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DRAFT REGULATORY EVALUATION, INITIAL REGULATORY FLEXIBILITY DETERMINATION, INTERNATIONAL TRADE IMPACT ASSESSMENT, AND UNFUNDED MANDATES ASSESSMENT

PART 60

Flight Simulation Device Qualification

Notice of Proposed Rulemaking
(14 CFR Part 60)

Office of Aviation Policy and Plans
Operations Regulatory Analysis Branch, APO-310
Norman R. Elrod
Mohan A. Samtani
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EXECUTIVE SUMMARY

This Regulatory Evaluation examines the economic impact associated with the proposed rule to establish 14 CFR Part 60. The proposed rule would establish requirements for the evaluation, qualification, and maintenance of Flight Simulation Devices (FSDs).

The estimated 10-year cost of this proposed rule would be approximately $1.9 million ($1.6 million, discounted) due to the development, review, and approval of a Quality Assurance program. The majority of the cost impact, estimated at approximately $1.3 million ($1.1 million, discounted) over a 10-year period, would be imposed on the industry. The FAA 10-year cost is estimated at approximately $571,000 ($413,000, discounted).

The main benefit of this proposed rule would be its contribution to a potential reduction in aviation accidents by ensuring that flightcrew members using FSDs receive the best possible training in a device that closely matches the performance and handling characteristics of the aircraft being simulated. Aviation safety would be better maintained because a Quality Assurance program would identify, for the user and the FAA, flightcrew training problems that could or would arise due to problems with the maintenance and operation of the FSD. Moreover, when training is interrupted due to maintenance problems, those problems would be quickly and accurately corrected to allow the training process to resume. Lastly, the proposed rule would consolidate and update existing FSD qualification requirements. For example, the proposed new part 60

would establish FSD requirements that could be used by any certificate holder as defined under part 60 who conducts training and evaluation, or intends to meet recent flight experience requirements. Its application, therefore, would be expanded beyond just those who operate under part 121.

The proposed rule would have no impact on domestic or foreign entities engaged in international trade and it would not have a significant economic impact on a substantial number of small entities. The proposed rule does not contain any Federal intergovernmental or private sector mandates; therefore, the requirements of Title II of the Unfunded Mandates Reform Act of 1995 do not apply.

I. INTRODUCTION

The FAA proposes to establish a new part 60 containing the qualification requirements for Flight Simulation Devices (FSDs) for certificate holders. A certificate holder, as defined in the proposed new part 60, is a person issued a certificate under parts 119, 141, or 142 or a person holding an approved course of training for flight engineers in accordance with part 63. The proposed changes are intended to contribute to a reduction in aviation accidents by ensuring that people using FSDs receive the best possible training in a device that closely matches the performance and handling characteristics of the aircraft being simulated. This regulatory evaluation considers the costs and benefits of the new part 60.

In addition to the regulatory evaluation, this document also contains an Initial Regulatory Flexibility Determination, which analyzes the economic impact of this proposed regulatory change on small entities, as required by the Regulatory Flexibility Act of 1980, as amended. This document also contains an assessment of the effect of the proposed regulatory changes on international trade, as required by the Office of Management and Budget. Finally, this document contains an Unfunded Mandate Assessment, as required by the Unfunded Mandates Reform Act of 1995.

II. BACKGROUND

This rulemaking, in conjunction with a separate rulemaking project that will follow this proposal, is in consideration of the overall new safety program *Safer Skies—A Focused*

Agenda announced in 1998 by the FAA Administrator. In the decade leading up to the Administrator's announcement, human error was identified as a major contributing factor in a large percentage of fatal accidents for U.S. air carriers. The goal set forth in the new safety program was an 80 percent reduction in the accident rate of U.S. air carriers by the year 2007. The FAA anticipates that the proposed new regulatory requirements and revisions to existing rules covering air carriers' training programs would contribute significantly to this reduction.

As part of the above effort, this rulemaking would establish part 60 as a permanent regulation. The new part 60 being proposed would contain the requirements for the evaluation, qualification, and maintenance of the FSDs that are used to meet the training and qualifying requirements for flight crewmembers.[1]

III. PROPOSAL

In general, the proposed rulemaking would establish the requirements for the evaluation, qualification, and maintenance of FSDs that would make up the proposed new part 60. The proposed requirements are based on the current requirements for simulators as contained in different parts of the FAA's regulations and in advisory circulars (ACs). The proposed new part 60 therefore, would establish FSD requirements that could be used by any certificate holder as defined under part 60 who conducts training and

[1] Flight simulation devices (FSDs) include flight simulators and flight-training devices (FTDs). Flight simulators are full size replicas of a specific type of aircraft cockpit, whereas flight training devices are full size replicas of aircraft instruments, equipment, panels, and controls in an open flight deck area or an enclosed aircraft cockpit replica.

evaluation, or intends to meet recent flight experience requirements. The proposed new part 60 would contain all of the requirements for qualifying FSDs.

