Exemption No. 10802

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

In the matter of the petition of **Greenpoint Technologies, Inc.** for an exemption from §§ 25.562(a) and 25.785(b) of Title 14, Code of Federal Regulations	**Regulatory Docket No. FAA-2013-0232**

PARTIAL GRANT OF EXEMPTION

By letters dated February 25, 2013, and March 20, 2013, Ms. Barbara Baillie, Senior Certification Engineer, Greenpoint Technologies, Inc., 4600 Carillon Pt., Kirkland, Washington 98033, petitioned the Federal Aviation Administration (FAA) for an exemption from the requirements of §§ 25.562(a) 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 a Boeing 747-8ZV airplane, serial number 42096. The proposed exemption is specifically for the installation of executive interiors on Boeing 747-8ZV airplanes, designated as "private, not for hire, not for common carriage."

The petitioner requests relief from the following regulations:

> **Section 25.562(a), 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—
> (1) proper use is made of the seats, safety belts, and shoulder harnesses provided for in the design; and (2) the occupant is exposed to loads resulting from the conditions prescribed in this section."
>
> **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, with minor edits for clarity. The complete petition is available on the Internet in the Federal Docket Management System at http://www.regulations.gov/ in docket number FAA-2013-0232.

As provided for in §11.61(b), Greenpoint hereby petitions for exemption from [14 CFR 25.562(a) at Amdt 25-64 and 25.785(b) at Amdt 25-88] for a Boeing Model 747-8ZV airplane, serial number 42096:

Regulation	Amendment	Requirement
25.562(a)	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 condition when -- (1) proper use is made of the seats, safety belts, and shoulder harnesses provided for in the design; and (2) the occupant is exposed to loads resulting from the conditions prescribed in this section.
25.785(b)	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 the facilities will not suffer serious injury in an emergency landing as a result of the inertia forces specified in §§ 25.561 and 25.562.

Extent of and reason for Relief Being Sought

Greenpoint requests relief from the general occupant protection requirements of §§ 25.562(a), Amendment [25-]64, and 25.785(b), Amendment [25-]88, for side-facing seats in the passenger compartment on Boeing Model 747-8ZV, S/N 42096, operated for "private, not-for-hire, not-for-common carriage." Relief will be limited to the original supplemental type certificate (STC) and will not apply to subsequent amendments to those STCs. This request is limited to the specific side-facing seat designs installed by the petitioner for the original STC and this limitation will be included in the limitation section of the STC. This request is limited to side-facing seats that do not include inflatable devices. Greenpoint Technologies proposes the following criteria as conditions of the exemption:

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.

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.

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.

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.

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.

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.

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.

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.

Statement of Public Interest

Granting this exemption would be in the public interest for the following reasons:

- VIP aircraft are used by Heads-of-State and Diplomatic Persons. Developing and maintaining positive relations with the operators of these aircraft benefits the US economy in terms of trade and balance of power;

- The use of US design and manufacture of aircraft and interiors such as this one develops and maintains the worldwide positive image and influence currently enjoyed by the US Aerospace Industry. Consistency in regulations and design requirements at and after contract award affects competitiveness and significant changes after the time of contract places the US industry in a significant lowered position to foreign industry. For instance, the imposition of the latest side-facing-seat policy represents a major, unplanned change that if imposed require increases in program cost and effort, and in this case results in lost viability of applicable interior modification. Future sales depend on potential customers worldwide finding the US certification process dependable and reasonable and changing requirements mid-stream is counter to this end;

- Granting of exemptions that are identical to others issued for the same airplane model and in the same time frame serves to level the playing field so as not to create an unfair advantage for on[e] US modifier over another. The "in-work" option provided for in the most recent side-facing-seat policy, FAA Policy Statement PS-ANM-25-03-R1, dated November 5, 2012, is the means to keep the playing field level which is in the public interest.

Statement of No Adverse Effect on Safety

The FAA has made adjustment to regulatory requirements based on specific design and operational factors numerous times in the past. This exemption will have no adverse impact on safety for the following reasons:

- The operation of this aircraft is limited to private use by an individual or a company and does not include scheduled flights, fare-paying public passengers or cargo-for-hire commercial service;

- The proposed interior configuration is designed for very small and highly controlled passenger population;

- The mitigating design requirements proposed will establish an acceptable level of safety for the occupants consistent with previous grants of exemption;

- This project meets the criteria for relief via grant of exemption in accordance with FAA Policy Statement PS-ANM-25-03R1, dated November 5, 2012, related to 14 CFR §§ 25.562(a) and 25.75(b), page 4, In-work section;

- The relief requested in identical to that previously granted in Exemption No. 10687, Regulatory Docket No. FAA-2012-0954, dated January 24, 2013 for relief from §§ 25.562(a) and 25.785(d) for two Boeing Model 747-8 airplanes with similar VIP applications.

