

**Exemption No. 10133**

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

In the matter of the petition of

**Jet Aviation Engineering Services L.P.**

for an exemption from § 25.601 of Title 14,  
Code of Federal Regulations

Regulatory Docket No. FAA-2010-0580

**GRANT OF EXEMPTION**

By letters dated May 27, 2010, and June 11, 2010, Mr. Mark W. Creager, Director of Certification, Jet Aviation Engineering Services L.P., 116 Kestrel Drive, Spring Branch, Texas 78070, petitioned for an exemption from the requirements of § 25.601 of Title 14, Code of Federal Regulations (14 CFR). This exemption, if granted, would permit in-flight occupancy of the lower lobe passenger rest compartment and upper deck of a Boeing Model 747-400 airplane, serial number 28343, which is in private, head of state, not-for-hire, not-for-common-carriage use. The proposed exemption is specifically for the installation of an executive interior.

**The petitioner requests relief from the following regulation:**

**Section 25.601, Amendment 25-0**, which requires no hazardous or unreliable design features.

**The petitioner supports its request with the following information:**

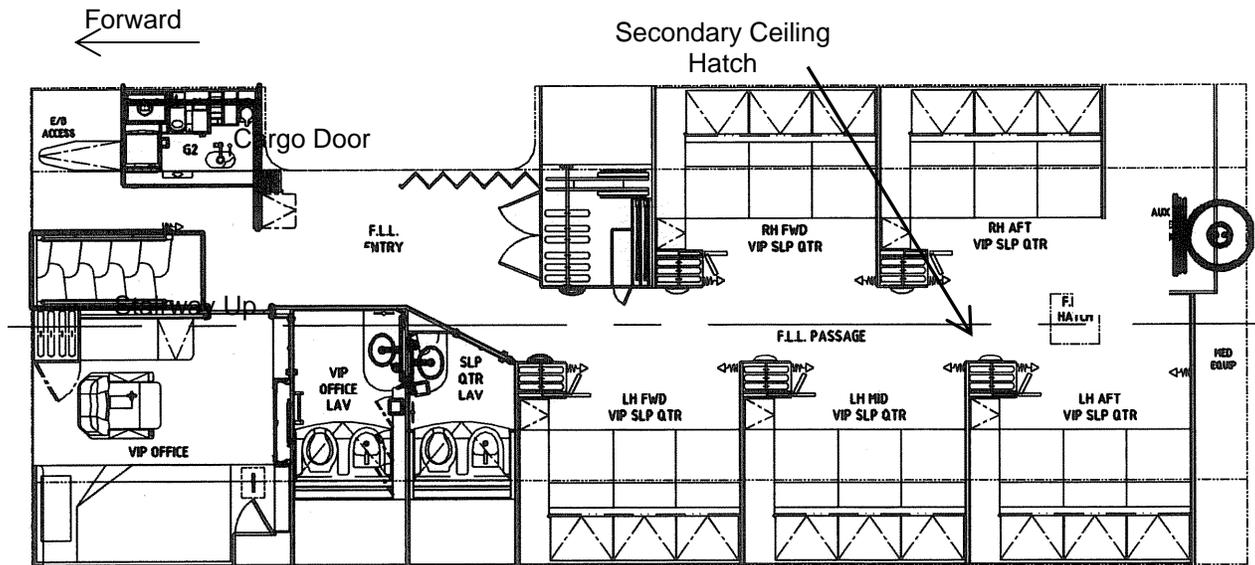
This section quotes, in part, the relevant information from the petitioner's request. The complete petition is available at the Department of Transportation's Federal Docket Management System, on the Internet at <http://regulations.gov>, in Docket No. FAA-2010-0580.

## BACKGROUND

Boeing 747-468, S/N 28343 is to be modified for use as a head of state VIP airplane. The Boeing Model 747-468 airplane is FAA approved under Type Certificate A20WE as a large Transport Category airplane that is limited to 660 passengers or less, depending on the interior configuration. The VIP interior configuration proposed for STC certification includes taxi, takeoff, and landing seating provisions for 72 passengers. One flight attendant only occupies the upper deck during taxi, take off, and landing. During flight nine passengers and one flight attendant can occupy the upper deck. The forward lower lobe passenger rest compartment is not occupied during taxi, takeoff, and landing. During flight 17 passengers and one flight attendant can occupy the forward lower lobe passenger rest compartment.

### Forward Lower Deck Alternating Tread Stair:

The forward lower cargo compartment is type approved as Class C. This compartment will be modified by removing the type approved cargo compartment container positioning system, cargo liner, smoke detection system and fire suppression system and installing a passenger rest interior as shown below that is occupiable only during flight. The rest area will include a smoke detection system.

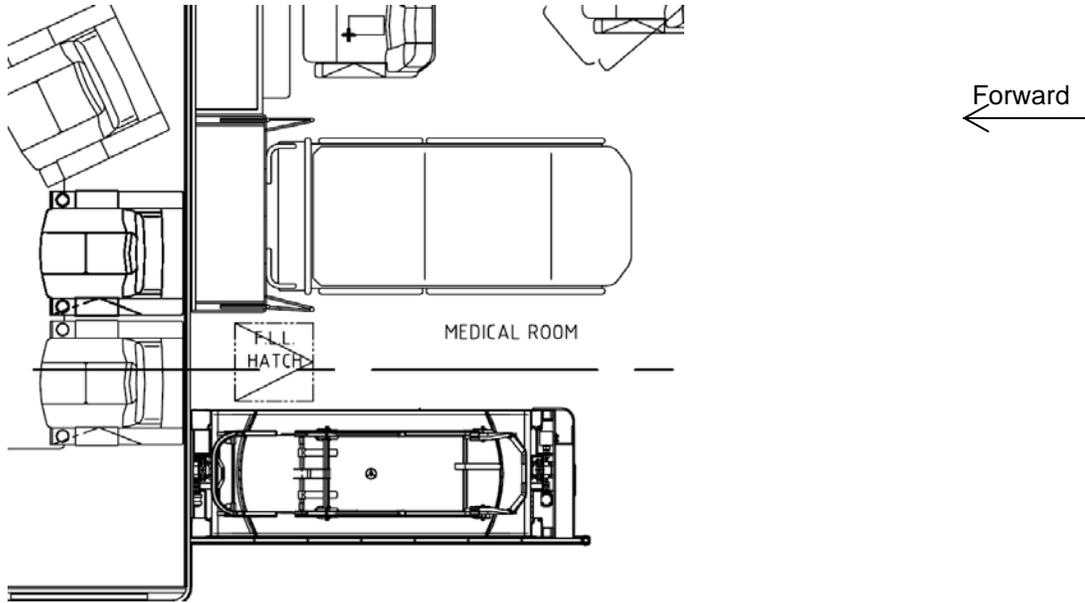


**Figure 1**  
**Forward Lower Lobe Passenger Rest Compartment**

Jet Aviation Engineering Services (JAES) proposes to use the entire forward lower lobe compartment as an in-flight accessible passenger rest compartment. The compartment is approximately 69 inches high after installation of the flooring and ceiling panels. The proposed configuration includes in-flight only seating for up to 18 occupants including a trained crewmember. The proposed in-flight only berthing capability will accommodate up to 11 occupants. The forward lower lobe passenger rest compartment will consist of five side-facing divans that convert to bunk beds. The divans face inboard. Each divan will be capable of seating three occupants or berthing two occupants when in bed configuration. Bulkheads forward and aft and a curtain on the inboard side separate the divans. A VIP sleeping room with a bed, chair and lavatory is located on the forward port side of the compartment. A pocket door separates the quarters from the rest of the compartment. A galley is located in the forward starboard side of the compartment. A second lavatory, coat storage, and flight attendant seat are also located in the compartment.