The proposed rule would permit any FSD qualified before the effective date of this rule to retain its qualification as long as the FSD continued to meet the standards under which it was originally evaluated, regardless of sponsor, and as long as the sponsor complies with the applicable provisions of the rule. This permits about 515 FSDs to be grandfathered in without undergoing an additional qualification, although they would be required to obtain Statements of Qualification in accordance with the proposed rule. The FAA expects the issuance of Statements of Qualification to previously-qualified FSDs to take minimal additional time since the FAA would look at the FSD during a regularly-scheduled evaluation. The proposed rule would also permit a sponsor to receive an interim qualification of an FSD for a new airplane type or model even though the flight test data used had not received final approval by the aircraft manufacturer. This interim qualification would continue for one year until the sponsor submits information from the aircraft manufacturer and the qualification test guide results. These sections make the proposed rulemaking very flexible and adaptable to promoting the qualification of FSDs. Sponsors can maintain current qualification and/or obtain qualification in a timely manner to keep FSDs operating for training, evaluation, or to meet recent flight experience requirements.

FSD Qualification Performance Standards

The Qualification Performance Standards (QPSs) for the proposed new part 60 provides the standards and information for sponsors to examine in setting up and operating their FSDs. The FAA proposes that the QPS be incorporated by reference as a regulation. However, the FAA also seeks comment on whether or not these QPSs should be published in the Code of Federal Regulation as appendices to the new part 60. These standards provide detailed guidance and information on how and on what the FSD will be evaluated. This provides the sponsors with advance knowledge on how to prepare their FSDs to obtain qualification status.

IV. COSTS

The FAA has determined that the total cost of implementing the new part 60 over the next 10 years would be approximately $1.9 million[2] ($1.6 million, discounted[3]). The majority of the cost impact, estimated at approximately $1.3 million ($1.1 million, discounted) over a 10-year period, would be imposed on the industry. The FAA 10-year cost is estimated at approximately $571,000 ($413,000, discounted). The costs of the proposed new part 60 are found in the reporting, recordkeeping, and other minor administrative and paperwork costs identified throughout part 60 including those contained in the Quality Assurance Program as proposed in §60.5. The FSD QPSs are also examined in this cost section. In addition, the equipment upgrade costs or retirement

[2] Unless stated otherwise, all monetary values in this analysis are expressed in current dollars.

[3] As required by the Office of Management and Budget (OMB), the present value of this cost stream was calculated by discounting the monetary values using a 7 percent interest rate over the 10-year period.

costs associated with the specific simulator compliance requirements proposed in §60.35 are discussed below, along with an explanation of why the FAA does not believe that such costs are likely. Additional background information necessary for the cost analysis of the proposed rulemaking is provided below.

Description of Industry

According to the FAA's National Simulator Program Manager (NSPM), there are currently 66 sponsors of FAA qualified aircraft simulators and upper level flight training devices (FTDs). This includes the FAA itself, which sponsors a single level C simulator for training in its Boeing 727 airplane. Most sponsors maintain multiple simulators (only 10 sponsors, including the FAA, sponsor a single simulator), and some sponsors such as Flight Safety Boeing and Flight Safety International maintain FSDs at multiple sites. Except for the National Aeronautics and Space Administration (NASA) and the FAA, all qualified sponsors of FSDs are either part 119 or part 142 certificate holders. Twenty-two of these are air carriers holding part 119 certificates; the rest are pilot training centers holding part 142 (training center) certificates.

Most air carriers do not sponsor FSDs; they contract or lease time to do specific training tasks on simulators sponsored by others. As noted above, only 22 of the approximate 160 air carriers now in business under part 121 are approved FSD sponsors.

There are currently four levels of flight simulators (levels A- D), and seven levels of FTDs (levels 1-7).[4] Simulators may be used for all flight maneuvers and procedures, which are typically referred to as flight tasks. However, use of Level A and B simulators require the supplemental use of either a higher level simulator or the airplane itself to complete the training and the checking required for certain initial, transition, and upgrade training program flight tasks. These flight tasks are as follows: 1) a normal takeoff; 2) a normal instrument landing system (ILS) approach; 3) a missed approach; 4) a normal landing; 5) a landing in sequence from an ILS approach; and 6) a landing with a simulated engine failure.

Most of the major certificate holders operating airplanes with more than 30 seats and conducting operations under part 121 are currently training with FSDs (which include flight simulators and flight training devices). They are familiar with and operating under the current part 121, appendix H and §121.407. Most certificate holders conducting flight operations under parts 121 and 135 in 10-19 and 20-30 passenger seat airplanes are currently training with FSDs, but with certain restrictions.[5] This is also true of parts 141

[4] According to NSPM, there are currently approximately 40 Level A simulators; 34 Level B simulators; 260 Level C simulators; and 137 Level D simulators that are qualified for use in an approved training program. The FAA has not established an accurate count of the number of sponsors for Levels 1-5 FTDs, it only tracks levels 6 and 7 FTDs. There are 17 Level 6 FTDs and 6 Level 7 FTDs qualified for use in an approved training program. However, with the promulgation of this rulemaking, the Level 7 FTD designation would be eliminated and the existing Level 7 devices would be re-classified as Level 6 FTDs. This would also remove the different authorizations for Level 7 and Level 6; however, no existing authorizations would change.

