Exemption No. 10687

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98057-3356

In the matter of the petition of **L-3 Communications Integrated Systems, L.P.** for an exemption from §§ 25.562 and 25.785(b) of Title 14, Code of Federal Regulations	**Regulatory Docket No. FAA-2012-0954**

PARTIAL GRANT OF EXEMPTION

By letter dated August 28, 2012, Mr. Phillip T. Crawford, ODA Administrator, L-3 Communication Integrated Systems, L.P., 7601 Maehr Road, PO Box 154580, Waco, Texas 76715-4580, petitioned the Federal Aviation Administration (FAA) for an exemption from the requirements of §§ 25.562 and 25.785(b) of Title 14, Code of Federal Regulations (14 CFR). The proposed exemption, if granted, would permit relief from the general occupant protection requirements for side-facing seats in the passenger compartment on two Boeing 747-8 airplanes, serial numbers 39749 and 41060. The proposed exemption is specifically for the installation of executive interiors on Boeing 747-8 airplanes, which have been designated as "private, not-for-hire, not-for-common carriage."

The petitioner requests relief from the following regulations:

> **Section 25.562, Amendment 25-64 –** "The seat and restraint system in the airplane must be designed as prescribed in this section to protect each occupant during an emergency landing when—"
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> **Section 25.785(b), Amendment 25-88 –** "Each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of these facilities will not suffer serious injury in an emergency landing as a result of the inertia forces specified in §§ 25.561 and 25.562."

The petitioner supports the request with the following information:

This section quotes the relevant information from the petitioner's request. The complete petition is available on the Internet in the Federal Docket Management System at http://www.regulations.gov/ in docket number FAA-2012-0954.

> L-3 Communications Integrated Systems, L.P., petitions the Federal Aviation Administration (FAA) for exemption from Title 14, Code of Federal Regulations (14 CFR) 25.562 and 25.785(b).
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> The proposed exemption, if granted, would grant relief from 14 CFR 25.562 and 25.785(b) as currently written and would establish appropriate requirements to comply with its intent. The proposed exemption is specifically intended for application to two in-work executive interiors programs on Boeing Model 747-8 airplanes designated as "VVIP/Government/Head-of-State."
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> **Background**
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> L-3 Communications Integrated Systems has been contracted by customers for interior completions of VVIP/Government/Head-of-State business interiors in two different Boeing Model 747-8 airplanes. As of February of 2012, L-3 ODA-750154-SW has taken applications for 747-8 interior Project Number P-11-001 and 747-8 interior project P-12-001. The certification basis for the Boeing 747-8 is 14 CFR 25, Amendment 25-1 through 25-120 with reversions, later amendments, Exemptions, and Special Conditions as shown in FAA Type Certificate Data Sheet A20WE. The proposed interiors include the use of single and multiple-place side-facing divans.
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> 14 CFR 25 governs Type Design certification requirements for transport category airplanes. The primary intent of the CFR, as applied to Transport Aircraft, is intended for US commercial or common-carriage applications. These regulations are to ensure that aircraft manufacturers provide the appropriate design features to meet the standards necessary to protect the traveling US public. These requirements define the normal public interest and safety level and provide regulatory guidelines to meet them.
>
> Recently FAA issued final Policy PS-ANM-25-03 Technical Criteria for Approving Side-Facing-Seats. L-3 and our customers have chosen to manage the approval of our proposed side-facing-seats as provided for in the "In-Work" section of the Policy memo and file this application for exemption.
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> When the individual aircraft is to be used in private service (e.g., not for US hire or common carriage), it is appropriate to take into consideration the specific needs of a different population of more experienced users and the operations specific to those users.
>
> Historically, the FAA has made adjustments to specific requirements based upon specific design and operational factors. Numerous Exemptions and other regulatory changes have been granted to meet specific aircraft designs and applications. Examples include exemptions 6820/6820A and 9762. As with other exemptions, L-3 proposes to use

mitigating design requirements and operational limitations to justify this exemption to our existing 747-8 aircraft modified for VVIP/Government/Head-of-State, not-for-hire or common-carriage service.

Basis for Exemption

The aircraft that are the subjects of this petition are Boeing Model 747-8s outfitted for non-commercial/non-common-carriage VVIP/Government use/Head-of-State service. These interiors make extensive use of single and multiple-place side-facing divans in order to achieve the functionality and comfort level required by the operator. These aircraft are typically in the service of foreign Heads-of-State friendly to US interests and will be operated under 14 CFR 91/14 CFR 125 regulations or equivalent foreign standard. For this reason the privileges of this proposed exemption will be exercised outside the United States.

