ***General***

#### Discussion

Inclusion of this quality program in Part 60 will place United Airlines' flight simulator program under two dissimilar, FAA-mandated, quality programs: that required by §60.5 of this rule and that of the Air Transport Oversight System (ATOS), specifically item 4.2.8, *Simulators/Training Devices*. Since the goal of these two quality requirements is the same—system safety—the disparate program requirements should be appropriately harmonized so that a sponsor subject to ATOS and soon to be under Part 60 will be required to meet the standards of only one FSD quality program.

#### Proposal

By rule, the quality program specified in Part 60 should be the only one FSD sponsors are audited under.

### ***Paragraph (c)***

#### Discussion

This paragraph can be read either that a) the NSPM does not require that a sponsor's quality program be pre-approved and when program deficiencies are discovered, presumably during an audit, they must be corrected; or b) the NSPM will pre-approve a sponsor's program and when submitted for approval, the NSPM will then determine whether the program meets the specified requirements. The paragraph needs clarification of its intent.

#### Proposal

United Airlines endorses the pre-approval of quality programs as well as the pre-approval of quality program changes.

## **§60.7 Sponsor qualification requirements**

### ***Paragraphs (a), (b)***

#### Discussion

United Airlines holds certificates under both Part 119 and Part 142. Under Part 142, United Airlines offers contract training using FSDs representing United Airlines' fleet as well as FSDs representing aircraft no longer flown by United Airlines. This section may be interpreted to mean that United Airlines must apply for sponsorship for those FSDs covered by United Airlines' Part 119 certificate and must apply separately for sponsorship for those FSDs covered only by our Part 142 certificate.

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

Proposal

Clarify the wording to allow a sponsor, such as United Airlines, who operates FSDs under multiple certificates to be the sole sponsor of those FSDs with only one quality program [§60.5(a)] and one management representative [§60.5(d)], if so desired.

***Paragraph(c)(1)***

Discussion

1. United Airlines opposes any hour-based minimum usage requirements for continuing qualification of a FSD. There is no precedence for this in aviation. As an example, United Airlines can keep an aircraft on the ground indefinitely as an operational spare with no penalty as long as the required inspections are completed. Also, an airman may not fly for more than two years; yet, he may reinstate his currency by simply receiving the required bi-annual flight training from any qualified flight instructor.
2. The specific requirement that a FSD be used 600 hours annually in the sponsor's FAA-approved training program will financially harm United Airlines. While we use all FSDs that represent United Airlines fleet aircraft in excess of 600 hours annually, the FSDs that represent aircraft no longer operated by United Airlines are not used more than 600 hours annually in a FAA-approved training program supplied by United Airlines. The provisions set forth in this section would prevent United Airlines from selling time on as many as seven dedicated contract training FSDs.

Proposals

1. Remove the hour-based minimum hour requirement. To satisfy the National Simulator Program Manager's (NSPM) concern over unnecessary expenditure of financial and human resources (Reference: Section-by-section discussion of proposed Part 60, §60.7, Sponsor Qualification Requirements), the NSPM should institute a Designee program similar to those in use by other FAA offices (e.g., Aircraft Certification and Aircrew Certification Designees).
2. Should the NSPM elect to retain an hour-based qualification requirement, the hour requirements should be minimal and any tie to the sponsor's FAA-approved training program must be removed to prevent United Airlines from incurring the above-mentioned economic penalty.

***Paragraph (c)(3)(ii)***

Discussion

United Airlines opposes any attempt to require that a FSD remain out of service for any enforced period of time. United Airlines has recently had the occasion to return a flight training device (FTD) to service based on the needs of a contract training customer. Any mandatory out-of-service time could prevent United Airlines from selling time on a FSD.

Proposal

Again, should the NSPM elect to retain an hour-based qualification requirement, the last clause in this paragraph must be modified to allow a sponsor to petition to return a FSD to service based

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

on the opportunity to utilize the device in a FAA-approved training program, and the NSPM must be able to rapidly respond to the request to requalify the FSD prior to the expiration of the mandatory 12 month out-of-service time.

### **§60.9 Additional responsibilities of the sponsor**

#### ***Paragraph (a)***

##### Discussion

The use of the word “immediately” in this paragraph should not be construed to mean that the NSPM could interrupt or stop training for a no-notice inspection of the FSD. The paragraph should be reworded to include language that requires the sponsor to make the FSD available to the NSPM for inspection as soon as practicable without disrupting training. If it is the intent of the NSPM to also claim the authority to conduct an “emergency” inspection of a FSD that does disrupt training, a paragraph should be added to this section outlining guidelines for when such an emergency inspection might be required.

##### Proposal

Reword paragraph (a) to include language that requires the sponsor to make the FSD available to the NSPM for inspection as soon as practicable without disrupting training. If necessary, add a new paragraph claiming the right to conduct an “emergency” inspection, including guidelines for when such an emergency inspection might be invoked.

#### ***Paragraph (b)(4)***

##### Discussion

United Airlines is moving toward a paperless environment. United Airlines would like the ability to present the applicable Statement of Qualification electronically, adjacent to the respective FSD.

##### Proposal

Modify the wording of this paragraph to allow the applicable Statement of Qualification to be electronically posted adjacent to the FSD.

### **§60.11 FSD use**

#### ***Paragraph (d)***

##### Discussion

As worded, this paragraph implies that the FSD software and active programming must remain static between NSPM evaluations. One could also infer that the NSPM must evaluate every combination of engine and avionic software variation available in the FSD prior to that software being used for training. United Airlines believes that it is the intent of this paragraph to require that the NSPM evaluate the FSD with the software and active programming used in the day-to-

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
 September 25, 2002

day training environment, with no effort being made on the part of the sponsor to use a “special” load during the NSPM evaluation.

Proposal

Modify the wording to indicate that the NSPM evaluation of the FSD must take place with the software and active programming used in the day-to-day training environment, which may be modified between NSP evaluations in accordance with the sponsor’s approved quality assurance program, with no effort being made on the part of the sponsor to use a “special” load during the NSPM evaluation.

**§60.13 FSD objective data requirements**

*General*

Discussion

In the past, the sponsor has often been placed between the NSPM and the aircraft manufacturer with respect to meeting the objective data requirements specified in the applicable Advisory Circular. The tenor of this entire section is that the NSPM will continue to place the weight of these regulatory requirements on the sponsor who has no control over the data product. Rationale for concerns are presented by paragraph below, followed by proposed new wording for §60.13.

*Paragraph (a)*

The requirement for aircraft manufacturers’ flight test data and all data developed after the type certificate was issued is too broad, impractical, and likely impossible to satisfy.

The aircraft manufacturer does not provide “all data” as part of a data package; rather, they only provide certain cases and sets of data. The flight test data package can consist of numerous volumes (particularly for older airplanes), only a portion of which are included in the Qualification Test Guide (QTG). The data the sponsor does have is available for review during the initial evaluation if a case is questionable; however, the logistics of submitting the entire flight test package to the NSPM are prohibitive.

*Paragraph (b)*

United Airlines has on rare occasion used de-identified flight recorder data available from the aircraft onboard Flight Operations Quality Assurance (FOQA) data recorder. These data, usually an averaging of many flights within certain specified parameters, have been used to verify the performance of the FSD simulation where there is not a good match between the simulation and the manufacturer-supplied objective data in the Master Qualification Test Guide (MQTG). This paragraph, as written, makes no allowances for such data, limiting acceptable data types to engineering or flight test data.

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

---

***Paragraph (d)***

United Airlines has no direct control over the form and manner of data provided. This requirement should be placed on the aircraft manufacturer or the STC holder. The form and manner that is acceptable to the NSPM should be defined.

***Paragraph (e)***

This paragraph, as written, could be used to place the sponsor in a position to require the aircraft manufacturer to provide additional flight test data. This has been the case in the recent past and has resulted in sponsors continuing to carry data discrepancies for years while waiting for aircraft manufacturers to respond. If the NSPM requires additional flight testing, that should be strictly between the NSPM and the data provider.