[5] The restrictions typically necessitate that the simulator training be supplemented with additional airplane use and training. As a consequence, the certificate holders operating smaller airplanes (10-19 seats and 20-30 seats) tend to substitute more airplane use to satisfy training requirements than the certificate holders operating larger airplanes. However, this holds true only if the small airplane operators chose to train in level B simulators, and then, only during the initial, transition, or upgrade training phase. If they opt to use level C or D simulators, they would operate them in similar manner as operators of larger airplanes (more than 30 seats).

and 142 operators giving parts 61 and 63 training. In some instances, the small airplane operators are either operating under the Advanced Qualification Program (AQP) or are transitioning from the mandatory traditional training program to the AQP, which requires flight simulation training.

The flight simulation market is dominated by four major manufacturers: Flight Safety International, CAE Electronics, Thomson Training and Simulation, and Reflectone. There are a few smaller manufacturers who produce one or two FSDs per year. Flight Safety International is also a part 142 certificate holder and a sponsor of FSDs while the other three manufacturers are neither certificate holders nor sponsors of FSDs.

A. Equipment Upgrade or Retirement Costs - §60.35 Specific Simulator Compliance Requirements

Proposed paragraph (a) of §60.35 sets forth simulator requirements that would take effect 18 months after the effective date of the final rule, but stipulates that any simulator that was qualified before that date would remain qualified. However, if the sponsor decides to upgrade the simulator for any reason, it would also have to be upgraded to comply with the provisions of proposed paragraph (a).

The FAA believes that the proposed modifications contained in paragraph (a) impose no added costs on either the sponsors or users of flight simulators. The proposed modifications are meant to address requirements that must be met by sponsors qualifying simulators for training 18 months after the promulgation of the final rule. The upgrading

of a simulator on the part of a sponsor as discussed in paragraph (a) would be a business decision or choice; it is not mandated by the proposed rulemaking.

Proposed paragraph (b) sets forth simulator requirements that would take effect 2 years after the effective date of a final rule. The proposed requirements state that each flight simulator used for meeting flight crewmember training, evaluation, or flight experience requirements of this chapter for certification or qualification must perform satisfactorily in ground operations, takeoff, climb, cruise, descent, approach, and landing (including normal, abnormal, and emergency landings). Although the only significant change from existing practice is the addition of landings to this list, the net effect of this added requirement would be to eliminate the use of Level A simulators for evaluation and flight experience requirements. Because of this added change a sponsor would either have to downgrade the Level A simulator to an FTD, upgrade it to a Level B simulator, or retire it from service altogether.[6]

The FAA's decision to eliminate the use of Level A simulators to meet flight crewmember training, evaluation, or flight experience for purposes of certification or qualification is based on safety considerations. The Level A simulator is the least sophisticated of today's simulator levels and the requirements for data applicable to simulators of this vintage are very elementary and relatively primitive when compared to today's standards for simulators. For example, the required performance and flight

[6] Retirement typically can be accomplished in three ways, all of which result in additional cost recovery or savings: 1) disassemble the simulator for spare parts; 2) discard, e.g., transfer ownership (sell) to a third world party; or 3) donate to a university.

characteristics of the Level A simulators are contained in two separate lists, the data for each having essentially been gathered during flight via "eye-ball" observation and "knee-board" recording, and then similarly compared to simulator performance. Other features of the Level A simulators are equally primitive.

First, the design work for the visual simulator, the Level A simulator, was developed in the 1960's and 1970's and is more restrictive than the current standards for other simulator levels.[7]

Second, the motion system requirements for Level A simulators were not as sophisticated as were the requirements for the visual system, and the visual systems have since been updated. During the 1970's, the requirement essentially stated only that the simulator "must have motion", and it was not until the early 1980's that any "requirements" for motion systems were formalized and published. Only a few Level A simulators were produced subsequent to the issuance of these revised requirements that would have incorporated the more up-to-date motion systems.

Third, use of technology developed 30 or more years ago ignores the advancements made in computers and the availability of meaningful flight test data. The levels of simulation that most utilize these advancements are the Level C and Level D simulators, with some limited advancement also occurring in Level B simulators. There have been no

[7] The Level A simulator is the current reference for the historic "visual" simulator and was referenced in the regulations as early as the mid- to late 1960's, when visual systems first appeared as attachments to the (non-visual) simulators that had been used in pilot training activities up to that time.

corresponding significant advancements in either the data or data applications for Level A simulators. This is again, most likely because very few new Level A simulators have been built recently, and it would be very costly to modify the current inventory of Level A simulators to incorporate the applicable data and data applications.

Finally, although takeoffs have been authorized in Level A simulators, landings have not been authorized. However, since takeoffs and landings occur in the same portion of the flight envelope, the FAA now believes that neither the takeoff nor the landing tasks should be allowed in a Level A simulator for purposes of obtaining credit for required flight crewmember evaluation or flight experience. The alternative, simply authorizing an additional flight task for landing for the Level A simulator in the absence of the required data, would be inconsistent with the FAA's proposed new policy--that all evaluations (e.g., airmen certification, proficiency checks, etc.) must be based on the capability of the simulator to provide accurate simulation for all phases of flight, and this is not the case for Level A simulators.