For access to the forward lower lobe passenger rest compartment, JAES proposes to install an alternating tread stairway for the forward end of this compartment area and a secondary overhead hatch at the aft end as shown in the above interior configuration. The alternating tread stairway will have a bi-fold door at the top main deck level that will remain open whenever the compartment is occupied.

The secondary access will be provided through a hatch installed in the main deck medical room floor near FS 880 as shown below. A telescopic ladder will be attached to provide access to climb between the main deck and the forward lower deck passenger compartment. The design features of the hatch are the same as hatches providing access to the forward Class C Cargo Compartment on a Boeing 767-300 Series Airplane under Special Condition 25-286-SC that was part of the VIP interior approval under STC ST10373SC.



**Figure 4**

**Main Deck Hatch Location for Forward Lower Lobe Passenger Rest Compartment  
Secondary Access**

The forward lower lobe passenger rest compartment will be constructed of materials meeting the flammability standards (Appendix F, Parts I & II) for the cabin interior and will include smoke detectors.

Access to the forward lower lobe passenger rest compartment would be limited to a maximum 17 passengers plus one trained crewmember. The main deck stair doorway will be closed during taxi, takeoff and landing and will remain open when the forward lower lobe passenger compartment is occupied. Access would be allowed during flight but not during taxi, takeoff and landing nor during a fire. Ordinance signs will be installed to inform passengers when to fasten seat belts during turbulence and when to leave the forward lower lobe passenger rest compartment and return to the main deck or upper deck seats.

Power outlets (110VAC) will be installed in the lower lobe compartment bay. These outlets will be powered only while the aircraft is parked or in flight and will be disabled during taxi, take-off and landing.

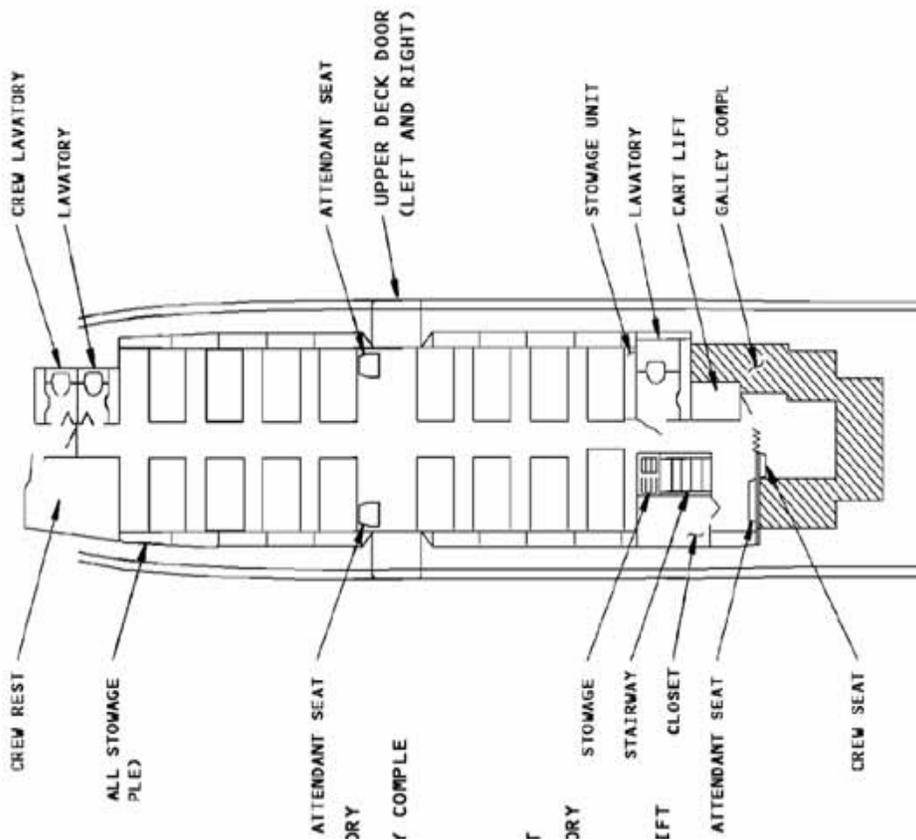
As part of the safety enhancement necessary to allow occupancy of the forward lower lobe passenger rest compartment, a trained crewmember must be in the compartment any time it is occupied. Further, JAES proposes the installation of warning and emergency equipment, as defined for a lower lobe service compartment in Title 14 Code of Federal Regulations (14 CFR) 25.819.

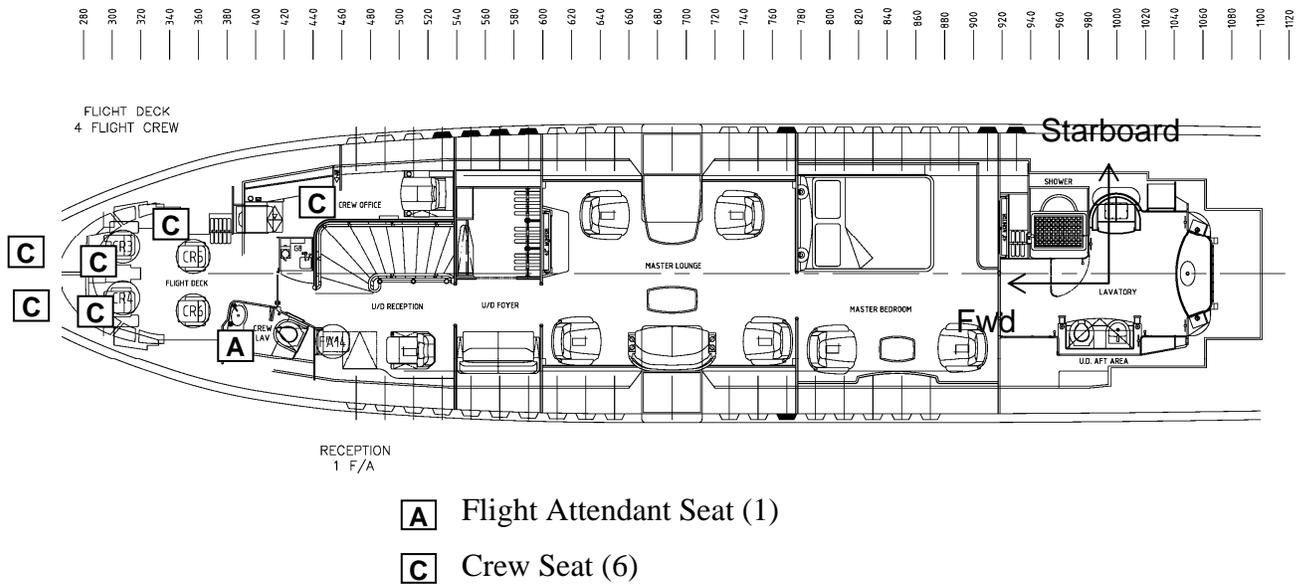
Speakers, warning lights, and buzzers will be installed in the forward lower lobe compartment to warn occupants of turbulent conditions, the presence of smoke or fire, or the need to leave the area. A crew interphone will be provided for communications with the flight deck. In addition, emergency supplemental oxygen complying with § 25.1447(c)(1), Amendment 25-41, will be provided to all occupants and galley and lavatory areas in case of decompression. Fire extinguishers and smoke hoods will also be installed in the compartment. Illuminated emergency exit signs and electric floor path lighting will be installed to direct passengers to the forward stairway as the primary egress path and to the aft overhead hatch as the secondary egress path.