The proposed interior configurations are designed for very small and highly controlled passenger populations vis-à-vis for-hire or common-carriage configurations for the general public. These passengers invited to travel on these aircraft are typically very experienced travelers. For this reason the crews and passengers who fly on this aircraft have a substantially higher familiarity with the aircraft and its systems than those envisioned by the writers of the original CFR.

The exemption proposed herein is justified based upon the following facts:

- The aircraft are to be delivered as foreign-registered aircraft.
- These aircraft are intended for VVIP/Government/Head-of-State use and are not appropriately configured for or intended for use for hire or common carriage.
- Depending on the interior layout, these aircraft typically carry a low fraction of the originally Type-Approved passenger load.
- The Petitioner proposes previously utilized and approved mitigating requirements and conditions that establish acceptable safety levels for the occupants consistent with previous grants.

Requested Relief and Mitigating Requirements

L-3 proposes to meet the requirements as follows:

Side-facing seats, §25.562 and §25.785(b).

a. Existing Criteria: All injury protection criteria of § 25.562(c)(1) through (c)(6) apply to the occupants of side-facing seats. The Head Injury Criterion (HIC) assessments are required only for head contact with the seat and/or adjacent structures.
b. Body-to-Body Contact: Contact between the head, pelvis, torso or shoulder area of one Anthropomorphic Test Dummy (ATD) with the head, pelvis, torso or

shoulder area of the ATD in the adjacent seat is not allowed during the tests conducted in accordance with § 25.562(b)(1) and (b)(2). Contact during rebound is allowed.

c. Thoracic Trauma: If the torso of an ATD at the forward-most seat place impacts the seat and/or adjacent structure during testing, compliance with Thoracic Trauma Index (TTI) injury criterion must be substantiated by dynamic test or by rational analysis based on previous test(s) of a similar seat installation. TTI data must be acquired with a Side Impact Dummy (SID), as defined by 49 CFR part 572, subpart F, or an equivalent ATD or a more appropriate ATD and must be processed as defined in Federal Motor Vehicle Safety Standard (FMVSS) part 571.214, section S6.13.5. The TTI must be less than 85, as defined in 49 CFR part 572, subpart F. Torso contact during rebound is acceptable and need not be measured.

d. Pelvis: If the pelvis of an ATD at any seat place impacts seat and/or adjacent structure during testing, pelvic lateral acceleration injury criteria must be substantiated by dynamic test or by rational analysis based on previous test(s) of a similar seat installation. Pelvic lateral acceleration must not exceed 130g. Pelvic acceleration data must be processed as defined in FMVSS part 571.214, section S6.13.5.

e. Body-to-Wall/Furnishing Contact: If the seat is installed aft of a structure—such as an interior wall or furnishing that may contact the pelvis, upper arm, chest, or head of an occupant seated next to the structure—the structure or a conservative representation of the structure and its stiffness must be included in the tests. It is recommended, but not required, that the contact surface of the actual structure be covered with at least two inches of energy absorbing protective padding (foam or equivalent) such as Ensolite.

f. Shoulder Strap Loads: Where upper torso straps (shoulder straps) are used for sofa occupants, the tension loads in individual straps must not exceed 1,750 pounds. If dual straps are used for restraining the upper torso, the total strap tension loads must not exceed 2,000 pounds.

g. Occupant Retention: All side-facing seats require end closures or other means to prevent the ATD's pelvis from translating beyond the end of the seat at any time during testing.

h. Test Parameters:

(1) All seat positions need to be occupied by ATDs for the longitudinal tests.

(2) A minimum of one longitudinal test, conducted in accordance with the conditions specified in § 25.562(b)(2), is required to assess the injury criteria as follows. Note that if a seat is installed aft of structure (such as an interior wall or furnishing) that does not have a homogeneous surface, an additional test or tests may be required to demonstrate that the injury criteria are met for the area which an occupant could contact. For example, different yaw angles could result in different injury considerations and may require separate tests to evaluate.

For configurations without structure (such as a wall or bulkhead) installed directly forward of the forward seat place, Hybrid II ATDs or equivalent must be in all seat places.

- For configurations with structure (such as a wall or bulkhead) installed directly forward of the forward seat place, a Side Impact Dummy or equivalent ATD or more appropriate ATD must be in the forward seat place and a Hybrid II ATD or equivalent must be in all other seat places.

- The test may be conducted with or without a deformed floor.

- The test must be conducted with either no yaw or 10 degrees yaw for evaluating occupant injury. Deviating from the no yaw condition must not result in the critical area of contact not being evaluated. Allowing the test to be conducted at 10 degrees yaw will permit many occupant injury tests to be considered in conjunction with the structural test. Note that this condition does not provide relief from the requirement that torso restraint straps, where installed, must remain on the occupant's shoulder during the impact condition of § 25.562(b)(2).