The FAA, however, believes that simply restricting the previously authorized takeoff maneuvers in the absence of the required data, while continuing to allow the Level A simulator to be used to meet certain flight crewmember evaluation or flight experience for purposes of certification or qualification, is an oversimplification that ignores the other primitive elements of the Level A simulator discussed above. The FAA provides for additional and more up-to-date simulation in the Level 6 FTD, which also disallows both takeoffs and landings. Furthermore, the Level 6 FTD may be equipped with both a

qualified visual system and a qualified motion system, although neither is required. The FAA, therefore, believes it is more appropriate to downgrade the Level A simulators to Level 6 FTDs rather than to retain a redundant and limited level of certification and qualification by continuing to authorize the selected use of Level A simulators.

With the addition of a qualified visual system and a qualified motion system, a Level 6 FTD may be able to conduct nearly all of the same training operations as the Level A simulator, with the exception of takeoff and landing tasks. Sponsors of current Level A simulators may choose this option (downgrading to Level 6) to limit the impact on any continued training operation with the same, reclassified equipment and avoid the expense of upgrading to a Level B simulator. There would be no additional cost to downgrade from a Level A simulator to a Level 6 FTD.

The NSPM, through field sampling of the industry, estimates that the total cost per simulator to upgrade from Level A to Level B ranges between $350,000 - $500,000. Of this cost, $250,000 - $300,000 would be required to upgrade the Level A equipment to that of Level B, and approximately $100,000 - $200,000 would be required to upgrade Level A software to Level B software. The cost to upgrade the software depends on the currency and quantity of the data that exists for a given simulator. If the most recent data is available, then the cost to upgrade software would be about $100,000 (low end), if not, the cost to upgrade software would be about $200,000 (high end).

As previously noted, there are currently 40 Level A simulators. If all sponsors chose to upgrade from Level A to Level B simulators, then the total industry cost of proposed §60.35 would range from $14 million to $20 million. The FAA, however, believes that very few sponsors, and quite possibly none of the sponsors, would chose to upgrade Level A simulators to Level B simulators and would tend to retire or downgrade Level A equipment for the several reasons discussed below.

The NSPM estimates that the age of the current inventory of Level A simulators is approximately 12-15 years with a remaining useful life of only 5-8 years, assuming a 20-year life cycle. Also, assuming a 10-year depreciation schedule, all Level A simulators have already been fully depreciated and their original costs recovered. Furthermore, there appears to be little demand for newly built Level A simulators. No new orders for Level A simulators have been placed since the late 1980's, and the inventory of Level A simulators has declined from 73 in 1990 to the current level of 40[8]. Maintenance costs are high for Level A simulators and will continue to mount as the age of the Level A simulators continues to increase. Finally, the FAA proposes to incorporate into this section a two-year compliance period after implementation of part 60. Thus, the decisions to upgrade or not would be made with regard to Level A simulators that have become even older and more costly to maintain.

In light of the above information, and given the high cost of upgrading simulators from Level A to Level B, the FAA concludes that few, if any, of the Level A simulators are likely to be

[8] The only Level A simulator qualified during the past decade has been configured for a Lear Jet 45, and qualification at the A level was necessitated only because the most recent flight data was unavailable at the time precluding qualification at a higher level.

upgraded. However, the FAA cannot accurately determine how many or which ones of the Level A simulators might be considered for upgrading and which ones are likely to be downgraded or retired. Of the forty qualified Level A simulators, 25 are qualified for aircraft types for which higher (B and above) levels of simulators are currently available. Consequently, the FAA believes this group of Level A simulators would likely be either downgraded or retired.

The FAA also believes that most of the remaining 15 Level A simulators are likely to be downgraded or retired because they are for aircraft types (for example, certain B-737's and certain DC-8's) that are either no longer in production or are in the process of being phased out. The FAA believes the remaining few Level A simulators for which none of the above conditions might apply, would nevertheless, also likely not be upgraded because the lease price would be insufficient to cover the rising maintenance cost already noted above. The FAA believes, therefore, that the more likely scenario with regard to whether sponsors would choose to upgrade Level A simulators to Level B simulators is that all Level A simulators are not likely to be upgraded.

The means by which Level A simulators could be retired were noted in footnote #6 and in each instance the outcome would be a cost savings to the sponsor (owner). The steps to downgrade a simulator would only necessitate an administrative update to the Master Qualification Test Guide (MTQG), the standards record of each FSD which includes the performance demonstrations and objective test results for qualification. A downgraded Level A simulator means that the device would no longer be used to do certain tasks that

it could do before as a Level A simulator (e.g., takeoffs for credit purposes for required part 121 checking or for part 61 airmen certification), although it could still be used to generate income as an FTD.

The FAA concludes that any costs associated with proposed §60.35 "Specific simulator compliance requirements" would likely be minimal. The FAA solicits comments from the industry and requests that all comments be accompanied by clear documentation.

B. Reporting, Recordkeeping, and other Administrative Costs

Proposed part 60 also contains numerous sections in which minor revisions to already existing reporting, recordkeeping and other administrative requirements could result in some additional costs being imposed on FSD sponsors (owners) and the FAA. Below are identified the principal sections for which these added costs, although negligible for the most part, are noted.