### Upper Deck Occupancy and Main Deck to Upper Deck Curved Segmented Stairway

As part of head of state VIP interior installation in Boeing 747-468 serial number 28343, JAES will install a curved segmented stairway between the main and upper decks to allow movement of passengers between decks. This will replace the straight segmented stairway between the upper and main decks (see Fig. 5) that is part of the aircraft type design. The new stairway is at the forward end of the upper deck and descends aft to the main deck.

The upper deck seating in this aircraft for taxi, takeoff, landing and ground operations is limited to a single flight attendant. Passenger access to the upper deck during cruise is permitted. Stairs between two decks of an airplane are not addressed by 14 CFR part 25. The stairway needs to be able to support movement and to ensure safe passage of the occupants to egress from the forward end of the upper deck to the main deck during





**Figure 5**  
**B747-468 Upper Deck Floor Plan Layout after Modification for Taxi, Takeoff,**  
**Landing, and Ground Operations**

moderate turbulence and in-flight emergency.

**DISCUSSION**

14 CFR part 25 of the Federal Aviation Regulations governs design certification of Transport Category aircraft. The primary intent of these regulations, as written, are to be certain that Aircraft Manufacturers provide for the appropriate design features in their respective aircraft to meet the standards necessary to protect the traveling public. Clearly, there is a requirement “in the public interest” and in the interest of safety to provide regulatory guidelines for certification. However, it is also very clear these regulations are intended to regulate the certification of “commercial” aircraft, which are ‘for hire’ to the general public.

While the greatest majority of these regulations represent a common sense inclusion for any aircraft regardless of its intended use, a few are obviously intended to regulate situations that are specific to an airline, or for hire operation. When a Transport Category aircraft is operated under part 91 and § 91.501 and/or part 125, some of the part 25 rules have acceptance criteria that are inappropriate, or are not compatible with this type of operation and the intended use of the aircraft.

Transport Category Aircraft intended for Private use, whether originally designed for private use or public, revenue-type operations and then utilized under part 91 or part 125, are used for personal (corporate) non-revenue operations, which represent significant operational differences from the typical revenue operation. The differences represented in these private operations can best be described as follows:

1. Operation is limited to the private use of an individual(s), Corporation, or Government and does not include public - for hire - operations.
2. Passenger capacity of the aircraft is significantly less than an equivalent aircraft in commercial operations. Typically, the capacity is less than 30% of that found in an airline configuration.
3. Flight and Cabin Crews are typically highly trained, and far more familiar with the individual aircraft they are operating, since it is normally the primary aircraft on which they perform their duties.
4. Security is extremely high in terms of access to the aircraft while on the ground and with respect to individuals boarding the aircraft.
5. Passengers on these aircraft are typically repeat passengers, and represent corporate employees or individual owners and family members. As a result, the passengers are far more familiar with the layout of the individual aircraft and the associated emergency equipment and exits.
6. Custom interior layouts, furnishings, fixtures, furniture, cabinets, galleys, etc. are more representative of 'Board Room' type furnishings, than airline style interiors. Seat Pitch and Aisle Widths are typically substantially more spacious than an airline interior.

#### **BASIS FOR EXEMPTION**

The aircraft that is the subject of this petition is a 747-400 aircraft. The aircraft is currently at the modification facility, Jet Aviation in Basel, Switzerland. It is a privately owned aircraft being modified with a head of state type interior.

In addition, Jet Aviation proposes the following conditions as part of the type design of the Forward Lower Deck Alternating Tread Stairway and the Main Deck to Upper Deck Covered Segmented Stairway:

**Forward Lower Lobe Passenger Rest Compartment:**

1. All requirements except paragraph (f) of §25.819 must be met. Section 25.819(f), the requirement of forward or aft facing seating, is omitted because the compartment will not be occupied during taxi, take-off and landing operations.
2. The airplane is not operated for hire or offered for common carriage. This provision does not preclude the operator from receiving remuneration to the extent consistent with 14 CFR parts 125 and 91, subpart F, as applicable.
3. Occupancy of the forward lower lobe passenger rest compartment is limited to a maximum 17 passengers plus one trained crewmember. There must be 18 seats or berths in the forward lower lobe passenger rest compartment. Each approved seat and berth must be able to withstand the maximum flight loads when occupied.
4. There must be appropriate placard(s) displayed in a conspicuous place at each entrance to the forward lower lobe passenger rest compartment to indicate:
  - (a) The maximum number of passengers allowed is 17 plus one trained crewmember;
  - (b) That occupancy must include at least one crewmember who has been trained in the evacuation procedures for the forward lower lobe passenger rest compartment;
  - (c) That occupancy is prohibited during taxi, take-off and landing;
  - (d) That smoking is prohibited in the forward lower lobe passenger rest compartment;
  - (e) That hazardous quantities of flammable fluids, explosives, or other dangerous cargo are prohibited from the forward lower lobe passenger rest compartment;
  - (f) That stowage in the forward lower lobe passenger rest compartment must be limited to emergency equipment, airplane-supplied equipment (e.g., bedding), galley service items, lavatory amenities and small personal items; cargo or passenger baggage is not allowed.
5. There must be at least one ashtray located conspicuously on or near the entry side of any entrance to the forward lower lobe passenger rest compartment.
6. There must be a means to prevent passengers from entering the compartment in the event of an emergency or when no trained crewmember is present.
7. The main deck stair doorway must be closed and locked during taxi, take-off and landing and must remain open when the forward lower lobe passenger compartment is

occupied. When the main deck stair doorway is open, the stairs must be adequately illuminated to provide situational awareness for the occupants.