In addition, this paragraph could subject the sponsor to large costs to obtain data as required by the NSPM. This requirement seems inappropriate and too broad.

Finally, the phrase “certain FSD qualification requirements” is too vague and must be defined in the rule; or, as a minimum, guidance given in the appropriate QPS information section.

***Paragraph (f)***

There are many types of data used in modern simulation; e.g., flight data, avionics data, 28-day navigational Jeppesen data updates, visual system database updates. This requirement goes to such a low level that the NSPM will have to be notified of *all* aircraft changes by each sponsor resulting in a tremendous amount of data, and if each sponsor follows this requirement, the NSPM will receive redundant notifications from all the various sponsors whenever a common change occurs.

This paragraph should clearly identify the scope of data covered by this notification process.

**Proposal**

The data referred to in this section should be limited to those data that are sufficient to validate the performance, handling qualities, or other characteristics of the aircraft, including data related to any relevant changes occurring after type certification.

Other than paragraph (b), the sponsor should have no role in this section. It must be the responsibility of the aircraft manufacturer or other data provider to supply the appropriate validation data for use by the sponsor in the QTG.

Finally, as a minimum, the NSPM should pre-approve the airplane manufacturer’s or data provider’s validation data roadmap (see the ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, Attachment D, 2<sup>nd</sup> edition) prior to allowing the data to be used for validation of an FSD.

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

To address these recommendations, United Airlines, as a sponsor, supports Boeing's proposal that §60.13 be reoriented to place the burden for provision of an acceptable validation data package upon the airplane manufacturer or other qualified data provider, rather than the sponsor. Boeing's proposal is reprinted below, in which they revised paragraphs, changed paragraph order, and included an additional paragraph related to provision of validation data roadmaps:

**§60.13 FSD objective data requirements.**

- (a) Except as provided in paragraphs (b) and (c) of this section, for the purposes of validating FSD performance and handling qualities during evaluation for qualification, the validation data package provided to the NSPM must include the aircraft manufacturer's flight test data including relevant data developed after the type certificate was issued (e.g., data developed in response to an airworthiness directive) if such data is the result of a change in performance, handling qualities, functions, or other characteristics of the aircraft that must be considered for flightcrew member training, evaluation, or for meeting experience requirements of this chapter.
- (b) The validation data package may contain flight test data from a source in addition to or independent of the aircraft manufacturer's data, in support of a FSD qualification, but only if this data is gathered and developed by that source in accordance with flight test methods, including a flight test plan, as described in the appropriate QPS. If approved by the NSPM on a case-by-case basis, supplemental validation data could also be derived from flight recorder data available from the aircraft onboard Flight Operations Quality Assurance (FOQA) data recorder.
- (c) The validation data package may contain predicted data, engineering simulation data, data from pilot owner or pilot operating manuals, or data from public domain sources acceptable to the NSPM for consideration, approval, and possible use in particular applications for FSD qualification.
- (d) The aircraft manufacturer or other qualified data provider must submit a description of the validation data plan, including data sources, for approval by the NSPM well in advance of preparation of the Qualification Test Guide (QTG). This description would typically be in the form of a 'validation data roadmap'.
- (e) Data or other material or elements of the validation data package must be presented in a form and manner acceptable to the NSPM.
- (f) The NSPM may require additional flight testing if the validation data package does not support FSD qualification requirements.

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
 September 25, 2002

---

(g) The aircraft manufacturer or supplemental type certificate (STC) holder must immediately notify the NSPM when an addition to or a revision of the flight- or airplane systems-related data used to program and operate a FSD for a particular airplane model is available; and provide technical information about the data update to help the NSPM determine its significance for training.

### §60.15 Initial qualification requirements

#### *Paragraph (a)*

##### Discussion

This paragraph requires that the sponsor make a request through the TPAA to have the NSPM conduct an initial FSD evaluation. While this is the current suggested process, current practice is that the sponsor applies directly to the NSPM while simultaneously requesting that the TPAA submit a concurring letter to the NSPM.

##### Proposal

Allow the sponsor to apply directly to the NSPM for an evaluation. Require that the sponsor notify the TPAA of the application and require only that the sponsor request that the TPAA send a concurring letter to the NSPM.

#### *Paragraph (b)(4)*

##### Discussion

The sample Statement of Qualification, Qualified/Non-Qualified Tasks contained in Appendix A, Attachment 5, Figure 4B is purported to be an exhaustive list of tasks and systems for which the specified simulator is qualified. The concept of requiring such a list is fraught with problems, such as mixing tasks with systems with maneuvers, yet ignoring whether any of these will support a user's training program.

First, paragraph (b)(4) of this section refers to the respective QPS list in Attachment 3 as a list of *operations tasks* and *simulator systems* (emphasis added). Yet, the sample Statement of Qualification, Qualified/Non-Qualified Tasks contained in Appendix A, Attachment 5, Figure 4B is referred to as a table of *tasks* even though the table is explicitly linked to the respective QPS list in Attachment 3.

Second, there are many items listed in the Statement of Qualification, Qualified/Non-Qualified Tasks that are neither. Thrust response [item B.4.(a)] is a subjective evaluation of the objective tests for engine acceleration and deceleration, not a task or system. A representative list of such non-task/non-system subjective tests are shown below:

- Thrust response [B.4.(a)]
- Ground handling [B.4.(c)]
- Brake operation [B.4.(e)]
- Airplane acceleration [C.1.(e)]

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

Third, many malfunctions are listed (e.g., pitch trim malfunction [E.3.(c)]). These are also not operational tasks or simulator systems, but neither are they a comprehensive list of malfunctions. Many are missing, such as fuel system failures (e.g., fuel imbalance), FMC failures (standby navigation), and APU malfunctions (fire, hot start, hung start) to name only a few. The IATA document *Flight Simulator Design and Performance Data Requirements*, 6<sup>th</sup> edition, recommends a list of 96 malfunctions, which should be included in this table for completeness.

Fourth, many types of aircraft equipment or maneuvers are simply listed. For example:

- TCAS [D.2.(v)]
- VOR [E.1.(a)(ii)]

Simply indicating that a FSD has a qualified TCAS system gives no useful information to the NSPM or potential contract user's TPAA. One needs to know how the TCAS operates (specific scenarios, etc.) in the FSD to know for what tasks the FSD may be used to train. Similarly, simply listing "VOR" as a type of non-precision approach gives little useful information. One may wish to know whether "VOR" refers to the traditional step-down approach; a constant descent angle approach, the type to which many major carriers are moving; or the more advanced VNAV non-precision approach, which requires line-selectable, non-precision approaches and a unique operational capability of the FMC not available in all FSDs.

Fifth, many operators will have training requirements beyond what is listed in Appendix A, Attachment 3.2, List of Operations Tasks. In order not to be in violation of §60.15(b)(4) or §60.16(a)(1)(i), it appears that the sponsor must list all tasks from their FAA-approved training programs as well as those tasks from the approved training programs of all contract users.

Sixth, the Qualified/Non-Qualified Task form, Appendix A, Attachment 5, Figure 4B, is linked explicitly to the QPS List of Operations Tasks, "The following are those items listed in the Airplane Flight Simulator Qualification Performance Standards (QPS), FAA-S-120-40C...indicating what tasks and systems are qualified and what tasks and systems are not qualified." Nowhere in this Part is the sponsor granted the authority to modify the master list contained in QPS FAA-S-120-40C. This seems to be in direct conflict with the requirement to update this list as required by §60.16(a).

Seventh, any list of approved tasks will likely lead others to believe that they cannot train any task beyond what is listed in this Statement of Qualification. In the Virtual Public Meeting, the NSPM states, "Any motivation of the sponsor to add tasks to the qualified list would be sufficient to adjust the list." Unfortunately, that motivation will only come from the sponsor's desire to use this list as a marketing tool since it will have no other value to the sponsor.