Section 60. 5 Quality Assurance Program

This section would call for a sponsor to develop, review, and have approved by the NSPM a quality assurance (QA) program for its FSD(s). The purpose of this program is to require the sponsor to systematically plan for implementing the requirements of part 60 and the QPS. The cost of this program would be approximately $1.9 million[9] ($1.6

[9] In calculating the costs, the following labor wage rates, which include fringe benefits estimated at 32.45%, were used for the industry: (1) Large sponsor's pilot instructor at approximately $86/hour; (2) Small sponsor's pilot instructor at approximately $29/hour; (3) Large sponsor's management representative at approximately $86/hour; (4) Small sponsor's management representative at approximately $35/hour; (5) FSD technician at approximately $29/hour; and (6) Clerk at approximately $15/hour. These private sector wage rates are assumptions based on expert opinion provided by the FAA's National Simulator Program

million, discounted) over a 10-year period. The majority of the cost impact, estimated at approximately $1.3 million ($1.1 million, discounted) over a 10-year period, would be imposed on the industry. The FAA 10-year cost is estimated at approximately $571,000 ($413,000, discounted).

The quality assurance program would impose two types of cost on the industry and the FAA: a set-up cost (fixed cost) and an annual cost. On the industry side, for each sponsor: (1) an FSD technician and a pilot instructor would spend approximately 320 hours and 64 hours, respectively, to develop a QA program; (2) an FSD technician and a pilot instructor would each spend approximately 16 hours to work on the technical coordination of metrics; and (3) a clerk would spend approximately 64 hours for a small sponsor or approximately 128 hours for a large sponsor to do the initial paperwork. To maintain the program on an annual basis, a management representative and a clerk would each spend approximately 12 hours to do the paperwork.

On the FAA side, to approve the program, an FSD inspector would spend approximately 16 hours to review and approve a quality assurance program from each sponsor. In addition, a clerk would spend approximately 2 hours to do the initial paperwork. To

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Manager. As for the FAA, the following labor wage rates, which also include fringe benefits estimated at 32.45%, were used: (1) FSD inspector at approximately $47/hour (GS-14, step 5) and (2) Clerk at approximately $14/hour (GS-5, step 1). The fringe benefits factor can be found in Table 4-5, page 4-22, Economic Analysis of Investment and Regulatory Decision--A Guide, FAA-APO-98-4, June 1998 (Analysis).

Any sponsor with more than 15 simulators in its inventory was considered a large sponsor. Any sponsor with 15 or fewer simulators in its inventory was considered a small sponsor.

maintain the program on an annual basis, a clerk would spend approximately 2 hours and an FSD inspector would spend approximately 16 hours to do the paperwork.

The total annualized cost[10] associated with the development, review, and approval by the NSPM for an FSD QA program is, as noted above, relatively minor, approximately $221,000 for all FSDs over the next 10 years. Additionally, experience in other industries has shown that the establishment of a recognized QA program could lead to cost savings. In a 1998 GAO report, it was found that on average, industries maintaining a recognized QA program as compared to industries without a QA program showed an increase of 18 percent in problems solved by employees and an increase of 14 percent in improved service and/or product reliability. The report also showed reductions in errors and customer complaints of 10 percent and 13 percent respectively. The result of these cost-savings was an increase in market share of 13 percent.[11]

Section 60.17 – Previously Qualified FSDs

Another key section, §60.17 "Previously Qualified FSDs", would permit any FSD qualified before the effective date of the proposed rule to retain its qualification as long

[10] For this analysis, the annualized cost represents a uniform stream of payments at 7 percent over a 10-year period. To calculate the annualized cost, the present value of the cost of this proposed rule over 10 years was multiplied by the capital recovery factor (0.14238) for 10 years at 7 percent.

[11] Another report prepared by SGS International Certification Services, Inc. and Lloyds Register on a survey conducted of an industry's companies with and without an established and recognized QA program supports the cost-savings benefit derived from a the existence of a QA program. The findings of this survey note that the profit margins of companies with a QA program were estimated to be 2 to 3 times higher than those companies without a QA program, and the sales growth of companies with a QA program averaged 20 percent as compared with an industry growth of about 7 percent on average. It should be noted that this is a strictly qualitative discussion on the potential cost savings as a result of the QA program requirement.

as it continues to meet the standards under which it was originally evaluated and as long as the sponsor continues to conduct the maintenance and inspection activities required by the proposed rule. This provision grandfathers in approximately 455 flight simulators[12] currently qualified. The sponsors of these FSDs would not incur any additional cost to requalify them when this new rule goes into effect, although they would be required to obtain an FAA-issued Statement of Qualification.

Section 60.31 Recordkeeping and Reporting

The recordkeeping and reporting requirement would impose minimal cost because the records that sponsors would be required to maintain are the same records they have been maintaining under simulator advisory circulars. Under §60.31 "Recordkeeping and Reporting," sponsors would have to maintain the following records:

- Master Qualification Test Guide;
- Programming used during initial qualification or for any subsequent upgrade qualification;
- Results of evaluations for the initial and any upgrade qualification;
- Results of quarterly objective tests;
- Results of three recurrent evaluations or the recurrent evaluations from the previous two years;

[12] Levels B, C, and D FSDs.