8. For all doors installed in the evacuation routes, there must be a means to preclude anyone from being trapped inside the compartment. If a locking mechanism is installed, it must be capable of being unlocked from the outside without the aid of special tools. The lock must not prevent opening from the inside of the compartment at any time.

9. There must be at least two emergency evacuation routes, each of which can be used by each occupant of the forward lower lobe passenger rest compartment to rapidly evacuate to the main cabin. The exit door/hatch for each route must be able to be closed from the main cabin after evacuation. In addition--

(a) The routes must be located with one at each end of the compartment.

(b) The routes must be designed to minimize the possibility of blockage, which might result from fire, mechanical or structural failure, or persons standing on top of or against the escape route. If an evacuation route utilizes an area where normal movement of passengers occurs, it must be demonstrated that passengers would not impede egress to the main deck. At the point at which the evacuation route terminates from the aft overhead hatch into the Medical Room, special consideration must ensure that the hatch or door can be opened when a person, the weight of a ninety-fifth percentile male, is standing on the hatch or door. The use of evacuation routes must not be dependent on any powered device. If there is low headroom at or near an evacuation route, provisions must be made to prevent or to protect occupants (of the forward lower lobe passenger rest compartment) from head injury.

(c) Emergency evacuation procedures, including the emergency evacuation of an incapacitated occupant from the forward lower lobe passenger rest compartment, must be established. All of these procedures must be transmitted to the airplane operator for incorporation into their training programs and appropriate operational manuals.

(d) There must be a limitation in the Airplane Flight Manual or other suitable means requiring that crewmembers be trained in the use of evacuation routes.

10. There must be a means for the evacuation of an incapacitated person (representative of a 95th percentile male) from the forward lower lobe passenger rest compartment to the passenger cabin floor. The evacuation must be demonstrated for all evacuation routes. A flight attendant or other crewmember (a total of one assistant within the forward lower lobe passenger rest compartment) may provide assistance in the evacuation. Additional assistance may be provided by up to three persons in the main passenger compartment. For evacuation routes having stairways, the additional assistants may descend down to one half the elevation change from the main deck to the lower deck compartment, or to the first landing, whichever is higher.

11. The following signs and placards must be provided in the forward lower lobe passenger rest compartment:

(a) At least one exit sign, located near each exit, meeting the requirements of §25.812(b)(1)(i) at Amendment 25-58, except that a sign with reduced background area of no less than 5.3 square inches (excluding the letters) may be utilized, provided that it is installed such that the material surrounding the exit sign is light in color (e.g., white, cream, light beige). If the material surrounding the exit sign is not light in color, a sign with a minimum of a one-inch wide background border around the letters would also be acceptable;

(b) An appropriate placard located near each exit defining the location and the operating instructions for each evacuation route;

(c) Placards must be readable from a distance of 30 inches under emergency lighting conditions; and

(d) The exit handles and evacuation path operating instruction placards must be illuminated to at least 160 micro lamberts under emergency lighting conditions.

(e) A visual means must be provided in the cockpit to advise the flight crew when the forward lower lobe access door is open. This is to ensure the flight crew is aware of that situation and can take appropriate action to evacuate the proposed forward lower lobe passenger compartment. This means must be active when the flaps are not retracted or the landing gear is deployed.

(f) There must be an “on/off” visual advisory/warning stating “No Entry” (or similar words) to be located outside and near the entrance door from the main deck to the proposed forward lower lobe passenger compartment. The advisory warning must be controlled from the flight deck. This is to prevent someone entering the proposed forward lower lobe passenger compartment when it is not supposed to be occupied.

(g) There must be both visible and audible advisory/warning means in the forward lower lobe passenger compartment to notify the occupants that they must exit the forward lower lobe passenger compartment. The visible and audible warning must be visible and audible from any part of the forward lower lobe passenger compartment. The visible and audible advisory/warning must be controlled from the flight deck.

12. There must be a means in the event of failure of the aircraft's main power system, or of the normal forward lower lobe passenger rest compartment lighting system, for emergency illumination to be automatically provided for the forward lower lobe passenger rest compartment.

- (a) This emergency illumination must be independent of the main lighting system.
  - (b) The sources of general cabin illumination may be common to both the emergency and the main lighting systems if the power supply to the emergency lighting system is independent of the power supply to the main lighting system.
  - (c) The illumination level must be sufficient for the occupants of the forward lower lobe passenger rest compartment to locate and transfer to the main passenger cabin floor by means of each evacuation route. This illumination level must be provided for sufficient time for all occupants to evacuate the compartment under worst case conditions.
  - (d) The illumination level must be sufficient with the privacy curtains in the closed position for each occupant of the forward lower lobe passenger rest compartment to locate a deployed oxygen mask.
13. There must be means for two-way voice communications between crewmembers on the flightdeck and occupants of the forward lower lobe passenger rest compartment. There must also be public address (PA) system microphones at each flight attendant seat required to be near a floor level exit in the passenger cabin per §25.785(h) at Amendment 25-51. The PA system must allow two-way voice communications between flight attendants and the occupants of the forward lower lobe passenger rest compartment, except that one microphone may serve more than one exit provided the proximity of the exits allows unassisted verbal communication between seated flight attendants.
14. There must be a means for manual activation of an aural emergency alarm system, audible during normal and emergency conditions, to enable crewmembers on the flightdeck and at each pair of required floor level emergency exits to alert occupants of the forward lower lobe passenger rest compartment of an emergency situation. Use of a public address or crew interphone system will be acceptable, provided an adequate means of differentiating between normal and emergency communications is incorporated. The system must be powered in flight for at least ten minutes after the shutdown or failure of all engines and auxiliary power units (APU) or the disconnection or failure of all power sources which are dependent on the continued operation of the engines and APUs.
15. There must be a means, readily detectable by seated or standing occupants of the forward lower lobe passenger rest compartment, which indicates when seat belts should be fastened. In the event there are no seats, at least one means must be provided to cover anticipated turbulence (e.g., sufficient handholds). Seat belt type berthing restraints must be provided for berths and must be compatible for the sleeping attitude during cruise conditions. There must be a placard on each berth requiring that berthing restraints must be fastened when occupied. If compliance with any of the other requirements of these conditions is predicated on specific head location, there must be a placard identifying the head position.

16. In lieu of the requirements specified in §25.1439(a) at Amendment 25-38 that pertain to isolated compartments and to provide a level of safety equivalent to that which is provided for occupants of a small isolated galley, the following equipment must be provided in the forward lower lobe passenger rest compartment:

- (a) At least one approved hand-held fire extinguisher appropriate for the kinds of fires likely to occur;
- (b) Two personal breathing equipment (PBE) devices approved to Technical Standard Order (TSO)-C116 or equivalent, suitable for fire fighting, or one PBE for each hand-held fire extinguisher, whichever is greater; and
- (c) One flashlight.