Eighth, the NSPM has no basis on which to approve a FSD to be qualified for a specified task. United Airlines is not aware of any master task analysis and media analysis on which the NSPM

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

can make this determination. While the linkage between required tasks and FSD level was previously determined by NSPM fiat and presented in the Table of Functions and Subjective Tests (e.g., AC 120-40B, App 3), it was at least a known quantity. Decoupling the required List of Operations Tasks from the FSD qualification level leaves the “task qualification” determination up to the subjective estimation of the sponsor and the particular NSPM evaluator.

Finally, The Advisory Circulars AC 120-40x and AC 120-45B; the ICAO document *Manual of Criteria for the Qualification of Flight Simulators*, 2<sup>nd</sup> edition; and the current JAR-STD 1A and 1B all link functional and subjective test requirements to the FSD level. United Airlines sees no justification for the NSPM’s deviation from this philosophy.

#### Proposal

The NSPM has made it known that the general intent of Part 60 is to capture current practice in rule form and to conform to internationally agreed upon standards and methodologies.

The NSPM should harmonize the List of Operations Tasks contained in Attachment 3 of each QPS with the appropriate Table of Functions and Subjective Tests contained in the respective JAR-STD, which, for airplanes, is based on the ICAO document *Manual of Criteria for the Qualification of Flight Simulators*, 2<sup>nd</sup> edition, and link the functions and subjective test requirements to specific FSD levels of qualification.

If a sponsor elects to not validate a required function contained in the Table of Functions and Subjective Tests for the level of qualification being sought, then the sponsor should be able to apply for an exemption. The exemption would require the sponsor to complete the table of Qualified/Non-Qualified Tasks. However, without such an exemption on file, the FSD should be supposed to meet all requirements of the Table of Functions and Subjective Tests for the appropriate qualification level with no need for the table of Qualified/Non-Qualified Tasks.

The requirement for the table of Qualified/Non-Qualified Tasks should be deleted for a FSD qualified without exemption.

#### ***Paragraph (d)(2)***

##### Discussion

This paragraph grants complete veto power of the simulator evaluation pilot selection to the TPAA. With no guidance from the NSPM and little simulation expertise, what possible criteria will the TPAA employ to make this decision? Unfortunately, such power could conceivably be used by the TPAA to force a sponsor to use a line pilot, or even a specific individual. Worse yet, the TPAA over one sponsor may force a more expensive solution than the TPAA over a different sponsor. This is an unusual and unacceptable amount of power for a regulatory authority to yield over a business in a situation in which historical evidence does not exist to support the necessity of such a provision.

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
 September 25, 2002

Proposal

Delete this requirement and see United Airlines' proposal for §60.15(d)(3), below.

***Paragraph (d)(3)***

Discussion

This requirement is unnecessarily restrictive. As with other airlines, United Airlines has realized that it is too expensive to maintain line pilot personnel on staff. United Airlines is unaware of any evidence that non-qualified test pilots have heretofore been inadequate. In fact, our experience has shown that a non-qualified pilot with a background in flight test is significantly more effective than a qualified pilot with no such background.

The qualification of the individual required to sign the statement required by §60.15(b)(3) should be a function of the requirements of the statement itself. There are three requirements stated in §60.15(b)(3)(i), (ii), and (iii).

*§60.15(b)(3)(i)*

This paragraph requires a statement that the systems and sub-systems function equivalently to the aircraft or set of aircraft. This checkout can take weeks following the FSD manufacturer's Acceptance Test Manual (ATM) and can be accomplished successfully by anyone familiar with, but not necessarily qualified in, the aircraft.

*§60.15(b)(3)(ii)*

This paragraph requires a statement that the performance and flying qualities of the FSD are equivalent to the aircraft or set of aircraft. There are two parts to this: first, that the objective and performance tests pass as required by this Part, and second, that the subjective assessment of the FSD is adequate.

The first part, that the objective and performance tests pass, does not require a qualified pilot and would be beyond the expertise of such a pilot with no engineering and simulation experience. The second part, evaluating the subjective tests, would not strictly require a pilot qualified in the aircraft, but only an experienced pilot. However, a wise FSD acceptance test program manager would certainly consult with a pilot who is *current* in the aircraft for the performance and handling qualities subjective tests. Such limited evaluation would require days and not weeks.

*§60.15(b)(3)(iii)*

This paragraph requires that for a type-specific FSD, the "cockpit configuration conforms to the configuration...being simulated." This can be accomplished by nearly anyone with a set of photographs of the airplane cockpit. It certainly does not require a pilot qualified in the airplane.

*Conclusion*

After reviewing the requirements for the statement called for in §60.15(b)(3), it appears that the only legitimate requirement for a pilot who is *current* in the airplane is to evaluate the subjective

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
 September 25, 2002

performance and handling qualities tests. Requiring that this pilot sign an overarching statement attesting to the accuracy of other than the subjective tests would be problematic given the threat to his license contained in §60.33(b)(2).

Requiring this pilot to be on-site to check all things required by §60.15(b)(3)(i), (ii), and (iii) has become prohibitively expensive and has been shown above to be unnecessary.

Elsewhere in this Part, the NSPM requires the sponsor designate a Management representative (MR) to be the primary point of contact with the NSPM. It is the MR that should be required to sign this statement. Further, the statement should be similar to that contained in AC 120-40B, Appendix 1, Figure 1, Application Letter. In this example letter, the signatory attests that “pilots have assessed the performance and flying qualities of the simulator and find that it represents the respective airplane.”

Proposal

The NSPM should:

- Delete the requirement that a qualified pilot sign the statement required by §60.15(b)(3);
- Modify QPS Attachment 6, Figure 6, Sample Request for Initial, Upgrade, or Reinstatement Evaluation Date to include a statement that “A pilot qualified in the airplane being simulated has assessed the performance and flying qualities of the simulator and find that it represents the respective airplane”;
- Further modify the above sample letter to include the other required attestations specified in the sub-paragraphs under §60.15(b)(3) that do not require a pilot qualified in the airplane;
- Require that the MR sign the letter; the MR will then be the accountable person under §60.33, Applications, logbooks, reports, and records: Fraud, falsification, or incorrect statements.

This proposal should also apply to §60.16(a)(1)(iii), QPS Appendix A, 17.h. and Appendix E, 17.h.

**§60.16 Additional qualifications for a currently qualified FSD**

***General***

Discussion

This entire section seems to exist to only support the requirement for the sponsor to maintain the table of Qualified/Non-Qualified Tasks as required by §60.15(b)(4).

Proposal

Above, United Airlines has recommended that the NSPM return to the ICAO- and JAA-accepted practice of linking functions and subjective tests to the FSD qualification level. If the NSPM

**Comments to Proposed Rule: 14 CFR Part 60  
Flight Simulation Device Initial and Continuing Qualification and Use  
Docket Number FAA-2002-12461  
September 25, 2002**

accepts this recommendation, then this section should be used only by those sponsors wishing to remove a previously issued exemption from the requirements of the Table of Functions and Subjective Tests and should be clearly titled as such.

***Paragraph (a)(1)(iii)***

Proposal

Please see the discussion and proposal under §60.15(d)(3), above.

**§60.19 Inspection, recurrent evaluation, and maintenance requirements**

***Paragraph (a)(2)***

Discussion

United Airlines agrees with the requirement to perform a preflight on a FSD at least once each calendar day in which the FSD is scheduled. However, the specific wording conflicts with our operation. United Airlines utilizes a 20-hour “operational day” that runs from 0600 to 0200 the following morning. Scheduled maintenance is performed between the hours of 0200 and 0600. It is possible for a FSD to be scheduled for a period to start between 0000 and 0200, which is at the end of United Airlines’ operational day; therefore, United Airlines would consider the preflight from the previous calendar day to still apply. Each FSD is preflighted prior to the beginning of the first period of use in each operational day.

