208912

E&S EVANS & SUTHERLAND

DEPT. OF TRANSPORTATION
DOCKETS

02 DEC 23 AM 11:36

Prepared by: David Morgan, Evans & Sutherland
Dated 18th December 2002

Reference document:

Federal Register
Part II
Department of Transportation
Federal Aviation Administration
14 CFR Parts 1, 60, 61, 63, 141 and 142.
[Docket No. FAA-2002-12461; Notice No.02-11] RIN 2120-AH07 - 16
Flight Simulation Device Initial and Continuing Qualification and Use; Proposed Rule
AGENCY: Federal Aviation Administration (FAA), DOT
ACTION: Notice of proposed rulemaking (NPRM)

Evans & Sutherland Computer Limited would like to offer the following observations and questions regarding the above referenced document, for your consideration:

Comment 1

General Discussion of Proposed Part 60 Section 60.25 (Page 60294) - Operation With Missing, Malfunctioning or Inoperative Components states "***The FAA is proposing this section because it believes that users must be alerted when an FSD has missing, malfunctioning or inoperative component, thereby limiting it's use for a certain task, while also providing the sponsor a reasonable time period to make repairs.***" It goes on to say that "***...Proposed paragraph (b) would require that within 7 calendar days, each missing, malfunctioning or inoperative component must be repaired or replaced, unless the NSPM requires a shorter time or authorizes a longer time..... The requirement to repair each missing, malfunctioning or inoperative component applies not only to components that are necessary for flightcrew training, evaluation or flight experience, but also to all other components of the FSD***"

Evans & Sutherland comment:

a) Is the intention of this statement to include visual scene content as well? For example, modifications to taxiways, runways and terminal buildings.
b) Seven (7) calendar days to correct the problems, install and test them on the Simulator may be unrealistic for visual scenes, particularly for legacy visual systems.

2 Horsham Gates ▪ North Street ▪ Horsham ▪ West Sussex RH13 5PJ ▪ England
tel 01403-221-500 ▪ fax 01403-221-501 ▪ web es.com
Evans & Sutherland Computer Ltd ▪ Reg. Office: 2 Horsham Gates ▪ North Street ▪ Horsham ▪ West Sussex RH13 5PJ ▪ Reg. No. 1750202 England

Comment 2

General Discussion of Proposed Part 60 Section 60.35 (Page 60296) – Specific Simulator Compliance Requirements states that "***Proposed paragraph (a) sets forth simulator requirements that would take effect 18 months after the effective date of the final rule of Part 60. These proposed requirements state that the flight simulator being evaluated for initial or upgrade qualification must conform to the aircraft simulated and must simulate the operation of all equipment or devices intended to simulate aircraft appliances installed and operating on the aircraft"***

Evans & Sutherland comment:

a) This implies that any future additions to the cockpit such as the Moving Map Display currently on test at Louisville airport in conjunction with UPS, would have to be simulated and correlate with the visual scene.
b) For weather radar etc, is this requirement now implying that all 3D clouds, storms etc on the visual scene must correlate with a dynamic radar sweep?
c) Is this also requiring that all aircraft fitted with EGPWS or TWAS etc must have visual terrain and obstacle correlation over the entire visual scene?

Comment 3

Appendix A to Part 60 Section 18. Operation With Missing, Malfunctioning, or Inoperative Components (Page 60318) states, ***"Each missing, malfunctioning or inoperative component must be repaired or replaced within 30 calendar days unless otherwise authorized by the NSPM"***

Evans & Sutherland comment:

a) This contradicts General Discussion of Proposed Part 60 Section 60.25 (page 60294), which states 7 days.