- Discrepancy log that includes the following: 1) a list of components or equipment missing, malfunctioning, or inoperative; 2) the action taken to correct the discrepancy; and 3) the date the corrective action was taken;
- Comments obtained in accordance with the requirements of the QA program;
- All modifications to FSD hardware or software configuration; and
- A current record of each certificate holder using the FSD.

The proposed rule would require the sponsor to maintain "comments obtained in accordance with the requirements of the Quality Assurance Program." This additional cost has been accounted for under the annual report that must be submitted by the Management Representative. The cost analysis for section 60.5 "Quality Assurance Program," includes this new cost to the industry. This section would also require the sponsor to keep a record of each certificate holder using the FSD and to provide the NSPM with a copy of this record semiannually. This action would impose a negligible cost on the sponsor.

Furthermore, the proposed rule would require that to maintain the qualification level for each FSD the sponsor must maintain a discrepancy log. The discrepancy log would be maintained in or immediately adjacent to the FSD to advise users of the FSD of the current maintenance status and the status of each discrepancy recorded for at least the preceding 30 days. This proposal is consistent with current industry practice and, therefore, would impose no additional cost on the sponsor. The FSD sponsor would also be required to maintain the log for a minimum of 2 years. The sponsor would not have to

keep these records immediately adjacent to the FSD; however, the records must be available for NSPM review. The FAA believes that the majority of sponsors currently keep their records for approximately a year. At most, there would be negligible cost associated with this proposed requirement. The FAA solicits comments from affected entities with respect to this finding and determination and requests that all comments be accompanied by clear documentation.

C. FSD Qualification Performance Standards

The FSD QPSs would establish the standards for airplane and helicopter simulator and FTD evaluation and qualification at one of the established levels. The QPS documents describe the procedures and criteria that would be used by the NSPM to evaluate and qualify FSDs. These documents would be published in compliance with the statutory authorization granted to the Administrator to prescribe standards applicable to the accomplishment of the safety mission of the FAA. Implementing the QPS documents would not incur additional cost on the FAA nor the FSD sponsors because the QPS is based on current agency practice that would be incorporated by reference into the FAA regulations.

V. BENEFITS

The implementation of a QA program would provide benefits to both the sponsors of FSDs and to the FAA. The main benefit of this proposed rule would be its contribution to a potential reduction in aviation accidents by ensuring that flightcrew members using FSDs receive the best possible training in a device that closely matches the performance

and handling characteristics of the aircraft being simulated. By adding a systems approach to the traditional evaluation of each FSD, elements of the sponsor's approach to day-to-day presentation of FSDs used for flightcrew member training, testing, and checking would be continually on the table for review and inspection.

Regular review and inspection of these elements (management responsibility, document control, resource allocation, process control, inspection and testing, control of measuring and monitoring devices, internal audits, and corrective actions), together with the technical evaluation of FSDs, would advance aviation safety. Such review and inspection would identify, for both the FSD user and the FAA, potential flightcrew member training problems that might develop due to the way in which the FSD is maintained and operated. For example, if FSD problems are detected and fixed promptly and accurately (before they impact the operation of the FSD), flightcrew members could have uninterrupted training in an FSD. The uninterrupted training would better allow the flightcrew members to retain knowledge and skills learned and practiced than if the training was interrupted because of a problem with the FSD.

In addition to the safety benefits of a QA program, there would be cost savings to an FSD sponsor. The long range cost savings to the sponsor can be identified by looking at a 1998 United States Government Accounting Office (GAO) report on companies employing quality assurance programs using the International Organization for

Standardization's ISO 9000[12], which is similar to the one proposed for FSD sponsors in the United States. In this report, the GAO found that production, delivery, and other problems solved by employees in these companies were "up" by a minimum of 18 percent. This report also found that product reliability was improved by 14 percent; that errors committed, causing unwanted delays and re-accomplishment costs, were down by 10 percent; and that customer complaints were reduced by more than 13 percent.

Likewise, a survey of over 2000 companies participating in similar QA programs in the United Kingdom (UK) for a longer period of time showed that employee and corporate efficiency increased by an average of 68 percent.[13] This survey also showed that "on time" delivery increased by 62 percent and that individual and corporate errors were reduced by 38 percent. These comparative numbers indicate that the longer a company is involved in a QA process, the better corporate results that company will achieve. A similar UK study, conducted by the same groups, looked at single industry performance, comparing those companies with a QA program to those without such a program. This comparison found that in times of economic down-turn, for each company with a viable QA program that went out of business, there were seven "non-QA supported" companies that closed their doors.

[12] "The ISO 9000 family of standards represents an international consensus on good management practices with the aim of ensuring that the organization can time and time again deliver the product or services that meet the client's quality requirements." (International Organization for Standardization – ISO). For additional information, visit ISO's website at http://www.iso.ch/iso.

[13] The survey was conducted by SGS International Certification Services, Inc. and Lloyds Register (UK certified evaluators of economic and operational performance).

The FAA believes that, with a QA program, it is likely FSD sponsors would initially see approximately 10 percent less errors, and up to 38 percent less errors as they gain experience in the administration of such a program. In the FSD industry, single errors can be extremely costly. For example, in one case an FSD sponsor needed to change a multi-million dollar visual system because one employee committed an error that resulted in the destruction of the visual system when power was applied. This error required the sponsor to replace this multi-million dollar piece of equipment.