(3) For the vertical test, conducted in accordance with the conditions specified in § 25.562(b)(1), Hybrid II ATDs or equivalent must be used in all seat positions.

Public Interest

As in the cases of numerous already established Exemptions, granting this petition for exemption would be clearly in the public interest of the people of the United States of America for the following reasons:

1. These aircraft are used by Governments friendly to the US government to transport their Heads-of-State, Diplomatic Persons, other VIPs, and related staff. US Public interest is advanced by developing and maintaining positive influence with the countries represented and governed by the aircraft's occupants. Ensuring these aircraft perform their missions as originally intended and contracted by their operators achieves that goal.
2. The VVIP/Head-of-State configured interior of the style and quality intended for these STCs is not suitable for charter operations or Common-Carriage operations. These aircraft will be restricted from use in for-hire or common carriage operations. Imposing the new policy at this time will not benefit the US public and may be viewed as detrimental to the aircraft's mission.
3. The population of people who use this aircraft is very small and restricted to personnel selected by the operator. Members of the flying public in the US and worldwide do not have access to this aircraft and therefore their Public Interest is not negatively impacted.
4. The use of US design and manufacture aircraft and interiors such as this one develops and maintains the worldwide positive image and influence currently enjoyed by the US Aerospace Industry. Application of non-harmonized

certification requirements creates differences between international regulatory agencies and industry players that require significant resources to manage. Without supporting cost-benefit data demonstrating a positive safety impact there can be no public benefit to applying these new requirements, especially to foreign aircraft.

5. Consistency in regulations and design requirements at and after contract award affects competitiveness. Significant changes occurring in regulations and design after the time of contract award places US industry in a significantly non-competitive position relative to foreign industry.
    a. The imposition of the latest side-facing-seat policy represents a major, unplanned, increase in program cost and effort. That coupled with the reduced interior utility based upon current customer expectations changes the competitive stance of L-3 relative to other completion centers.
    b. Growth in future aerospace sales is in the US Public interest. Future sales depend on what potential customers worldwide see as an environment of fairness and consistency in establishing contracted airworthiness requirements.
6. The exemption request for two programs, if granted, allows the FAA to expend resources on addressing these requirements only once. The US Public interest is advanced by minimizing the impact on FAA's budget and improving FAA's ability to concentrate resources on other higher priorities, including Continuing Operational Safety.

***Federal Register* publication**

A summary of this petition was published in the *Federal Register* on November 16, 2012 [77 FR 68882-68883]. No comments were received.

The FAA's analysis:

The FAA considers the petitioner's proposal to be in the public interest for the same reasons as those previously stated by the petitioner.

As more and more transport category airplanes have been configured (or re-configured) for "private, not-for-hire" use, the FAA has given considerable attention to the issue of appropriate regulation of such airplanes. Some of the current regulations governing design certification of transport category airplanes are not compatible with private, not-for-hire use of such airplanes. Given this situation, the FAA has received a number of petitions for exemption from certain regulations. The FAA has granted such exemptions when it finds that to do so is in the public interest and does not adversely affect the level of safety provided by the regulations. In the future, the FAA intends to propose regulations governing transport category airplanes in private use, obviating the need for case-by-case review of individual petitions for exemption.

Side-facing seats are considered a novel design for transport category airplanes that include Amendment 25-64 in their certification basis. Such seats were not considered when those

airworthiness standards were issued. Therefore, the existing regulations do not provide adequate or appropriate safety standards for occupants of side-facing seats. The FAA conducted research to develop an acceptable method of compliance with §§ 25.562 and 25.785(b) for side-facing seat installations. As a result of that research, the FAA recently published policy statement PS-ANM-25-03-R1, which provides proposed special conditions for side-facing seats to provide an acceptable method of compliance with §§ 25.562 and 25.785(b). As part of the policy statement we included an implementation section that provides two options for in-work certification programs. The first option is to follow the criteria in the policy statement; the second option is to apply for an exemption for both single- and multiple-place side-facing seats to use the previous criteria established in the exemption granted to multiple-place side-facing seats. The petitioner selected the second option for the two 747-8 VIP interior airplane programs that they have in-work. The FAA agrees that these two certification programs do meet the intent of the in-work programs envisioned by the policy statement.

The petitioner requested exemption from the requirements of § 25.562 for the side-facing seats. As we have stated in the past on previous exemptions for multiple-place side-facing seats, the requirements of § 25.562 are applicable to side-facing seats, and only an exemption to the requirement of § 25.562(a) is needed for side-facing seats. Therefore, the exemption to § 25.562(a) is addressed in this exemption.

The petitioner stated that none of the side-facing seats will be equipped with inflatable lap belts or inflatable shoulder belts. Therefore, this exemption does not address the additional requirements for inflatable devices and cannot be used on side-facing seats with inflatable devices.

