



# Federal Aviation Administration

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## Memorandum

Date: December 9, 2010

To: Manager, Seattle Aircraft Certification Office, ANM-100S

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Susan Letcher, ANM-150S

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for the Boeing Model 777-300ER Airplane Position Light Overlapping Intensities (FAA Project Number AT3908SE-T)

ELOS Memo #: AT3908SE-T-SE-25

Reg. Ref.: §§ 21.16, 25.1389(b)(3), and 25.1395

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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 on the establishment of an equivalent level of safety (ELOS) finding for the Boeing Model 777-300ER airplane.

### Background

Boeing submitted a request for an ELOS finding to Title 14, Code of Federal Regulations (14 CFR) 25.1389(b)(3) and 25.1395 for the Model 777-300ER airplane, on which position light overlapping intensities exceed the maximums allowable per §§ 25.1389(b)(3) and 25.1395. Position light overlap areas are those areas where the area of coverage of one position light overlaps the area of coverage of another position light. Sections 25.1389(b)(3) and 25.1395 specify maximum allowable position light overlapping intensities depending on viewing angle. The intent of §§ 25.1389(b)(3) and 25.1395 is to limit the angle and intensity of overlapping signals to ensure that an observer in another aircraft can visually detect the orientation and direction of travel of the observed airplane. The 777-300ER position light overlapping intensities exceed the maximum allowable overlapping intensities in the following areas:

- The red position light exceeds the maximum allowable overlapping intensity in the green position light area of coverage.
- The green position light exceeds the maximum allowable overlapping intensity in the red position light area of coverage.

- The white position light exceeds the maximum allowable overlapping intensity in the red and green position light areas of coverage.

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

§§ 25.1389(b)(3) and 25.1395

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

§§ 25.1389(b)(3) and 25.1395

### **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 considered the 777-300ER position light system design and the specific overlap conditions, and determined that the specific overlap conditions allow granting of an ELOS for §§ 25.1389(b)(3) and 25.1395, based on the following:

- In all cases, the exceeding intensities in the overlap areas are only slightly above the allowable overlapping intensities are located at angles that would not be considered critical viewing angles or only cover a small area such that the exceeding intensity would only be visible to an observer in another aircraft for a very short time.
- The 777-300ER position light intensity significantly exceeds the minimum intensity required by § 25.1391. As such, slightly exceeding the allowable overlap intensity would not affect signal clarity of the position light system.
- A trained observer could not visually discriminate between a position light system producing the overlap intensities described above, and one without the exceeding overlaps. The difference can be discriminated only with sensitive precision instruments.

As such, the FAA granted an ELOS for §§ 25.1389(b)(3) and 25.1395 to allow position light overlapping intensities above the maximum allowable overlapping intensities identified in §§ 25.1389(b)(3) and 25.1395 for 777-300ER airplanes.

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

The high main beam intensity of the position lights, the relatively small exceeding overlapping intensities, and the size/location of the viewing angles at which the exceeding overlapping intensities can be observed minimize the potential for confusion by an observer in another aircraft regarding the orientation and direction of travel of the 777-300ER airplane.

### FAA approval and documentation of the ELOS finding

The FAA has approved the aforementioned equivalent level of safety finding in project issue paper SE-25. This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The Transport Directorate 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 (TC's & ATC's). An example of an appropriate statement is provided below.

Equivalent Level of Safety Findings have been made for the following regulation(s):  
 §§ 25.1389(b)(3) and 25.1395 (documented in TAD ELOS Memo AT3908SE-T-SE-25)

Original Signed by

*Gregg Bartley for*

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 Manager, Transport Airplane Directorate,  
 Aircraft Certification Service

December 10, 2010

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 Date

ELOS Originated by Seattle ACO:	Project Engineer Marcia Smith	Routing Symbol ANM-130S
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