Proposal

Change the wording of this paragraph to allow for performance of the FSD preflight to be based either on a calendar day or on an operational day, not to exceed 24-hours in length, as designated by the sponsor.

***Paragraph (a)(3)***

Discussion

United Airlines sees no reason to require an operational preflight each 7 consecutive days of a FSD that is not scheduled for use. Paragraph (a)(2) of this section requires that a preflight be performed prior to the first period of any training day; given that the provisions of this paragraph are met, there is no added benefit to the sponsor or user to perform a preflight each 7 calendar days on a FSD that is temporarily dormant. United Airlines does, on occasion, remove a FSD from service for short periods of time, to exceed 7 days, to perform project work or preventive maintenance, or simply to conserve energy. With a FSD out of service for any such reason, the preflight required each 7 days could not be completed. This paragraph will require additional administrative tracking with no added benefit to the sponsor or user. As long as all of the other requirements of this Part are met, a FSD will be always ready for use in training without this 7-day preflight requirement.

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

Proposal

Remove this paragraph. If the NSPM will not consider its removal, then the NSPM should allow provision for a sponsor to place a FSD in a temporarily dormant state to exceed 7 days if the sponsor has appropriate procedures in their Quality Manual to ensure that the FSD operates correctly when returned to service.

**§60.23 Modifications to FSDs**

Discussion

This section is hard to follow. Separate definitions of “modification” seem to appear in paragraphs (a) and (d) and are unclear. Paragraphs (c) and (e) both appear to discuss modification notification requirements, though somewhat differently.

Proposal

Change the wording of 60.23 as follows:

**§60.23 Modifications to FSDs.**

**[Basic “modification” definition]**

- (a) For the purposed of this part, a FSD is said to have been modified when:
- (1) Additional equipment or devices intended to simulate aircraft appliances are added;
  - (2) Changes are made to either of the following that are intended to impact flight or ground dynamics, or impact performance or handling characteristics of the simulator
    - (i) Software,
    - (ii) Hardware;
  - (3) Replacement or modification of the host computer;
  - (4) Replacement or modification of the motion, visual, or control loading systems (or sound system for FSD levels requiring sound tests and measurements).

**[When a modification must be made]**

- (b) When the sponsor determines that any of the following circumstances exist and determines that the FSD cannot be used adequately to train, evaluate, or provide flight experience for flightcrew members, the sponsor must modify the FSD accordingly.
- (1) The aircraft manufacturer or another approved source develops new data regarding the performance, functions, or other characteristics of the aircraft being simulated;
  - (2) A change in aircraft performance, functions, or other characteristics occurs;
  - (3) Equipment or appliances are added to meet the FAR requirements for the airworthiness of the aircraft;

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

(4) A change in operational procedures or requirements occurs.

**[FSD issuance]**

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

**[Using the modified FSD]**

(d) For circumstances other than those described in paragraph (c) of this section, the sponsor may not use, or allow the use of, or offer the use of, the FSD with the proposed modification for flightcrew member training or evaluation or for obtaining flight experience for the flightcrew member to meet any requirement of this chapter unless:

- (1) The sponsor has notified the NSPM and the TPAA of their intent to install the proposed modification, and;
  - (i) Twenty-one days have passed since the sponsor notified the NSPM and the TPAA of the proposed modification and the sponsor has not received any response from either the NSPM or the TPAA;
  - (ii) Twenty-one days have passed since the sponsor notified the NSPM and the TPAA of the proposed modification and one has approved the proposed modification and the other has not responded;
  - (iii) Fewer than twenty one days have passed since the sponsor notified the NSPM and the TPAA of the proposed modification and the NSPM and TPAA both approve the proposed modification;
  - (iv) The sponsor has successfully completed any evaluation the NSPM may require conducted in accordance with the standards for an evaluation for initial qualification or any part thereof before it is placed in service.
- (2) The notification must include a complete description of the planned modification, including a description of the operational and engineering effect the proposed modification will have on the operation of the FSD, and results of all objective tests that have been re-run with the modification incorporated, including any necessary updates to the MQTG.
- (3) The notification must be submitted in a form and manner as specified in the appropriate QPS.

**[User notification]**

(e) When a modification is made to an FSD, the sponsor must notify each certificate holder planning to use that FSD of that modification prior to that certificate holder using that FSD the first time after the modification is complete.

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

**[MQTG update]**

- (f) The MQTG must be updated with current objective test results in accordance with §60.15(b)(5) and appropriate flight test data in accordance with §60.13, each time an FSD is modified and an objective test is affected by the modification. If an FSD Directive is the cause of this update, the direction to make the modification and the record of the modification completion must be filed in the MQTG.

## **§60.25 Operating with missing, malfunctioning, or inoperative components**

### ***Paragraph (b)***

#### Discussion

Imposing a 7-day requirement to correct all missing, malfunctioning, or inoperative components is unnecessarily restrictive and could require resources to be marshaled against a less important problem simply because of this artificial deadline. Because United Airlines currently operates over 40 FSDs, obtaining a waiver of this requirement for components that are missing, malfunctioning, or inoperative and cannot be corrected within 7 days for each of those devices could be burdensome for both United Airlines and the NSPM.

United Airlines currently employs a discrepancy prioritizing system that allows for the proper management of discrepancies and deployment of resources as a function of training requirements. Each FSD discrepancy is prioritized on a scale of 1 to 4 based on its impact to training. Under this system, even a contract training crew has the authority to create a priority 1 discrepancy based on their training program requirements.

#### Proposal

United Airlines offers three options in order of preference:

1. Reword the paragraph to allow an option for the sponsor to develop a discrepancy prioritizing system, or other system providing the same results, with the time allowed to effect component replacement or repair dependent on the discrepancy priority as it relates to training. Such a system should require the approval of the NSPM and be included in the sponsor's Quality Manual. This approach would allow the sponsor some flexibility allocating resources while still achieving the assumed intent of the NSPM.
2. If 1 above is unacceptable, United Airlines would suggest a minimum of 30 days to effect component repair or replacement, if it were to apply equally to all discrepancies. And since the office of the NSPM is not open on evenings, weekends, or government holidays, the requirement should be further relaxed to allow the sponsor to seek a waiver on the first business day following the 30 days if the time were to expire on a weekend or holiday.
3. If neither 1 nor 2 above is acceptable and this paragraph remains as an inflexible, short-timeline requirement, the NSPM must grant Designee authority to large sponsors. (See our comment on Annual Burden Estimates under the Paperwork Reduction Act, above).

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
 September 25, 2002

---

***Paragraph (c)***

Discussion

A literal reading of this paragraph would require that a sponsor effectively dispatch each FSD each period. This would meet the letter of the requirement that each missing, malfunctioning, or inoperative component is placarded like the MEL procedures followed in line operations. In the case of United Airlines, this would require in excess of 40 simulator technicians to be at the ready at 1000, 1400, 1800, and 2200 when each FSD period is scheduled to end and the next period begin. To accomplish this would be an enormous financial burden for no perceived gain in training value. The additional requirement of this paragraph, to require that a list missing, malfunctioning, or inoperative components be readily available in or adjacent to the FSD for review by the FSD users should suffice for daily operations. Placarding missing, malfunctioning, or inoperative components discovered the previous day could practically be accomplished, but only during the FSD preflight.

Proposal

This paragraph should be reworded to indicate that only those components that are missing, malfunctioning, or inoperative at the time of the operational preflight [§60.19(a)(2)] require placarding and that it is not the intent of this paragraph to require that a FSD be dispatched each period.

**§60.27 Automatic loss of qualification and procedures for restoration of qualification**

***Paragraph (a)(3)***

Discussion

In the past, United Airlines has unbolted a simulator from the floor and slid it forward without disconnecting any wiring in order that we might slide a second simulator by. A literal reading of this paragraph would require that the first simulator is no longer qualified.