In another example of a costly error, a sponsor had to replace a $110,000 visual system projector because of an error by an employee. To make matters worse, the error was repeated when the replacement for the destroyed projector was installed and power was re-applied; the result was the destruction of the second $110,000 projector.

A third example of a costly error was when a sponsor "dropped" one simulator on another simulator while moving it to allow for maintenance on the second simulator. In this case, the sponsor did not make adequate provision for the type of maintenance necessary and did not prepare and implement a standardized process to address development of a special procedure for this type of unusual, "ad-hoc" circumstance. The result was a cost of over $100,000 to repair the two simulators and interrupted training for both airplane types (with the commensurate interruption to flight operations). In addition to these examples, there are many more examples of less costly, yet significant, errors committed in the FSD industry each year. If only 10 percent of these errors were eliminated, the cost savings to the FSD industry would be considerable.

Quality Assurance audits conducted by the FAA's National Simulator Program (NSP) staff (i.e., audits of the FSD sponsor's program or an audit of the sponsor-conducted internal audits of their own program) would provide the FAA a more broad and a more accurate evaluation of the program the sponsor uses to maintain its fleet of FSDs. With the implementation of a QA program, as described herein, and a periodic, though less frequent, technical evaluation of each individual FSD, the NSP would have the capability to assess each sponsor's capability and their actual performance in maintaining their FSDs. This approach would allow the US-wide fleet of FSDs to grow without requiring the commensurate growth of the NSP staff to inspect each FSD as frequently as those FSDs are inspected currently. Functionally, this would provide the FAA with an ability to conserve fiscal and personnel resources so that both may be committed to the most pressing safety issues when and where deemed necessary. The present surveillance and inspection process, without a QA program in place, does not provide the FAA with enough (or any) continuing quality assurance to allow for less frequent inspections of FSDs that are being operated and maintained well. Similarly, the present surveillance and inspection process does not allow for the targeted use of inspection resources on FSDs that are not being operated and maintained as well as other FSDs.

In summary, there are five types of safety and economic benefits of incorporating a QA program for each FSD sponsor. First, aviation safety would be better maintained because a QA program would identify, for the user and the FAA, flightcrew training problems that could or would arise due to problems with the maintenance and operation of the FSD. Second, when training is interrupted due to maintenance problems, those problems

would be quickly and accurately corrected to allow the training process to resume. Third, sponsors would see cost savings due to a reduction of mistakes (such as those described above). Fourth, sponsors could see cost savings by having to support less frequent evaluations by NSP staff. And fifth, the FAA (and the tax payers) would realize cost savings by requiring less frequent on-site FSD evaluations; by not requiring commensurate growth of FAA personnel committed to individual evaluations of an ever-expanding fleet of FSDs; and by providing the ability to focus a more constant personnel resource on safety areas more deserving of individualized scrutiny.

Lastly, the proposed new part 60 would consolidate and update the existing FSD qualification requirements. Currently, regulations regarding advanced simulators are located in appendix H. Those who operate airplanes under other parts of the regulations and wish to use appendix H authorizations have to obtain exemptions from the certificate holding requirements of part 121 and have the appropriate simulator authorizations incorporated into their exemptions or would have to obtain a part 142 certificate. The proposed new part 60 would establish FSD requirements that could be used by any certificate holder as defined under part 60 who conducts training and evaluation, or intends to meet recent flight experience requirements. Its application, therefore, would be expanded beyond just those who operate under part 121.

VI. INITIAL REGULATORY FLEXIBILITY DETERMINATION

The Regulatory Flexibility Act of 1980 (RFA) establishes "as a principle of regulatory issuance that agencies shall endeavor, consistent with the objective of the rule and of

applicable statutes, to fit regulatory and informational requirements to the scale of the business, organizations, and governmental jurisdictions subject to regulation." To achieve that principle, the Act requires agencies to solicit and consider flexible regulatory proposals and to explain the rationale for their actions. The Act covers a wide-range of small entities, including small businesses, not-for-profit organizations and small governmental jurisdictions.

Agencies must perform a review to determine whether a proposed or final rule will have a significant economic impact on a substantial number of small entities. If the determination is that it will, the agency must prepare a regulatory flexibility analysis as described in the Act.

However, if an agency determines that a proposed or final rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the 1980 act provides that the head of the agency may so certify and a regulatory flexibility analysis is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

The adoption of this proposal would impose an estimated 10-year cost of approximately $114,000 ($98,000, discounted) on approximately six small entities (see Appendix B for details). Each of these sponsors would incur a one-time cost of approximately $13,000 to develop a QA program and an annual cost of approximately $600 to maintain the program. To determine the impact of the cost on these small entities, the FAA examined

the relation of a small entity's annualized cost[14] to its potential annual revenue. The FAA estimated that each flight simulation device, on average, is in use for training about 4,800 hours[15] a year. Also, according to industry sources, most sponsors charge a minimum of $250 an hour for training in a Level B simulator[16]. As a result, a sponsor's potential annual revenue from one Level B simulator is estimated at $1.2 million. Therefore, the annualized cost of this proposed rule for each small entity, approximately $2,300, would be considerably less than one percent of the estimated potential annual revenue ($1.2 million) for a small entity with only one Level B simulator. The FAA contends that these small entities would not be significantly impacted by the cost of this proposed rule.