Public Summary

Greenpoint technologies requests exemption from 14 CFR §§ 25.562(a) and 25.785(b) for a 747-8ZV airplane. The 747-8 aircraft is intended to be a VIP executive airplane including installation of single and multiple-place side-facing divans. This request is necessary in order to certify the desired aircraft configuration for the end customer.

Background and Supportive Information

The Boeing Model 747-8ZV project airplane is intended to be a VIP executive aircraft; modified under Bahamian registration. Greenpoint is cont[r]acted to design, install and certify an executive interior in a Boeing Model 747-8ZV per customer specifications. STC certification is sought under FAA project #ST11824SE-T. The certification basis for the project is defined in Type Certificate Data Sheet A20WE and includes 14 CFR 25 through Amendment 25-120 and Special Conditions for the Model Boeing 747-8 aircraft. The Project Specific Certification Plan, Geenpoint Document G1265-CP-04, Revision D, dated February 1, 2013, was accepted by FAA Letter 150S-13-45, dated February 18, 2013. The proposed interior installation includes the use of single and multiple-place side-facing divans. No inflatable seat belts or harnesses will be used. All seats will be manufactured by B/E Aerospace located in Miami, Florida. Seats will fall into four categories based on location of the seat on the aircraft. Each side facing seat is actually a discrete frame. Multiple, discrete frames may be installed end-to-end with a gap between structures to ensure that the seats do not load share regardless of occupancy.

14 CFR part 25 governs Type Design certification requirements for transport category airplanes. The FAA has stated that to the extent considered appropriate for safety, part 25 requirements contain different provisions based on passenger capacity discriminants. These requirements do not distinguish between airplanes operated in air carrier service and airplanes operated for private use. Aviation industry representatives have stated that the part 25 standards are written with only air carrier operation in mind, and the FAA has issued alternative standards related to cabin interiors for private use airplanes based on these alternate standards providing an acceptable level of safety. The relief requested is in line with these prior issued alternative standards and will have no adverse impact on safety given the operation of the aircraft is limited to private use by an individual or a company and does not include scheduled flights, fare-paying public passengers or cargo-for-hire commercial service. Additionally, the occupants are a small, highly controlled passenger population.

Recently, the FAA issued Policy Statement PS-ANM-25-03-R1 on November 5, 2012, which contains compliance methods that should be applied to new seat-certification programs. Defined therein, is an implementation option for “in-work” projects when the date of application precedes the effective date of the final policy and that do not have a previously granted exemption or an approved special condition in the certification basis.

The FAA’s intent of the policy is to achieve long-term safety benefits associated with a more-comprehensive examination of safety aspects relevant to side-facing-seats, and has

found that applicants with projects currently in work, are eligible, under certain conditions, for exemption [from] the criteria defined therein given the applicant adequately addresses all requirements of 14 CFR §11.87. Greenpoint requests relief based on the "in-work" allowance defined in this recent policy statement as our STC date of application precedes the effective date of this new policy.

Privilege of this Exemption Outside the United States

In accordance with §11.81(h), Greenpoint Technologies requests that the privileges of this exemption be extended outside of the United States. This extension of privileges is necessary because the end user of the Boeing Model 747-8 airplane being modified is a foreign national and the airplane will be operated the majority of time outside the US.

***Federal Register* publication**

A summary of this petition was published in the Federal Register on April 11, 2013 [78 FR 21702]. One supportive comment was 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 this certification program meets the intent of the in-work programs envisioned by the policy statement.

The petitioner states 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 applied to 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, Greenpoint Technologies, Inc., is hereby granted an exemption from 14 CFR 25.562(a), Amendment 25-64, and 25.785(b), Amendment 25-88. The exemption is granted to the extent necessary to allow Greenpoint Technologies, Inc., 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 number 42096, that is 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.

5. 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®.

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 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 June 17, 2013.

/s/ John Piccola

John Piccola
Acting Manager, Transport Airplane Directorate
Aircraft Certification Service