Comment 4

Appendix A to Part 60, attachment 1 General Simulator Requirements 2a (Page 60319) states that ***" If real-world, operational airports are simulated, the visual representation and scene content is compared to that of the actual airport. This comparison requires accurate simulation of that airport to the extent set out in this document and as required by the qualification level sought. It also requires the visual scene to be modified; e.g. when additional runways or taxiways are added; when existing runway(s) are lengthened or permanently closed; when magnetic bearings to or from a runway are changed; when significant and recognizable changes are made to the terminal, other airport buildings, or surrounding terrain etc."***

2 Horsham Gates ▪ North Street ▪ Horsham ▪ West Sussex RH13 5PJ ▪ England
tel 01403-221-500 ▪ **fax** 01403-221-501 ▪ **web** es.com

Evans & Sutherland Computer Ltd. ▪ Reg. Office: 2 Horsham Gates ▪ North Street ▪ Horsham ▪ West Sussex RH13 5PJ ▪ Reg. No. 1750202 England

Evans & Sutherland comment:

a) What is the proposed timescale for modifying the visual scenes and having the corrected version on the simulator ready for training?
b) For various operators, what will be the baseline reference documentation for these checks? Evans & Sutherland recommends referencing the currently available AIP or Jeppesen charts for the airport in question.

Comment 5

Appendix A to Part 60, Table of Minimum Simulator Requirements, section 3i(1) Latency (Page 60322) states ***"Visual change may start before motion response, but motion acceleration must be initiated before completion of the visual scan of the first video field containing different information"***

Evans & Sutherland comment:

a) This, though slightly differently stated, will line up with the latest JAA statement which requires that *Motion onset shall occur before the end of the scan of the first video field containing different visual information.* And *Visual response time. The interval from an abrupt control input to the start of the visual display scan of the first video field containing the resulting different information.* Note this second statement refers to the START of the visual field. If the FAA wants to be the same as JAA they will also need to state this clearly.

Comment 6

Appendix A to Part 60, Table of Minimum Simulator Requirements, section 7c. Visual system (Page 60325) states, ***"wide angle systems providing cross cockpit viewing must provide a minimum field of view of 150 degrees horizontally"***

Evans & Sutherland comment:

a) The latest JAA STD standard proposes a minimum of 180 degrees horizontal field of view.

2 Horsham Gates ▪ North Street ▪ Horsham ▪ West Sussex RH13 5PJ ▪ England
tel 01403-221-500 ▪ **fax** 01403-221-501 ▪ **web** es.com

Evans & Sutherland Computer Ltd ▪ Reg. Office: 2 Horsham Gates ▪ North Street ▪ Horsham ▪ West Sussex RH13 5PJ ▪ Reg. No. 1750702 England

Comment 7

Appendix A to Part 60, Table of Minimum Simulator Requirements, section 7i. Visual Ground Segment (Page 60326) defines the data requirements.

Evans & Sutherland comment:

a) Although the data requirements are specified in the above referenced section there is no specific test as per AC120-40C Appendix 2 test 4a, which defines the tolerance value and application.

Comment 8

Appendix C (Helicopter simulators) to Part 60, Table of Minimum Simulator Requirements, section 3i Latency (Page 60442) states that ***"the response time for Latency and Transport delay must be within 100 milliseconds for a level C & D device"***

Evans & Sutherland comment:

a) 100m/s is achievable only if the host can compute the change in about 1 1/3 fields at 60hz (19m/s) or less. The Image Generator needs approximately 81m/s (for dusk/night calligraphic systems today). It would be much more achievable if the FAA used the JAA STD rule which states 'to the beginning of the field in which the data changes.' This would take the visual latency down to 56m/s in dusk/night. The other alternative is to run at 50 or 60hz dusk/night with a consequent capacity reduction in scene content. This topic was subjected to significant debate during the ICAO simulator requirements discussions in Atlanta in May 2000 (adopted by JAA), whereby the general industry view was that the loss of capacity to achieve 100ms tended to be outweighed.