Proposal

Reword this paragraph to apply to a FSD that is physically moved from one location and installed in a different location, regardless of the distance, or to a FSD that is reinstalled in the same location but has had the “waterfall” wiring disconnected and reconnected.

***Paragraph (a)(4)***

Discussion

It was pointed out in the Virtual Public Meeting discussion that routine maintenance (e.g., visual tube replacement, motion leg replacement) could cause this paragraph to be invoked. It appears that the intent of this paragraph is to ensure the NSPM evaluates the requirement for requalification of a FSD after the equivalent of an aircraft heavy maintenance visit. No one at United Airlines has any memory of performing such heavy maintenance checks on a FSD. Any

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

extensive maintenance work that we have performed has always been associated with a modification that would be covered under §60.23.

Proposal

United Airlines sees no purpose for this requirement and feels it should be deleted. If the NSPM retains this paragraph, it must be re-written to clearly allow normal FSD maintenance activities that would appear as heavy maintenance to the inexperienced observer, such as replacing hydraulic power units, motion legs, or visual monitors or projectors.

***Paragraph (b)(2)***

Discussion

This paragraph would have the sponsor serving two masters with respect to FSD qualification: the NSPM and the TPAA. The lines of authority between these FAA entities should remain clear.

Proposal

Remove the reference to the TPAA and allow only the NSPM the authority to waive the evaluation requirement.

***Paragraph (c)***

Discussion

This paragraph is too vague. Unless some objective criteria is developed, a sponsor could easily be at the mercy of the individual in the office of the NSPM who is tasked with making this decision on a particular day.

Proposal

Develop clear guidelines specifying the number of normally scheduled evaluations that can be missed and the performance of the particular FSD against the sponsor's quality measurements as required in the applicable Quality Assurance Program section of the Appendices to this Part. Without specific guidance, this is merely informational material and should be placed in the information section of an appropriate section of the QPS Appendices.

**§60.29 Other losses of qualification and procedures for restoration of qualification**

Discussion

This section, like §60.27(b)(2), above, blurs the lines of authority between the NSPM and the TPAA. Only the NSPM should have jurisdiction over the qualification of any FSD covered by this Part. The TPAA has no technical understanding of simulator qualification; however, the TPAA should have sole jurisdiction over the use of a qualified FSD in a FAA-approved training program.

**Comments to Proposed Rule: 14 CFR Part 60  
Flight Simulation Device Initial and Continuing Qualification and Use  
Docket Number FAA-2002-12461  
September 25, 2002**

---

Proposal

Remove all references to the TPAA from this section and allow only the NSPM to revoke and restore the qualification of a FSD. That the TPAA has the authority to approve the FSD for use in training should appear elsewhere in this Chapter.

**§60.31 Recordkeeping and reporting**

***Paragraph (a)(1)***

Discussion

As written, it can be inferred that a sponsor is required to maintain the MQTG and all previous amendments. Since the MQTG, by its very definition, is the QTG that applies to a particular FSD as it is presently qualified, any previous revision of a MQTG will no longer represent the FSD. There will be added overhead cost to maintain previous copies of the MQTG. With each modern FSD having a MQTG of over 10 volumes, clearly the requirement to store previous copies quickly becomes unwieldy. This would also result in a potential liability issue to maintain previous copies of the MQTG reaching back years to FSD configurations that no longer exist.

Proposal

Reword the paragraph (a)(1) as follows:

“(1) The MQTG, as amended in accordance with standard document revision practices.”

***Paragraph (a)(2)***

Discussion

Maintaining an actual copy of all programming changes since the initial qualification will be difficult and an administrative burden. Retaining a literally copy of previous FSD software configurations has no value beyond what the sponsor may require for troubleshooting. Frequently, after hardware changes are effected, any previous FSD software will no longer run and is of no value. This includes software used for the initial qualification and subsequent upgrade qualifications.

A second objection is the amount of storage space, physical or electronic, to maintain literal copies of programming that may span the 20 to 30 year life of a FSD will be prohibitive for the over 40 FSDs sponsored by United Airlines.

The NSPM should only require that a *record* of programming changes since initial qualification be kept.

Proposal

Reword the paragraph (a)(2) as follows:

“(2) A record of all aircraft system software and aerodynamic and engine model programming changes since the original initial evaluation of the FSD.”

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

Add the following QPS Requirement to §21., Recordkeeping and Reporting, of each QPS:  
“a. The minimally acceptable record of programming changes must consist of the name of the aircraft system software, aerodynamic model, or engine model changed, the date of the change, and the reason for the change.”

Add the following QPS Requirement to §5.f., Quality Assurance Program, of each QPS:  
“(?) A method to ensure that the correct, qualified FSD aircraft system software and aerodynamic and engine model is being used for training, testing, and/or checking.”

***Paragraph (a)(3)(iv)***

Discussion

The requirement to acquire and act on independent feedback is specified in §5.(19), Quality Assurance Program, of each QPS. It should be sufficient that the sponsor demonstrates this process is in place and not be required to maintain the actual independent feedback for longer than 30 days, just as the requirement for logbook discrepancies in §60.19(a)(5)(i).

Proposal

Shorten the required time to retain independent comments obtained in accordance with §60.9(b)(1) to 30 days.

***Paragraph (b)***

Discussion

This paragraph places an unnecessary burden on the FSD sponsor. If the NSPM requires a list of users, the burden should be placed on the user in coordination with their respective TPAA. From the sponsor's viewpoint, this is needless documentation.

Proposal

United Airlines offers two options, in order of preference:

- 1) Delete this requirement.
- 2) Require that this report must be made **only** when requested by the NSPM and the sponsor will have 7 days to provide it once requested.

If the paragraph remains, changed or otherwise, the NSPM must clarify that it was not the intent of the FAA to have a U.S. sponsor of a foreign FSD provide a list of customers of the foreign operator of that FSD.

***Paragraph (c)***

Discussion

United Airlines has developed its own records systems that have well suited our operations for many years. These systems have been proven in actual use. The NSPM's approval or acceptance of these existing systems should be immediate unless “appropriate security or

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
 September 25, 2002

controls to prevent the illegal or inappropriate alteration of such records after the fact” do not exist.

Proposal

Reword paragraph (c) as follows:

“The records specified in this section must be maintained in plain language form or in coded form, if the coded form provides for the preservation and retrieval of information, with appropriate security or controls to prevent the illegal or inappropriate alteration of such records after the fact.”

***Paragraph (d)***

Discussion

The NSPM will requalify the FSDs annually, the NSPM will conduct periodic QA audits, and the sponsor must submit the results of their self-audits. There appears to be nothing value-added about requiring an annual comprehensive report.

Proposal

Delete the requirement for this comprehensive report. If the requirement remains, further detail, such as an example, must be supplied regarding the report content.

**§60.35 Specific simulator compliance requirements**

***Paragraph (a)***

Discussion

If the NSPM is trying to force sponsors to modify FSD cockpits to match that of the aircraft being simulated, this paragraph is not sufficiently specific. However, United Airlines objects to this paragraph on three additional grounds.

First, with a captive fleet of aircraft, such as United Airlines has, there are still minor differences between cockpits of like aircraft. To which specific cockpit would this paragraph apply? The implication is that the FSD must track with a specific tail-numbered aircraft.

This segues to the second objection. Sponsors with no captive fleet have no specific cockpit against which to match a FSD. How will this paragraph be applied in such a case? Too, Airbus is pushing the simulation industry toward a generic simulator for one type or a family of aircraft, again, with no specific cockpit to match.

The final objection is that while the *general* cockpit configuration is within the purview of the NSPM, the *specific* cockpit configuration must remain between the user and the TPAA. For a further discussion of this, see United Airlines’ comments on QPS Appendix A, Attachment 1, paragraphs 2.a and 3.c, below.

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

Proposal

Revise this paragraph to clearly state that the general cockpit configuration (equipment, appliances, etc.) must match the airplane to be simulated, to include equipment required by FAR for aircraft airworthiness, such as TCAS for an aircraft that is required to have TCAS onboard. (For more detail on this, see our comments under Table of Minimum Simulator Requirements 2.a. and 3.c.)