17. A smoke or fire detection system (or systems) must be provided that monitors each occupiable area within the forward lower lobe passenger rest compartment, including those areas partitioned by curtains. Flight tests must be conducted to show compliance with this requirement. Each system (or systems) must provide:

- (a) A visual indication to the flightdeck within one minute after the start of a fire;
- (b) An aural warning in the forward lower lobe passenger rest compartment; and
- (c) A warning in the main passenger cabin. This warning must be readily detectable by a flight attendant, taking into consideration the positioning of flight attendants throughout the main passenger compartment during various phases of flight.

18. The forward lower lobe passenger rest compartment must be designed such that fires within the compartment can be controlled without a crewmember having to enter the compartment, or the design of the access provisions must allow crewmembers equipped for fire fighting to have unrestricted access to the compartment. The time for a crewmember on the main deck to react to the fire alarm, to don the fire fighting equipment, and to gain access must not exceed the time for the compartment to become smoke-filled, making it difficult to locate the fire source.

19. There must be a means provided to exclude hazardous quantities of smoke or extinguishing agent originating in the forward lower lobe passenger rest compartment from entering any other compartment occupied by crewmembers or passengers. This means must include the time periods during the evacuation of the forward lower lobe passenger rest compartment and, if applicable, when accessing the forward lower lobe passenger rest compartment to manually fight a fire. Smoke entering any other compartment occupied by crewmembers or passengers when the access to the forward lower lobe passenger rest compartment is opened, during an emergency evacuation, must dissipate within five minutes after the access to the forward lower lobe passenger rest

compartment is closed. Hazardous quantities of smoke may not enter any other compartment occupied by crewmembers or passengers during subsequent access to manually fight a fire in the forward lower lobe passenger rest compartment (the amount of smoke entrained by a firefighter exiting the forward lower lobe passenger rest compartment through the access is not considered hazardous). During the 1-minute smoke detection time, penetration of a small quantity of smoke from the forward lower lobe passenger rest compartment into an occupied area is acceptable provided it dissipates rapidly (i.e., less than 5 minutes). Flight tests must be conducted to show compliance with this requirement.

20. There must be a supplemental oxygen system within the passenger rest compartment as follows:

- (a) There must be at least two masks for each berth, two masks for each seat that is not adjacent to another seat, and four masks for each divan that seats three occupants.
- (b) There must also be an oxygen mask readily accessible to each occupant that can reasonably be expected to be either transitioning from the main cabin into the passenger rest compartment, transitioning within the rest compartment, or transitioning from the passenger rest compartment to the main cabin.
- (c) The system must provide an aural and visual alert to warn the occupants of the passenger rest compartment to don oxygen masks in the event of decompression. The aural and visual alerts must activate concurrently with the deployment of the oxygen masks in the passenger cabin. To compensate for sleeping occupants, the aural alert must be heard in each section of the rest compartment and must sound continuously for a minimum of five minutes or until a reset switch within the rest compartment is activated. A visual alert that informs occupants that they must don an oxygen mask must be visible in each section.
- (d) There must also be a means by which the oxygen masks can be manually deployed from the flight deck.
- (e) Procedures for rest compartment occupants in the event of decompression must be established. These procedures must be transmitted to the operator for incorporation into their training programs and appropriate operational manuals.
- (f) The supplemental oxygen system for the passenger rest shall meet the same 14 CFR part 25 regulations as the supplemental oxygen system for the passenger cabin occupants.
- (g) The illumination level of the normal passenger rest compartment lighting system must be sufficient for each occupant of the compartment to locate a deployed oxygen mask.

(h) A placard indicating the location of a reclined occupant's head is required if access to a deployed oxygen mask depends upon the orientation of the reclined occupant.

21. The following requirements apply to the several sections divided by installation of curtains or partitions:

(a) A placard is required adjacent to each curtain that visually divides or separates, for privacy purposes, the passenger rest compartment into small sections. The placard must require that the curtain(s) remains open when the private section it creates is unoccupied.

(b) For each section of the passenger rest compartment created by the installation of a curtain, the following requirements of these conditions must be met with the curtain open or closed:

- (1) No smoking placard (Above condition 4.(d)),
- (2) Emergency illumination (Above condition 12),
- (3) Emergency alarm system (Above condition 14),
- (4) Seat belt fasten signal or return to seat signal as applicable (Above condition 15.),
- (5) The smoke or fire detection system (Above condition 17), and
- (6) The oxygen system (Above condition 20).

22. Where a waste disposal receptacle is fitted, it must be equipped with a built-in fire extinguisher designed to discharge automatically upon occurrence of a fire in the receptacle.

23. Materials (including finishes or decorative surfaces applied to the materials) must comply with the flammability requirements of §25.853 at Amendment 25-59. Mattresses must comply with the flammability requirements of §25.853(b) and (c) at Amendment 25-59.

24. All lavatories within the forward lower lobe passenger rest compartment are required to meet the same requirements as those for a lavatory installed on the main deck except with regard to above condition 17 for smoke detection.

25. All enclosed stowage compartments within the forward lower lobe passenger rest compartment that are not limited to stowage of emergency equipment or airplane-supplied equipment (e.g., bedding) must meet the design criteria given in the table below. As indicated by the table below, this condition does not address enclosed stowage compartments greater than 200 ft<sup>3</sup> in interior volume. The in-flight accessibility of very large enclosed stowage compartments and the subsequent impact on the crewmembers ability to effectively reach any part of the compartment with the contents of a hand fire extinguisher will require additional fire protection considerations similar to those required for inaccessible compartments such as Class C cargo compartments.

<b>Fire protection features</b>	<b>Stowage compartment interior volumes</b>		
	<b>less than 25 ft<sup>3</sup></b>	<b>25 ft<sup>3</sup> to 57 ft<sup>3</sup></b>	<b>57 ft<sup>3</sup> to 200 ft<sup>3</sup></b>
<b>Materials of Construction (a)</b>	Yes	Yes	Yes
<b>Detectors (b)</b>	No	Yes	Yes
<b>Liner (c)</b>	No	No	Yes
<b>Locating Device (d)</b>	No	Yes	Yes

(a) Materials of Construction:

The material used to construct each enclosed stowage compartment must at least be fire resistant and must meet the flammability standards established for interior components per the requirements of §25.853. For compartments less than 25 ft<sup>3</sup> in interior volume, the design must ensure the ability to contain a fire likely to occur within the compartment under normal use.

(b) Detectors:

Enclosed stowage compartments equal to or exceeding 25 ft<sup>3</sup> in interior volume must be provided with a smoke or fire detection system to ensure that a fire can be detected within a one-minute detection time. Flight tests must be conducted to show compliance with this requirement. Each system (or systems) must provide:

- (1) A visual indication in the flightdeck within one minute after the start of a fire;
  - (2) An aural warning in the forward lower lobe passenger rest compartment;
- and
- (3) A warning in the main passenger cabin. This warning must be readily detectable by a flight attendant, taking into consideration the positioning of flight attendants throughout the main passenger compartment during various phases of flight.