Report prepared by:

David J Morgan
Regional Program Manager – North America
Commercial Simulation

Tel: (407) 482 4628
Fax: (407) 482 4611
Cell: (801) 556 7728
Email: damorgan@es.com

Prepared by: David Morgan, Evans & Sutherland
Dated 18th December 2002

Reference document:

Federal Register
Part II
Department of Transportation
Federal Aviation Administration
14 CFR Parts 1, 60, 61, 63, 141 and 142.
[Docket No. FAA-2002-12461; Notice No.02-11] RIN 2120-AH07
Flight Simulation Device Initial and Continuing Qualification and Use; Proposed Rule
AGENCY: Federal Aviation Administration (FAA), DOT
ACTION: Notice of proposed rulemaking (NPRM)

Evans & Sutherland Computer Limited would like to offer the following observations and questions regarding the above referenced document, for your consideration:

Comment 1

General Discussion of Proposed Part 60 Section 60.25 (Page 60294) - Operation With Missing, Malfunctioning or Inoperative Components states "***The FAA is proposing this section because it believes that users must be alerted when an FSD has missing, malfunctioning or inoperative component, thereby limiting it's use for a certain task, while also providing the sponsor a reasonable time period to make repairs.***" It goes on to say that "***...Proposed paragraph (b) would require that within 7 calendar days, each missing, malfunctioning or inoperative component must be repaired or replaced, unless the NSPM requires a shorter time or authorizes a longer time..... The requirement to repair each missing, malfunctioning or inoperative component applies not only to components that are necessary for flightcrew training, evaluation or flight experience, but also to all other components of the FSD***"

Evans & Sutherland comment:

a) Is the intention of this statement to include visual scene content as well? For example, modifications to taxiways, runways and terminal buildings.
b) Seven (7) calendar days to correct the problems, install and test them on the Simulator may be unrealistic for visual scenes, particularly for legacy visual systems.

2 Horsham Gates ▪ North Street ▪ Horsham ▪ West Sussex RH13 5PJ ▪ England
tel 01403-221-500 ▪ **fax** 01403-221-501 ▪ **web** es.com
Evans & Sutherland Computer Ltd ▪ Reg. Office: 2 Horsham Gates ▪ North Street ▪ Horsham ▪ West Sussex RH13 5PJ ▪ Reg. No. 1750292 England

Comment 2

General Discussion of Proposed Part 60 Section 60.35 (Page 60296) – Specific Simulator Compliance Requirements states that "***Proposed paragraph (a) sets forth simulator requirements that would take effect 18 months after the effective date of the final rule of Part 60. These proposed requirements state that the flight simulator being evaluated for initial or upgrade qualification must conform to the aircraft simulated and must simulate the operation of all equipment or devices intended to simulate aircraft appliances installed and operating on the aircraft***"

Evans & Sutherland comment:

a) This implies that any future additions to the cockpit such as the Moving Map Display currently on test at Louisville airport in conjunction with UPS, would have to be simulated and correlate with the visual scene.
b) For weather radar etc, is this requirement now implying that all 3D clouds, storms etc on the visual scene must correlate with a dynamic radar sweep?
c) Is this also requiring that all aircraft fitted with EGPWS or TWAS etc must have visual terrain and obstacle correlation over the entire visual scene?

Comment 3

Appendix A to Part 60 Section 18. Operation With Missing, Malfunctioning, or Inoperative Components (Page 60318) states, ***"Each missing, malfunctioning or inoperative component must be repaired or replaced within 30 calendar days unless otherwise authorized by the NSPM"***

Evans & Sutherland comment:

a) This contradicts General Discussion of Proposed Part 60 Section 60.25 (page 60294), which states 7 days.