## **Appendix A to Part 60: QPS for Airplane Flight Simulators**

### **§4 Background**

*Paragraph (b) and (c)*

Discussion

United Airlines endorses the implication of these paragraphs that evaluations conducted under U.S. authority employ the criteria and standards used by ICAO. The Level D requirements in Appendix A should match the ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, 2<sup>nd</sup> edition, to include the guidance of Attachments A through H. All lower level airplane FSD evaluation requirements, including those contained in Appendix B, should be a subset of the ICAO requirements.

Proposal

Modify the criteria and standards of a Level D, full-flight simulator to match that specified in the 2<sup>nd</sup> edition of the ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, to include the guidance of Attachments A through H. Modify the criteria and standards for all lower level airplane FSD evaluations contained in Appendices A and B to be a subset of the ICAO requirements.

### **§5 Quality Assurance Program**

Discussion

The quality system requirements expressed in each of the four appendices to Part 60 appear to contain the same requirements. What is missing, however, are guidance documents: the Sponsor Registration Review form (SQAP:2000 Job Aid 1), the Checklist of Questions, the Objective Assessment of a Sponsor's Quality Assurance Program (SQAP:2000 Attachment 1) and the equivalent of the SQAP:2000 Process Guidelines, all of which are currently available on the NSP web site. These are all valuable documents to a sponsor when setting up the required quality program and should be included as QPS attachments. Since the quality program requirement is

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
 September 25, 2002

identical regardless of FFS or FTD, airplane or helicopter, the requirements and attachments need only be described once in the rule.

Proposal

Create a fifth appendix to the rule as follows: *Appendix E, FSD Quality Assurance Program*, to include attachments such as a Sponsor Registration Review form (SQAP:2000 Job Aid 1), a Checklist of Questions, an Objective Assessment of a Sponsor's Quality Assurance Program (SQAP:2000 Attachment 1) and the equivalent of the SQAP 2000 Process Guidelines.

***Paragraph f.(20)***

Discussion

Most new FSDs have internal test equipment built into them (e.g., I/O devices: DAs, ADs; sensors; test software) in addition to the traditional external test equipment. Most of the internal test equipment would have to be removed to be calibrated in the traditional sense. The process by which internal test equipment is calibrated and adjusted for accuracy must be carefully considered or undo expense will result.

Proposal

For integral test equipment, allow the sponsor to develop repeatability tests with tolerances as part of the Quality System.

***Information Paragraph g.***

General Discussion

§60.6(a) requires the analysis of performance and effectiveness. However, there is no guidance given as to how a sponsor might accomplish this. Several years ago, ARINC, under direction from the Flight Simulator Engineering and Maintenance Conference (FSEMC), sponsored an industry working group to develop standards for simulator metrics. This work was published as ARINC Paper 433, "Standards Measurements for Flight Simulator Quality." This paper, as amended, should be referenced to provide guidance to sponsors as one acceptable method of meeting the requirements of Section 60.6(a).

Proposal

Reference ARINC Paper 433, "Standards Measurements for Flight Simulator Quality" as one acceptable method of meeting the requirements of Section 60.6(a).

***Paragraph g.(3)***

Discussion

This paragraph includes two *requirements* not listed elsewhere: the requirement to include a foreign FSD under the sponsor's QA program, if the foreign FSD is not under an approved QA program; and the requirement to perform one external QA audit of the foreign FSD QA program, if it is included in an approved QA program.

First, since these are new requirements, they should be moved out of the informational section.

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

Second, performing external audits of other carriers is a complex undertaking. In IATA's Operational Safety Audit (IOSA) program, under which code-sharing airlines will audit each other, there are specific guidelines addressing confidentiality of findings and contesting findings. What is the process if the NSPM rejects the audit findings? How will the NSPM respond if American Airlines were to give a foreign sponsor a passing audit and later United were to conduct an audit on the same foreign operator and find them failing? This is far too complex an issue to address in one simple sentence.

Third, it seems inconsistent to require an external audit of a foreign FSD QA program if it is operating under a NSPM/foreign authority-approved QA program and not require an external audit of a domestic FSD operating under a NSPM-approved QA program. The reciprocal recognition of a foreign FSD as described in this paragraph explicitly states the NSPM has accepted that foreign carrier's FSD QA program; therefore, no external audit should be required.

Proposal

First, move into a rule or requirements section the requirement for the domestic sponsor to include in their QA program any foreign FSD not who does not have a NSPM/foreign authority-approved quality program. Second, delete the requirement for a domestic sponsor to perform one external quality audit on any foreign FSD that is under a NSPM/foreign authority-approved QA program.

## **§9 Simulator objective data requirements**

### ***QPS Requirements Paragraph g.***

Discussion

The draft ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, 2<sup>nd</sup> edition, provides additional guidance for when the use engineering data is acceptable. This information, contained in Appendix B of the ICAO document, should be incorporated into the informational section. In addition, Appendix E and F of the ICAO document provide guidelines for data requirements for alternate engines and alternate avionics, respectively. They, too, should be incorporated.

Proposal

Incorporate Appendices B, E, and F of the ICAO document into this informational section and the similar informational section in Appendix B of this rule.

### ***Information Paragraph j.***

Discussion

This should be moved into the requirements paragraph.

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
 September 25, 2002

---

Proposal

See the discussion and proposal on §60.13, above.

***Information Paragraph (new)***

Discussion

The industry continues to struggle with manufacturers over data. Perhaps some weight from the NSPM could be thrown behind the sponsors if the NSPM were to recommend that data providers use the IATA document “Flight Simulator Design and Performance Data Requirements,” as amended. United Airlines believes that the addition of this recommendation would provide formal recognition of this document by the NSPM and provide guidance for smaller data providers regarding the level of data required for simulation.

Proposal

Add a paragraph to the information section recommending that data providers use the IATA document “Flight Simulator Design and Performance Data Requirements,” as amended.

**§11 Initial (and upgrade) qualification requirements**

Discussion

Appendix A of the draft ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, 2<sup>nd</sup> edition, contains additional guidance for qualifying new FSDs. This material should be incorporated into the QPS requirements of this paragraph and the associated paragraph in Appendix B.

Proposal

Incorporate Appendix A of the draft ICAO document into the informational section of this paragraph and the associated paragraph in Appendix B.

**§14 Inspection, maintenance, and recurrent evaluation requirements**

***Information Paragraph (new)***

Discussion

The NSPM should develop a recommended profile to be flown by NSP evaluation pilots during FSD recurrent evaluations. This follows from three propositions:

First, with the advanced avionics (e.g., Airbus FMGC) now in use in aircraft, which are “smart” with respect to aircraft phase of flight, multiple and frequent repositions of a FSD, such as experienced during some recurrent evaluations, can cause the avionics to malfunction or to lock-up when they become “confused” as to the phase of flight. Experience has shown that the more a FSD is “flown” like an airplane, the more it will “fly” like an airplane.

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
 September 25, 2002

Second, with a reasonably standardized flight profile, the discrepancy data gathered by the NSPM could be used to monitor trends at both the sponsor level and throughout the industry in general. The profile could be periodically varied based on the data analysis or the desire for other data. Without a standard profile, the discrepancy data gathered will be of little use.

Third, the use of standardized profiles is accepted practice in airplane development flight testing, new airplane acceptance, and airplane maintenance flight testing.

Proposal

The NSPM should develop a standardized recurrent evaluation profile to be used on a typical recurrent evaluation. An example of such a profile can be found in JAR-STD 1A, Change 1, IEM STD 1A.015, paragraph 4.6 (page 2-C-6). The NSPM would always reserve the right to deviate from this profile should circumstances require it.