(c) Liner:

If it can be shown that the material used to construct the stowage compartment meets the flammability requirements of a liner for a Class B cargo compartment, then no liner would be required for enclosed stowage compartments equal to or greater than 25 ft<sup>3</sup> in interior volume but less than 57 ft<sup>3</sup> in interior volume. For all enclosed stowage

compartments equal to or greater than 57 ft<sup>3</sup> in interior volume but less than or equal to 200 ft<sup>3</sup>, a liner must be provided that meets the requirements of §25.855 at Amendment 25-72 for a class B cargo compartment.

(d) Location Device:

Detector areas which contain enclosed stowage compartments exceeding 25 ft<sup>3</sup> interior volume and which are located away from one central location such as the entry to the forward lower lobe passenger rest compartment or a common area within the forward lower lobe passenger rest compartment would require additional fire protection features and/or devices to assist the firefighter in determining the location of a fire.

26. Training Manuals and Training must include:

- (a) Use and actions associated with the warnings and placards specified herein.
- (b) Accessing and exiting the forward lower lobe passenger compartment including emergency evacuation (includes above conditions 5, 6, 7, 8, 9.(a), 9.(b), 9.(c), 9.(d), 10.
- (c) Maintaining an exit path aisle and access to the evacuation routes (associated with above condition 4.(b).

27. Each stairway and ladder between the forward lower lobe passenger compartment and the main deck must meet the following requirements:

- (a) The stairway must be straight with adequate step size to comfortably stand on both feet. Handrails on each side of the stairway must allow support at any position on the stairs and allow people to steady themselves during foreseeable conditions, including, but not limited to, moderate turbulence in flight. The handrails must be constructed, so that there will be no obstruction on them which will cause the user to release his/her grip on the handrail or will hinder the continuous movement of the hands along the handrail. Handrails must be terminated in a manner which will not obstruct pedestrian travel or create a hazard. Adequacy of the design must be demonstrated by using persons representative of the 5% female and the 95% male.
- (b) The ladder must be straight, one segment.
- (c) The steps of the ladder must have essentially rectangular treads. Treads and landings must be designed and demonstrated to be free of hazard. The landing area at the lower lobe and main deck level must be demonstrated to be adequate in terms of flow rate for the maximum number of people that will be using the stair in an emergency. Treads and risers must be designed to ensure an easy and safe use of the stairway.

- (d) General illumination must be provided so that, when measured along the centerlines of each tread of the stairway or ladder, the illumination is not less than 0.05 foot-candle. In normal operation, the general illumination level must not be less than 0.05 foot-candles. The assessment must be done under day light and dark of night conditions.
- (e) The stairway must accommodate the carriage of an incapacitated person from the lower lobe to the main deck. The crew member procedures for such carriage must be established.
- (f) The stairway must be designed such that evacuees can achieve an adequate rate for going up under probable emergency conditions, including a condition in which a person falls or is incapacitated while on a stairway.
- (g) The stairway must have a wall or the equivalent on each side to minimize the risk of falling and to facilitate use of the stairway under conditions of abnormal airplane attitude.
- (h) The stairway and ladder ends must be indicated by an exit sign visible to passengers when in the stairway. This exit sign must meet the requirements of §25.812(b)(1)(ii).
- (i) The public address system must be audible in the stairway during flight.
- (j) "No smoking" and "return to seat" signs must be installed and must be visible in the stairway both going up and down and at the stairway entrances.
- (k) Cabin crew procedures and positions must be established to manage the use of the stairs in flight under both normal and emergency situations. This may require that cabin crewmembers have specific dedicated duties for the management of the stairs during emergency and precautionary evacuations.
- (l) It should not be hazardous for crewmembers or passengers who are returning to their seats to use the stairway during moderate turbulence.

Upper Deck Occupancy and Main Deck to Upper Deck Curved Segmented Stairway:

- 28. The airplane is not operated for hire or offered for common carriage. This provision does not preclude the operator from receiving remuneration to the extent consistent with 14 CFR parts 125 and 91, subpart F, as applicable.
- 29. Occupancy of the upper deck passenger compartment is limited to a maximum of 9 passengers plus one flight attendant. There must be 9 seats or berths in the upper deck passenger compartment. Each approved seat and berth must be able to withstand the maximum flight loads when occupied.

30. There must be appropriate placard(s) displayed in a conspicuous place at each entrance to the upper deck passenger compartment to indicate:

- (a) The maximum number of passengers allowed in the upper deck during flight is 10 including the flight attendant;
- (b) In addition, at least one flight attendant must be in the upper deck at all times;
- (c) That occupancy is prohibited during taxi, take-off and landing except by the flight attendant;
- (d) That smoking is prohibited in the upper deck.

31. The following signs and placards must provided in the upper deck passenger compartment:

- (a) There must both visible and audible advisory/warning means in the upper deck passenger compartment to notify the occupants that they must exit the compartment. The visible and audible warning must be visible and audible from any part of the upper deck passenger compartment. The visible and audible advisory/warning must be controlled from the flight deck.

32. In lieu of the requirements specified in § 25.1439(a) at Amendment 25-38 that pertain to isolated compartments and to provide a level of safety equivalent to that which is provided for occupants of a small isolated galley, the following equipment must be provided in the upper deck passenger compartment:

- (a) At least one approved hand-held fire extinguisher appropriate for the kinds of fires likely to occur;
- (b) Two personal breathing equipment (PBE) devices approved to Technical Standard Order (TSO)-C116 or equivalent, suitable for fire fighting, or one PBE for each hand-held fire extinguisher, whichever is greater; and
- (c) One flashlight

33. Curved Segmented Staircase:

In addition to the requirements of 14 CFR 25.811 through 25.813, the curved segmented staircase must be evaluated for the following:

- (a) It must have entrance, exit, and gradient characteristics that would allow, with the airplane in level attitude and in each attitude resulting from the collapse of any one or more legs of the landing gear, the passengers of the upper deck, without assistance of a

crewmember, to commingle with passengers of the main deck during an emergency evacuation and exit the aircraft through a main deck exit. This must be shown by demonstration, tests, analysis or any combination thereof.

(b) The stairway must have a handrail on at least one side in order to allow passengers to steady themselves during foreseeable conditions, including but not limited to the condition of gear collapse on the ground and moderate turbulence in flight. The handrails must be constructed, so that there will be no obstruction on them which will cause the user to release his/her grip on the handrail or will hinder the continuous movement of the hands along the handrail. Handrails must be terminated in a manner which will not obstruct passengers travel or create a hazard.

(c) It must accommodate the carriage of an incapacitated person from the upper deck to the main deck. The crewmember procedures for such carriage must be established.

(d) It must be designed and located so as to provide evacuees an adequate descent rate under probable emergency conditions, including a condition in which a person falls or is incapacitated while on it.

(e) It must be designed and located to minimize damage to it during an emergency landing or ditching.

(f) General illumination must be provided so that when measured along the center lines of each tread and landing, the illumination is not less than 0.05 foot candle.

(g) Means must be provided to assist the occupants in locating the stairway in conditions of dense smoke. (This is the wording on page 24 of the petition.)

(h) Omitted.