Accordingly, pursuant to the Regulatory Flexibility Act, 5 U.S.C. 605(b), the Federal Aviation Administration certifies that this rule would not have a significant economic impact on a substantial number of small entities. The FAA solicits comments from affected entities with respect to this finding and determination and requests that all comments be accompanied by clear documentation.

VII. INTERNATIONAL TRADE IMPACT ASSESSMENT

The Trade Agreement Act of 1979 prohibits Federal agencies from engaging in any standards or related activities that create unnecessary obstacles to the foreign commerce of the United States. Legitimate domestic objectives, such as safety, are not considered

[14] As examined in further detail in footnote 10, for this analysis, the annualized cost represents a uniform stream of payments at 7 percent over a 10-year period.

[15] The FAA estimated that, on average, an FSD is in use 16 hours a day, 6 days a week, 50 weeks each year.

[16] This is the lowest FSD level under the proposed rule.

unnecessary obstacles. The statute also requires consideration of international standards and where appropriate, that they be the basis for U.S. standards.

In accordance with the above statute, the FAA has assessed the potential effect of this proposed rule and has determined that it would have only a domestic impact and therefore create no obstacles to the foreign commerce of the United States.

VIII. UNFUNDED MANDATES ASSESSMENT

The Unfunded Mandates Reform Act of 1995 (the Act), enacted as Pub. L. 104-4 on March 22, 1995, is intended, among other things, to curb the practice of imposing unfunded Federal mandates on State, local, and tribal governments.

Title II of the Act requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in a $100 million or more expenditure (adjusted annually for inflation) in any one year by State, local, and tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a "significant regulatory action."

This proposed rule does not contain such a mandate. Therefore, the requirements of Title II of the Unfunded Mandates Reform Act of 1995 do not apply.

APPENDIX A

TOTAL COST OF QUALITY ASSURANCE PROGRAM

Total Costs				
Years	Undiscounted Costs			Discounted Costs
	One-time Cost	Annual Costs	Total Costs	
2002	$941,837	$95,973	$1,037,810	$969,916
2003	$0	$95,973	$95,973	$83,827
2004	$0	$95,973	$95,973	$78,343
2005	$0	$95,973	$95,973	$73,217
2006	$0	$95,973	$95,973	$68,427
2007	$0	$95,973	$95,973	$63,951
2008	$0	$95,973	$95,973	$59,767
2009	$0	$95,973	$95,973	$55,857
2010	$0	$95,973	$95,973	$52,203
2011	$0	$95,973	$95,973	$48,783
Total Cost of Rule	$941,837	$959,730	$1,901,567	$1,554,296

Summary of Industry Costs				
Years	Undiscounted Costs			Discounted Costs
	One-time Cost	Annual Costs	Total Costs	
2002	$889,932	$44,068	$934,000	$872,897
2003	$0	$44,068	$44,068	$38,491
2004	$0	$44,068	$44,068	$35,973
2005	$0	$44,068	$44,068	$33,619
2006	$0	$44,068	$44,068	$31,420
2007	$0	$44,068	$44,068	$29,364
2008	$0	$44,068	$44,068	$27,443
2009	$0	$44,068	$44,068	$25,643
2010	$0	$44,068	$44,068	$23,970
2011	$0	$44,068	$44,068	$22,402
Total Industry Cost	$889,932	$440,680	$1,330,612	$1,141,227

Summary of FAA Costs				
Years	Undiscounted Costs			Discounted Costs
	One-time Cost	Annual Costs	Total Costs	
2002	$51,905	$51,905	$103,810	$97,019
2003	$0	$51,905	$51,905	$45,336
2004	$0	$51,905	$51,905	$42,370
2005	$0	$51,905	$51,905	$39,598
2006	$0	$51,905	$51,905	$37,008
2007	$0	$51,905	$51,905	$34,586
2008	$0	$51,905	$51,905	$32,324
2009	$0	$51,905	$51,905	$30,209
2010	$0	$51,905	$51,905	$28,233
2011	$0	$51,905	$51,905	$26,386
Total FAA Cost	$51,905	$519,050	$570,955	$413,069

APPENDIX B

TOTAL COST OF RULE FOR SIX SMALL ENTITIES

Total Costs					
Years	Undiscounted Costs			Discounted	Costs
	One-Time Cost	Annual Costs	Total Costs		
2002	$77,366	$3,617	$80,983		$75,685
2003	$0	$3,617	$3,617		$3,159
2004	$0	$3,617	$3,617		$2,953
2005	$0	$3,617	$3,617		$2,759
2006	$0	$3,617	$3,617		$2,579
2007	$0	$3,617	$3,617		$2,410
2008	$0	$3,617	$3,617		$2,252
2009	$0	$3,617	$3,617		$2,105
2010	$0	$3,617	$3,617		$1,967
2011	$0	$3,617	$3,617		$1,839
Total Costs	$77,366	$36,170	$113,536		$97,708