***Paragraph 14.f.***

Discussion

This paragraph says that a recurrent evaluation will take approximately 8 hours of simulator time. Review of the results of the quarterly tests [sub-paragraph (1)] does not require simulator time. In the hundreds of recurrent evaluations over the past few years at United Airlines, a recurrent evaluation has never taken longer than 4 hours of simulator time, which includes running a sampling of the objective tests. It costs money to schedule a FSD for unused time.

As suggested in the discussion immediately preceding this, the NSPM should develop a standardized test profile. The profile suggested in JAR-STD 1A is designed to take approximately 2 hours, so allow 2½. This should be ample time to subjectively determine whether a FSD is operating properly. The 1½ remaining hours would then be available for objective testing. If the evaluator finds problems with the FSD during the 4 hours available for testing, then the evaluator has the option of removing the FSD from service and then can continue to test it, as required.

The guideline stating that the evaluator can run up to 30% of the objective tests is excessive. Using our newest simulator as an example, the evaluator could request 36 objectives tests to be run. To randomly sample the objectives tests should require no more than 10 tests be run.

Proposal

Change the guideline in paragraph f. to state that a normal recurrent evaluation requires approximately 8 hours, broken down as follows: 4 hours to review the results of the objective tests and performance demonstrations, 2½ hours to subjectively evaluate the FSD, and 1½ hours to sample objective tests.

Change the guideline in paragraph f.(2) to state that at the discretion of the evaluation, up to 10 randomly selected objective tests may be run.

**Comments to Proposed Rule: 14 CFR Part 60  
Flight Simulation Device Initial and Continuing Qualification and Use  
Docket Number FAA-2002-12461  
September 25, 2002**

---

***Paragraph 17.h.***

Proposal

Please see the discussion and proposal under §60.15(d)(3), above.

**Attachment 1 to Appendix A**

***Paragraph 1.***

Discussion

In several places, the rule requires compliance with and reporting of “performance demonstrations,” e.g., §60.15(b)(5)(iii). The rule also contains references to “objective tests,” which are clearly identified in the QPS Attachment 2, and “subjective tests,” which are clearly identified in QPS Attachment 3. However, the only place that the term “performance demonstration” is defined seems to be in §60.19(a)(1) where it refers to the “...appropriate QPS Attachment 1 performance demonstrations.” United Airlines presumes that the performance demonstration is in reference to Attachment 1, Table of Minimum Simulator Requirements. Referring to the column labeled “additional details,” some of the requirements clearly indicate that “a demonstration is required...” This Attachment and the table should be re-titled and additional words put into the “additional details” column clearly identifying those items considered to be “performance demonstrations.”

Proposal

Re-title QPS Attachment 1 to “General Simulator Requirements and Performance Demonstrations,” re-title the table to “Table of Minimum Simulator Requirements and Performance Demonstrations.” Clearly identify for each requirement in Attachment 1 whether it is a “performance demonstration” item as required by the rule.

***Paragraph 1.a.(2)(a)***

Discussion

The implication of this paragraph is that every real-world, operational airport simulated must contain scene content comparable to the actual airport. The intent of the visual scene content requirements generated by the visual working group for the ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, 2<sup>nd</sup> edition, of which United Airlines was a part, was clearly that the specified scene content was only to demonstrate the required visual system capability. While each of the three demonstration airports should belong to the sponsor’s route structure, it was not the intent that each of these three airports had to meet the scene content requirements; only that among the three, all of the scene content requirements could be met. Further, the visual working group was insistent that the scene content beyond the three demonstration airports was between the user and the respective TPAA. United Airlines believes that it is beyond the purview of the NSPM to specify scene content beyond that required at the demonstration airports. SFAR 58, *Advanced Qualification Program*, under which United

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
 September 25, 2002

Airlines trains, allows us to tailor our training program to our specific needs based on our training needs analyses. This should apply to model scene content.

Proposal

Revise this paragraph to state clearly that scene content requirements are for the visual system capability demonstration only and shall be demonstrated across three airports within the user's route structure, where possible. Further, state that visual scene content beyond the demonstration airports is between the user and the TPAA. This was captured in the ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, 2<sup>nd</sup> edition, as follows:

The minimum airport model content artifacts for the purposes of this document are those features required to satisfy visual capability tests, and provide suitable visual cues to allow completion of all Functions and Maneuvers Tests described in this appendix. If all of the elements cannot be found at a single real world airport, then additional real world airports may be used.

***Table of Minimum Simulator Requirements***

General Comment

This table should be revised to reflect the ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, 2<sup>nd</sup> edition, for Level D FSDs, with the lesser devices being a subset of these requirements.

***Table of Minimum Simulator Requirements 2.a., 3.c.***

Discussion

*"Programming", Paragraph 3.c.*

It is difficult to know the intent of this paragraph.

The NSPM has always required that the FSD handle and perform like the aircraft. This has always been the goal of United Airlines. We have achieved it by updating data packages (e.g., aerodynamic models), as appropriate. However, we have never updated a FSD with every aircraft modification or data release. Boeing has just advised us to plan for updates to 36 data documents in 2003. United Airlines will review each of these changes against our own criteria (and against those specified under §60.23, Modifications to FSDs, if it were in effect) to determine whether to update the FSD programming. Paragraph 3.c. of the Table of Minimum Simulator Requirements requires that the FSD "programming" be updated within 6 months of..."appropriate data releases..." without defining "programming" or "appropriate data releases."

§60.23, as United Airlines has proposed above, requires that modifications be made when:

- (1) The aircraft manufacturer or another approved source develops new data regarding the performance, functions, or other characteristics of the aircraft being simulated;
- (2) A change in aircraft performance, functions or other characteristics occurs;

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
 September 25, 2002

- (3) Equipment or appliances are added to meet the FAR requirements for the airworthiness of the aircraft;
- (4) A change in operational procedures or requirements occurs.

If “programming” and “appropriate data releases” refer to changes identified in (1) – (3) above, then the “programming” update requirements of this paragraph are rather benign and should be deleted since these requirements are covered in §60.23. If “programming” and “appropriate data releases” go beyond what is required in §60.23, then this paragraph adds only confusion.

*“Hardware”, Paragraphs 2.a. and 3.c.*

United Airlines feels that the literal interpretation of the hardware requirements in these two paragraphs may be the most troublesome requirements in the entire rule. Paragraphs similar to 2.a. have been the most often ignored and inconsistently applied paragraphs in the applicable FSD Advisory Circulars—both by the NSPM and the sponsor. As written, and if actually enforced, these paragraphs imply a significant regulatory shift in the specification of FSD requirements for training. This is based on United Airlines’ reading of the paragraph to require that the FSD, from the pilot’s perspective, have all of the flight deck equipment (i.e., panels, switches, instruments, etc.) to replicate the aircraft.

Current practice is that the requirement for the FSD cockpit to replicate the aircraft has been either ignored or implemented in coordination with the TPAA. For a sponsor with a captive fleet of aircraft, such as United Airlines, when a new piece of equipment was added to the cockpit (e.g., TCAS) the questions have always been, “Must the FSD be modified before the first aircraft is modified? The last aircraft? Some mid-point aircraft?” United Airlines has worked with our POI to determine specific cockpit configuration modification timetables. Other sponsors, such as Part 142 certificate holders, have no captive fleet of aircraft and, therefore, do not have to match their FSDs’ cockpits to any specific aircraft. QPS Attachment 1, paragraphs 2.a. and 3.c. do nothing to answer these questions or the likely lack of fair application of this requirement across sponsors with captive fleets and those without.

United Airlines presumes that the intent of this “cockpit replication” requirement is so that a crew will train in a FSD cockpit that replicates the one in the aircraft in which they fly. However, United Airlines, with the pre-approval of the POI, routinely trains at off-campus facilities in FSDs that do not “replicate” the cockpit of our aircraft. It is unreasonable that these sponsors providing their FSDs for use by United Airlines would be required to ensure their FSD cockpits replicate that used by United Airlines and all other users of their FSD. And if they are not required to, then it is unfair to require United Airlines to replicate the cockpit of our captive fleet.