(i) Omitted.

(j) An emergency exit sign meeting § 25.812(b)(1)(i) must be provided in the upper deck near the stairway visible to passengers approaching along the main aisle as required by § 25.811(d)(1). (This is the wording on page 24 of the petition.)

(k) The public address system must be audible in the stairway during all flight phases.

(l) "No smoking" and "return to seat" signs must be installed and must be visible in the stairway both going up and down and at the stairway entrances.

(m) Cabin crew procedures and positions must be established to manage the use of the stairs on the ground and in flight under both normal and emergency situations. This may

require that cabin crew members have specific dedicated duties for the management of the stairs during emergency and precautionary evacuations.

(n) It should not be hazardous for crew members or passengers who are returning to their seats to use the stairway during moderate turbulence.

(o) The stairway must have a handrail on at least one side in order to allow people to steady themselves during foreseeable conditions, including but not limited to the condition of gear collapse on the ground and moderate turbulence in flight. The handrail(s) must be constructed, so that there will be no obstruction on them which will cause the user to release his/her grip on the handrail or will hinder the continuous movement of the hands along the handrail. Handrail(s) must be terminated in a manner, which will not obstruct pedestrian travel or create a hazard. Persons representative of the 5% female and the 95% male must demonstrate adequacy of the design.

#### 34. Interdeck Communication:

An intercom and a two-way alerting means between passenger decks and between each passenger deck and the flight deck must be provided that meet the following requirements:

(a) They must remain operable in the event of the loss of the main power supply.

(b) They must be capable of providing crewmembers on all decks an immediate indication of an emergency situation on any deck.

#### 35. Emergency Lighting System:

In addition to the requirements of 14 CFR 25.812, the following apply:

(a) The upper deck emergency lighting system power supplies must be independent of the main deck emergency lighting system power supplies.

(b) The emergency lighting system must be designed so that after any single transverse vertical separation of the fuselage during a crash landing, not more than 25 percent of all required electrically illuminated emergency lights in the upper deck are rendered inoperative, in addition to the upper deck emergency lights that are directly damaged by the separation.

#### 36. Other factors to take into account:

(a) The familiarity of the crew and passengers with the specific aircraft and its associated emergency equipment and exits are a significant factor in the safety of this operation.

**IN THE PUBLIC INTEREST** - The approval of this Petition for Exemption would demonstrate the FAA's willingness to deal with the issues involved with this Exemption, and would be in the Public Interest for the following reasons:

There is no degradation of safety involved with this request and therefore no detrimental impact to the public at large; and

1. Given the proliferation of Executive Configured Transport Category Aircraft currently taking place, and anticipated in the near future, this type of exemption will enable US manufacturers of transport category aircraft greater flexibility to effectively compete in this expanding market; and
2. Additional sales of US manufactured transport aircraft outside the traditional airline market can only serve to increase profitability of US airframe manufacturers, giving greater job stability to the workers employed by those manufacturers; and
3. Greater stability of a work force as significant as the US aircraft manufacturers represent can only result in additional fuel to stabilize the economy of the US due to the normal household activity associated with stable workers; and
4. Stability and improved financial performance of the US airframe manufacturers translates into increased orders and stability in numerous other supporting manufacturing organizations; and
5. Increased sales of these executive configured transport aircraft will ultimately result in some portion of those aircraft being completed at US owned or operated Aircraft Completion Facilities, providing improved financial performance and work force stability for those organizations as well; and
6. Improved financial performance of US owned or operated corporations, and increased work force stability translates into continued and improved tax revenues for all governmental organizations involved; and
7. Improved financial performance allows US corporations to continue to invest in new R & D research which will allow the US to maintain or improve its competitive position in the world economy; and
8. A large number of these types of sales can be predicted to be to "offshore" clients, improving the US Balance of Trade Deficit significantly.

**PUBLIC COMMENT** – Because previous exemptions of this type have been granted and further because this exemption will affect only the subject aircraft, JAES does not believe that there is any interest among the general public in the outcome of this Petition

for Exemption and therefore requests that its publication in the Federal Register and Period for Public Comment be waived.

### ***Federal Register Publication***

A summary of the petition was published in *Federal Register* on June 30, 2010 (75 FR 37879). No comments were received.

### **The FAA's analysis**

As more and more transport category airplanes have been configured (or re-configured) for private 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 use of such airplanes. Because of this, we have received a number of petitions for exemption from certain regulations. We have granted such exemptions when we find that to do so is in the public interest and does not adversely affect the level of safety provided by the regulations. We recently published Special Requirements for Private Use Transport Category Airplanes, SFAR 109, which has significantly reduced the need for case-by-case review of individual petitions for exemption for private use airplanes. This SFAR, however, has a maximum passenger limit of 60 passengers and the subject airplane for this exemption has 72 passengers. Therefore, this airplane is not covered by the SFAR, hence the need for this exemption.

Whereas the petitioner refers to the changes in design considerations as “conditions” in their supporting information, the FAA refers to them as “limitations” to the exemption. Therefore, in our analysis and decision, we use the word “limitations.”

The FAA has reviewed the limitations proposed by the petitioner for the forward lower lobe passenger rest compartment and upper deck occupancy, and generally agrees with these limitations. However, there are several areas that must be modified and some limitations that need to be added to obtain an acceptable level of safety for this airplane.

In the petitioner's proposal there were several locations where subparagraphs were omitted in the numbering system. We have reorganized the limitations of the exemption to address this issue. Also, there was the condition that limited the airplane to private use only and was listed in both the forward lower lobe and upper deck sections. We removed it from those subsections and put it in general section applicable to the entire exemption.

For the forward lower lobe passenger rest area, we agree with applying the requirements of § 25.819 to this area with the exception of § 25.819(f), and have added that to this exemption (see limitation 1).

In reviewing the petitioner's proposal of occupancy we determined that we need to modify the proposal to clearly state the limitation for occupancy (see limitation 2).

In addition to the curved segmented stairway installation, Jet Aviation proposes to deactivate the 6R-Upper Deck exit door, and uses the 6L-Upper Deck exit as an emergency exit on the upper deck. The 6L-Upper Deck exit will have a divan installed immediately in front of it. Jet Aviation proposes to de-rate the 6L-Upper Deck exit that was originally type certificated as a Type A emergency exit to a Type III emergency exit due to the taxi, takeoff, and landing position of the flight attendant. The divan has a removable back cushion assembly, which will be removed and stowed during taxi, takeoff and landing in the event that the flight attendant in the upper deck compartment must utilize the 6L. To address this exit configuration we have added limitations to address the exit configuration (see limitations 28, 29, and 30).

For access to the Upper Deck exit and the evacuation means, the flight attendant would be required to step up to the divan base and to walk across it, and to step down a short ramp to reach the exit door threshold. Sufficient space exists outboard of the divan for the flight attendant to stand in preparation for transiting the slide and adequate aisle space exists to move past the table installed inboard of the divan. Actuation of the emergency exit is accomplished by pulling the operating handle inboard. Access and operation is unaffected by the divan in the TTL configuration. To address this access to the exit we have added an additional limitation (see limitation 30).