Comment 4

Appendix A to Part 60, attachment 1 General Simulator Requirements 2a (Page 60319) states that " ***If real-world, operational airports are simulated, the visual representation and scene content is compared to that of the actual airport. This comparison requires accurate simulation of that airport to the extent set out in this document and as required by the qualification level sought. It also requires the visual scene to be modified; e.g. when additional runways or taxiways are added; when existing runway(s) are lengthened or permanently closed; when magnetic bearings to or from a runway are changed; when significant and recognizable changes are made to the terminal, other airport buildings, or surrounding terrain etc."***

2 Horsham Gates ▪ North Street ▪ Horsham ▪ West Sussex RH13 5PJ ▪ England
tel 01403-221-500 ▪ **fax** 01403-221-501 ▪ **web** es.com

Evans & Sutherland Computer Ltd ▪ Reg. Office: 2 Horsham Gates ▪ North Street ▪ Horsham ▪ West Sussex RH13 5PJ ▪ Reg. No. 1750202 England

Evans & Sutherland comment:

a) What is the proposed timescale for modifying the visual scenes and having the corrected version on the simulator ready for training?
b) For various operators, what will be the baseline reference documentation for these checks? Evans & Sutherland recommends referencing the currently available AIP or Jeppesen charts for the airport in question.

Comment 5

Appendix A to Part 60, Table of Minimum Simulator Requirements, section 3i(1) Latency (Page 60322) states ***"Visual change may start before motion response, but motion acceleration must be initiated before completion of the visual scan of the first video field containing different information"***

Evans & Sutherland comment:

a) This, though slightly differently stated, will line up with the latest JAA statement which requires that *Motion onset shall occur before the end of the scan of the first video field containing different visual information.* And *Visual response time. The interval from an abrupt control input to the start of the visual display scan of the first video field containing the resulting different information.* Note this second statement refers to the START of the visual field. If the FAA wants to be the same as JAA they will also need to state this clearly.

Comment 6

Appendix A to Part 60, Table of Minimum Simulator Requirements, section 7c. Visual system (Page 60325) states, ***"wide angle systems providing cross cockpit viewing must provide a minimum field of view of 150 degrees horizontally"***

Evans & Sutherland comment:

a) The latest JAA STD standard proposes a minimum of 180 degrees horizontal field of view.

2 Horsham Gates ▪ North Street ▪ Horsham ▪ West Sussex RH13 5PJ ▪ England
tel 01403-221-500 ▪ **fax** 01403-221-501 ▪ **web** es.com

Evans & Sutherland Computer Ltd ▪ Reg. Office: 2 Horsham Gates ▪ North Street ▪ Horsham ▪ West Sussex RH13 5PJ ▪ Reg. No. 1746202 England

Comment 7

Appendix A to Part 60, Table of Minimum Simulator Requirements, section 7i. Visual Ground Segment (Page 60326) defines the data requirements.

Evans & Sutherland comment:

a) Although the data requirements are specified in the above referenced section there is no specific test as per AC120-40C Appendix 2 test 4a, which defines the tolerance value and application.

Comment 8

Appendix C (Helicopter simulators) to Part 60, Table of Minimum Simulator Requirements, section 3i Latency (Page 60442) states that ***"the response time for Latency and Transport delay must be within 100 milliseconds for a level C & D device"***

Evans & Sutherland comment:

a) 100m/s is achievable only if the host can compute the change in about 1 1/3 fields at 60hz (19m/s) or less. The Image Generator needs approximately 81m/s (for dusk/night calligraphic systems today). It would be much more achievable if the FAA used the JAA STD rule which states 'to the beginning of the field in which the data changes.' This would take the visual latency down to 56m/s in dusk/night. The other alternative is to run at 50 or 60hz dusk/night with a consequent capacity reduction in scene content. This topic was subjected to significant debate during the ICAO simulator requirements discussions in Atlanta in May 2000 (adopted by JAA), whereby the general industry view was that the loss of capacity to achieve 100ms tended to be outweighed.

Report prepared by:

David J Morgan
Regional Program Manager – North America
Commercial Simulation

Tel: (407) 482 4628
Fax: (407) 482 4611
Cell: (801) 556 7728
Email: damorgan@es.com