



# Federal Aviation Administration

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## Memorandum

Date: November 20, 2015

To: Manager, Boeing Aviation Safety Oversight Office, ANM-100B

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: George Panger ANM-150S

Subject: INFORMATION: Equivalent Level of Safety Finding for Escape Slide Inflation Times on Boeing Model 787-8/-9/-10 (Project Nos. TC6918SE-T, PS06-0496, PS06-0497, PS13-0546 and PS14-1031)

ELOS Memo #: TC6918SE-T-CS-1

Regulatory Ref: §§ 25.809(b)(2), 25.810(a)(1), 21.21(b)(1)

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The purpose of this memorandum is to inform the certificate management aircraft certification office of an evaluation made by the Transport Airplane Directorate (TAD) on the establishment of an equivalent level of safety (ELOS) finding for the Boeing Model 787-8 airplanes.

This memo was subsequently revised to extend this ELOS to the Boeing Model 787-9 and 787-10 airplanes.

### Background

The requirement that emergency exit assist means (i.e., slide/rafts) must be “automatically erected within 10 seconds after deployment is begun” was introduced at Amendment 25-15 in Title 14, Code of Federal Regulations (14 CFR) 25.809(f)(1)(ii). This requirement was later moved to § 25.810(a)(1)(ii) at Amendment 25-72, and at Amendment 25-88, the requirement was changed from 10 seconds to six seconds for all assist means except those installed at Type C exits. Recently, § 25.810 was revised at Amendment 25-114, but the requirement for assist means erection time remained unchanged.

The type certification of the baseline 767-200/-300 and 777-200/-300 models was accomplished prior to Amendment 25-88, so assist means were required to be automatically erected within 10 seconds after initiation of deployment. The 767-400ER and 777-200LR/-300ER derivative models, which used the same Type A exits and slide deployment mechanisms that were installed on the respective baseline models, were certificated after Amendment 25-88. Based on the historical performance of the Type A exit slide/rafts on the baseline models, Boeing believed that

the Type A slide/rafts on the derivative models may not meet the more stringent six second time for deployment and inflation adopted in § 25.810(a)(1)(ii), Amendment 25-88. As a result, Boeing requested that equivalent level of safety findings be granted for the 767-400ER and 777-200LR/-300ER models so that the same Type A slide/rafts could be used on the derivative models. In both cases, the FAA granted equivalent level of safety findings for the requirements of § 25.810(a)(1)(ii), Amendment 25-88, which essentially allowed the escape slide/raft deployment time to be greater than six seconds. These equivalent level of safety findings were documented in FAA Issue Paper C-2, dated October 15, 1998 for the 767-400ER, and FAA Issue Paper CI-19, dated January 5, 2001 for the 777-200LR/-300ER.

The Boeing Model 787 series aircraft escape slide/raft deployment and inflation systems will be similar to those used on the model 777 series, and therefore, Boeing has requested that the FAA grant an equivalent level of safety finding similar to those granted for the 767-400ER and the 777-200LR/-300ER which allows the Type A escape slide/raft deployment time to be greater than six seconds.

### **Applicable regulation(s)**

§§ 21.21(b)(1), 25.809(b)(2), 25.810(a)(1)

### **Regulation(s) requiring an ELOS**

§ 25.810(a)(1)(ii)

### **Description of compensating design features or alternative standards which allow the granting of the ELOS (including design changes, limitations or equipment need for equivalency)**

The FAA has determined that the Model 787 series Type A emergency exit escape slide/raft deployment time can be greater than six seconds provided that the slide/rafts become usable within 10 seconds of activating the exit door opening means. While this perspective is reflected in § 25.810(a)(1)(ii) in that the assist means for Type C exits are required to be erected within 10 seconds of actuating the exit opening means, this ELOS is not intended to increase the level of certification of the Type A doors on the Model 787 series to the more rigorous requirements of Type C doors.

As such, the FAA can grant an equivalent level of safety finding for § 25.810(a)(1)(ii), Amendment 25-114, provided Boeing offers as a compensating feature that the Type A exit doors and escape slide/rafts will be ready for use within 10 seconds of actuating the exit opening means as demonstrated during certification repeatability testing.

### **Explanation of how design features or alternative standards provide an equivalent level of safety to the level of safety intended by the regulation**

Granting an equivalent level of safety finding based on a 10 second overall system performance standard is justifiable for two reasons. Meeting the 10 second overall performance standard

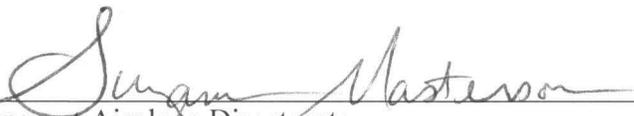
would align the Model 787 series Type A exit and assist means requirements with the more rigorous requirements applicable to Type C exit assist means. This method of compliance can also be thought of as requiring the Type A exit and assist means to be ready for use within the 10 second time frame allowed by Amendment 25-88 for just opening the Type A exit doors.

### **FAA approval and documentation of the ELOS**

The FAA has approved the aforementioned ELOS finding in Issue Paper CS-1 or Administrative Collector Issue Paper G-6. This memorandum provides standardized documentation of the ELOS that is non-proprietary and can be made available to the public. The TAD has assigned a unique ELOS Memorandum number (see front page) to facilitate archiving and retrieval of this ELOS. This ELOS Memorandum number should be listed in the type certificate data sheet under the Certification Basis section. An example of an appropriate statement is provided below.

Equivalent safety findings have been made for the following regulation:

§ 25.810(a)(1)(ii) Emergency Egress Assist Means and Escape Routes (documented in TAD ELOS Memo TC6918SE-T-CS-1)

  
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 Transport Airplane Directorate  
 Aircraft Certification Service

November 24, 2015  
 Date

ELOS Originated by Seattle ACO:	George L. Panger	ANM-150S
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