While written in the FSD-related Advisory Circulars, the interpretation of the requirement that a FSD be modified to match aircraft modifications has never been clearly seen by United Airlines as within the scope of the NSPM to address. Indeed, the very essence of SFAR 58, *Advanced*

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
 September 25, 2002

*Qualification Program*, under which United Airlines trains, allows a carrier to develop a training program based on a task and media analyses. These analyses are approved by AFS-230, and then the training program is approved by the POI. Were, as an example, United Airlines to elect to forgo installing the Predictive Windshear System (PWS) in our FSDs because the media analysis showed it could be trained elsewhere, and were AFS-230 and the POI to agree, then United Airlines should not have to modify the FSDs for such “optional” equipment as PWS simply because the NSPM directs it.

However, there must be some minimum equipment required in a FSD and the NSPM should exercise control over that requirement. It is fair in the opinion of United Airlines for the NSPM to require that the FSD cockpit require all equipment, appliances, etc. necessary as required by FAR for the airworthiness of the aircraft being simulated as operated by the user. In other words, the NSPM should require the minimum equipment that would be required by FAR if one were to go to Boeing and buy a basic airplane for domestic, flag, or supplemental operations carrying passengers or freight.

The Information section of QPS Attachment 1, paragraph 1(b)(2), as amended below, captures this:

- (a) General cockpit configuration, *including equipment and appliances required by FAR for the airworthiness of the aircraft as operated by the FSD user.*
- (b) FSD programming
- (c) Equipment operation
- (d) Equipment and facilities for instructor/evaluator function
- (e) Motion system
- (f) Visual system
- (g) Sound system

If “hardware” updates as used in paragraph 3.c. is intended to be tied to §60.23, then there is no need for paragraph 3.c. As written, this paragraph only obfuscates the requirements of §60.23 and Appendix A, §17.

Paragraph 2.a. should be re-written to reflect that the FSD cockpit must be a “full-scale replica...as required by FAR for the airworthiness of the aircraft as operated by the user.”

Proposal

Revise the Information section of QPS Attachment 1, paragraph 1(b)(2):

- (a) General cockpit configuration, *including equipment and appliances required by FAR for the airworthiness of the aircraft as operated by the FSD user.*
- (b) FSD programming
- (c) Equipment operation
- (d) Equipment and facilities for instructor/evaluator function
- (e) Motion system

**Comments to Proposed Rule: 14 CFR Part 60  
Flight Simulation Device Initial and Continuing Qualification and Use  
Docket Number FAA-2002-12461  
September 25, 2002**

- (f) Visual system
- (g) Sound system

Revise QPS Attachment 1, Appendix A (and B), Table of Minimum Simulator (FTD) Requirements, paragraph 2.a. to clearly state that the cockpit equipment requirements are for a “full-scale replica...as required by FAR for the airworthiness of the aircraft as operated by the user.” The rest of the rule must be reviewed to ensure this philosophy is promulgated throughout (e.g., Appendix A 17.h.(3)).

Remove QPS Attachment 1, Appendix A (and B), Table of Minimum Simulator (FTD) Requirements, paragraph 3.c. United Airlines believes that §60.23, amended above as United Airlines proposes, and Appendix A, §17 provide sufficient guidance to a sponsor when a FSD modification is required.

***Table of Minimum Simulator Requirements 3.n.***

Discussion

This requirement is quite vague and its intent is unknown to United Airlines.

Proposal

Clarify the paragraph more explicitly state the requirement in terms of the intent.

***Table of Minimum Simulator Requirements 7s.***

Discussion

After extended discussion, the following requirements were deleted from the ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, 2nd edition:

1. “The simulator cockpit ambient lighting must be dynamically consistent with the visual scene displayed.” (General simulator requirements)
2. “The daylight scene must be part of a total daylight cockpit environment which at least represents the amount of light in the cockpit on an overcast day. For daylight scenes, such ambient lighting must not “washout” the displayed visual scene nor fall below 5 foot-lamberts (17 cd/m<sup>2</sup>) of light as reflected from an instrument approach plate at knee height at both pilots’ station. These requirements are applicable to any simulator equipped with a “daylight” visual system.” (Additional details)

Proposal

Delete these requirements and update this table to match the requirements specified in the ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, 2nd edition.

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

**Attachment 2 to Appendix A**General Comments

Appendix C, Validation Test Tolerances; Appendix D, Validation Data Roadmap; Appendix G, Transport Delay Testing Method; and Appendix H, Recurrent Validations—Validation Test Data Presentation of the ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, 2nd edition, add a great deal of explanatory material to the area of FSD validation testing. Each ICAO appendix should each be added to the Informational section of this Attachment as well as those of Appendix B of this rule.

Proposal

The Table of Objective Tests should be revised to reflect the ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, 2<sup>nd</sup> edition, to include the relevant appendices, for Level D FSDs, with the lesser devices being a subset of these requirements in harmony with JAR-STD 1A and 1B.

***Paragraph 1.a.(5)***Discussion

This could be guidance for any data provider; however, the NSPM should certify all validation data packages prior to their use in a FSD.

Proposal

Require that all validation data packages be certified by the NSPM prior to their use in a FSD. See our comments under §60.13.above.

***Paragraph 1.a.(8)***Discussion

This requirement was excluded from the ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, 2<sup>nd</sup> edition.

Proposal

Delete this requirement.

***Paragraph 1.b.(2)***Discussion

There is currently no industry-wide agreement on what constitutes “safe” operation of a motion system. Neither is there industry-wide acceptance of how a motion system would be tested for safe operation. United Airlines is unsure of the intent of this paragraph, since it requires only a one-time attestation of motion system safety with no provision for periodic compliance testing. Too, the control loading system has not been considered here.

**Comments to Proposed Rule: 14 CFR Part 60**  
**Flight Simulation Device Initial and Continuing Qualification and Use**  
**Docket Number FAA-2002-12461**  
September 25, 2002

---

Proposal

The ICAO flight simulator qualification document Motion Team should be reconvened to provide guidance regarding what constitutes a “safe” motion/control loading system and how the systems should be tested to ensure safety.

***Paragraph 3.a.—Motion System***

Discussion

The angular excursions are unnecessarily large. The tolerance would be more reasonable if 40° were the total allowable excursion (i.e.,  $\pm 20^\circ$ ). As has been stated before, this entire table should be modified to agree with the ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, 2<sup>nd</sup> edition.

Proposal

Modified this entire table to agree with the ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, 2<sup>nd</sup> edition.

***Paragraph 3.d.***

Discussion

This requirement, as written, may require additional sensors and not give adequate performance evaluation criteria. Too, the bandwidth requirement is too great for some existing systems.

Proposal

Modified this entire table to agree with the ICAO document, *Manual of Criteria for the Qualification of Flight Simulators*, 2<sup>nd</sup> edition. If a phase specification must be retained, then change the specification from 45 deg to 60 deg for the range to 4 Hz and the NSPM should provide an option for objective testing to use leg position frequency response results. The legs could all be driven simultaneously

It must be noted that the opinion of some members of the of the ICAO motion working group was that an individual leg frequency response was a more sensitive and less error prone method of measuring the response of motion system hardware. United Airlines subsequently verified that detuning a single leg so that it was out of its single leg frequency response tolerance did not result in the heave acceleration frequency response being out of tolerance.

**Attachment 5 to Appendix A**

***Figure 4B***

Proposal

Please see the discussion and proposal under §60.15(b)(4), above.

***Comments to Proposed Rule: 14 CFR Part 60  
Flight Simulation Device Initial and Continuing Qualification and Use  
Docket Number FAA-2002-12461  
September 25, 2002***

---

**Appendix B to Part 60: QPS for Airplane Flight Training Devices**

With the exception of those comments directed specifically at full-flight simulators, all of United Airlines' comments made to Appendix A should be considered applicable to this appendix.