The FAA's decision:

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 40113 and 44701, delegated to me by the Administrator, L-3 Communication Integrated Systems, L.P., is hereby granted an exemption from 14 CFR 25.562(a), Amendment 25-64, and 14 CFR 25.785(b), Amendment 25-88. The exemption is granted to the extent necessary to allow L-3 Communication Integrated Systems, L.P., relief from the general occupant protection requirements of §§ 25.562(a) and 25.785(b) for side-facing seats in the passenger compartment on Boeing Model 747-8 airplanes, serial numbers 39749 and 41060, that are operated for "private, not-for-hire, not-for-common carriage." This exemption applies to the original supplemental type certificates (STC) and does not apply to subsequent amendments to those STCs. This exemption is limited to the specific side-facing seat designs installed by the petitioner for the original STCs, and this limitation must be included in the limitation section of the STCs. This exemption is limited to side-facing seats that do not include inflatable devices. This exemption is subject to the following conditions:

1. Existing Criteria: All injury protection criteria of § 25.562(c)(1) through (c)(6) apply to the occupants of side-facing seating. The Head Injury Criterion (HIC) assessments are only required for head contact with the seat and/or adjacent structures.

2. Body-to-Body Contact: Contact between the head, pelvis, torso, or shoulder area of one Anthropomorphic Test Dummy (ATD) with the adjacent seated ATD's head, pelvis, torso, or shoulder area is not allowed during the tests conducted in accordance with § 25.562(b)(1) and (b)(2). Contact during rebound is allowed.

3. Thoracic Trauma: If the torso of an ATD at the forward most seat place impacts seat and/or adjacent structure during testing, compliance with Thoracic Trauma Index (TTI) injury criterion must be substantiated by dynamic test or by rational analysis based on previous test(s) of a similar seat installation. TTI data must be acquired with a Side Impact Dummy (SID), as defined by 49 CFR part 572, subpart F, or an equivalent ATD, or a more appropriate ATD and must be processed as defined in Federal Motor Vehicle Safety Standard (FMVSS) part 571.214, section S6.13.5. TTI must be less than 85, as defined in 49 CFR part 572, subpart F. Torso contact during rebound is acceptable and need not be measured.

4. Pelvis: If the pelvis of an ATD at any seat place impacts seat and/or adjacent structure during testing, pelvic lateral acceleration injury criteria must be substantiated by dynamic test or by rational analysis based on previous test(s) of a similar seat installation. Pelvic lateral acceleration must not exceed 130g. Pelvic acceleration data must be processed as defined in FMVSS part 571.214, section S6.13.5.

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6. Shoulder Strap Loads: Where upper torso straps (shoulder straps) are used for sofa occupants, the tension loads in individual straps must not exceed 1,750 pounds. If dual straps are used for restraining the upper torso, the total strap tension loads must not exceed 2,000 pounds.

7. Occupant Retention: All side-facing seats require end closures or other means to prevent the ATD's pelvis from translating beyond the end of the seat at any time during testing.

8. Test Parameters:

(a) All seat positions need to be occupied by ATDs for the longitudinal tests.

(b) A minimum of one longitudinal test, conducted in accordance with the conditions specified in § 25.562(b)(2), is required to assess the injury criteria as follows. Note that if a seat is installed aft of structure (for example, an interior wall or furnishing) that does not have a homogeneous surface, an additional test(s) may be required to demonstrate that the injury criteria are met for the area which an occupant could

contact. For example, different yaw angles could result in different injury considerations and may require separate tests to evaluate.

- For configurations without structure (for example, wall, bulkhead) installed directly forward of the forward seat place, Hybrid II ATDs or equivalent must be in all seat places.

- For configurations with structure (for example, wall, bulkhead) installed directly forward of the forward seat place, an SID or equivalent ATD or more appropriate ATD must be in the forward seat place and a Hybrid II ATD or equivalent must be in all other seat places.

- The test may be conducted with or without deformed floor.

- The test must be conducted with either no yaw or 10 degrees yaw for evaluating occupant injury. Deviating from the no yaw condition must not result in the critical area of contact not being evaluated. Allowing the test to be conducted at 10 degrees yaw will permit many occupant injury tests to be considered in conjunction with the structural test. This test is considered acceptable since an exemption is sought in lieu of compliance with part 25. Note that this condition does not provide relief from the requirement that torso restraint straps, where installed, must remain on the occupant's shoulder during the impact condition of § 25.562(b)(2).

(c) For the vertical test, conducted in accordance with the conditions specified in § 25.562(b)(1), Hybrid II ATDs or equivalent must be used in all seat positions.

Issued in Renton Washington, on January 24, 2013.

/s/

Ali Bahrami
Manager, Transport Airplane Directorate
Aircraft Certification Service