We have also added a limitation requiring some placarding displayed in a conspicuous place at each entrance to the upper deck passenger compartment to indicate the limitation for access and occupancy of the upper deck (see limitation 31).

The petitioner, in its public interest statement, maintains that there would be no degradation of safety. While a grant of exemption would not provide the same level of safety as would be afforded by strict compliance with the regulations, the resultant level of safety would be consistent with that in other private use airplanes. The level of safety that results from this exemption is specifically requested and desired by that segment of the public that will fly on these airplanes, the owners. The FAA considers that granting the petition is in the public interest for the reasons stated by the petitioner.

### **The FAA's Decision**

In consideration of the foregoing, I find that a grant of exemption is in the public interest and will not adversely affect the level of safety provided by the regulations. Therefore, pursuant to the authority contained in 49 U.S.C. 40113 and 44701, delegated to me by the Administrator, Jet Aviation Engineering Services L.P., is hereby granted an exemption from requirements of 14 CFR 25.601 and 25.819(f) to the extent necessary to allow installation of an executive interior on a "private, not-for-hire" Boeing Model 747-400 airplane, serial number 28343. Specifically, the exemption allows relief from the requirement to permit in-flight occupancy of the lower lobe passenger rest compartment and the upper deck of the airplane. This exemption is subject to this one following general limitation.

The airplane must not be operated for hire or offered for common carriage. This provision does not preclude the operator from receiving remuneration to the extent consistent with 14 CFR parts 125 and 91, subpart F, as applicable.

Other specific limitations are as follows:

**Forward Lower Lobe Passenger Rest Compartment:**

1. All requirements of § 25.819, except paragraph (f), must be met. Section 25.819(f), the requirement for forward or aft facing seating, is omitted because the compartment will not be occupied during taxi, take-off and landing operations.
2. Occupancy of the forward lower lobe passenger rest compartment is limited to a maximum 17 passengers plus one trained crewmember. There must be 18 seats or berths in the forward lower lobe passenger rest compartment. Each approved seat and berth must be able to withstand the maximum flight loads when occupied.
3. There must be appropriate placard(s) displayed in a conspicuous place at each entrance to the forward lower lobe passenger rest compartment to indicate:
  - (a) The maximum number of passengers allowed is 17 plus one trained crewmember;
  - (b) That occupancy must include at least one crewmember that has been trained in the evacuation procedures for the forward lower lobe passenger rest compartment;
  - (c) That occupancy is prohibited during taxi, takeoff and landing;
  - (d) That smoking is prohibited in the forward lower lobe passenger rest compartment;
  - (e) That hazardous quantities of flammable fluids, explosives, or other dangerous cargo are prohibited from the forward lower lobe passenger rest compartment;
  - (f) That stowage in the forward lower lobe passenger rest compartment must be limited to emergency equipment, airplane-supplied equipment (e.g., bedding), galley service items, lavatory amenities and small personal items; cargo or passenger baggage is not allowed.
4. There must be at least one ashtray located conspicuously on or near the entry side of any entrance to the forward lower lobe passenger rest compartment.
5. There must be a means to prevent passengers from entering the compartment in the event of an emergency or when no trained crewmember is present.
6. The main deck stair doorway must be closed and locked during taxi, takeoff, and landing, and must remain open when the forward lower lobe passenger compartment is occupied. When the

main deck stair doorway is open, the stairs must be adequately illuminated so that occupants have a clear view of the stairs.

7. For all doors installed in the evacuation routes, there must be a means to preclude anyone from being trapped inside the compartment. If a locking mechanism is installed, it must be capable of being unlocked from the outside without the aid of special tools. The lock must not prevent opening from the inside of the compartment at any time.

8. There must be at least two emergency evacuation routes, each of which can be used by each occupant of the forward lower lobe passenger rest compartment to rapidly evacuate to the main cabin. The exit door/hatch for each route must be able to be closed from the main cabin after evacuation. In addition--

(a) The routes must be located with one at each end of the compartment.

(b) The routes must be designed to minimize the possibility of blockage, which might result from fire, mechanical or structural failure, or persons standing on top of or against the escape route. If an evacuation route utilizes an area where normal movement of passengers occurs, it must be demonstrated that passengers would not impede egress to the main deck. At the point at which the evacuation route terminates from the aft overhead hatch into the Medical Room, special consideration must ensure that the hatch or door can be opened when a person, the weight of a ninety-fifth percentile male, is standing on the hatch or door. The use of evacuation routes must not be dependent on any powered device. If there is low headroom at or near an evacuation route, provisions must be made to prevent or to protect occupants (of the forward lower lobe passenger rest compartment) from head injury.

(c) Emergency evacuation procedures, including the emergency evacuation of an incapacitated occupant from the forward lower lobe passenger rest compartment, must be established. All of these procedures must be transmitted to the airplane operator for incorporation into their training programs and appropriate operational manuals.

(d) There must be a limitation in the Airplane Flight Manual or other suitable means requiring that crewmembers be trained in the use of evacuation routes.

9. There must be a means for the evacuation of an incapacitated person (representative of a 95th percentile male) from the forward lower lobe passenger rest compartment to the passenger cabin floor. The evacuation must be demonstrated for all evacuation routes. A flight attendant or other crewmember (a total of one assistant within the forward lower lobe passenger rest compartment) may provide assistance in the evacuation. Additional assistance may be provided by up to three persons in the main passenger compartment. For evacuation routes having stairways, the additional assistants may descend down to one half the elevation change from the main deck to the lower deck compartment, or to the first landing, whichever is higher.

10. The following signs and placards must be provided in the forward lower lobe passenger rest compartment:

(a) At least one exit sign, located near each exit, meeting the requirements of § 25.812(b)(1)(i), at Amendment 25-58, except that a sign with reduced background area of no less than 5.3 square inches (excluding the letters) may be utilized, provided that it is installed such that the material surrounding the exit sign is light in color (e.g., white, cream, light beige). If the material surrounding the exit sign is not light in color, a sign with a minimum of a one-inch wide background border around the letters would be acceptable;

(b) An appropriate placard located near each exit defining the location and the operating instructions for each evacuation route;

(c) Placards must be readable from a distance of 30 inches under emergency lighting conditions; and

(d) The exit handles and evacuation path operating instruction placards must be illuminated to at least 160 micro lamberts under emergency lighting conditions.

(e) A visual means must be provided in the cockpit to advise the flightcrew when the forward lower lobe access door is open. This is to ensure the flightcrew is aware of that situation and can take appropriate action to evacuate the proposed forward lower lobe passenger compartment. This means must be active when the flaps are not retracted or the landing gear is deployed.

(f) There must be an “on/off” visual advisory/warning stating “No Entry” (or similar words) to be located outside and near the entrance door from the main deck to the proposed forward lower lobe passenger compartment. The advisory warning must be controlled from the flightdeck. This is to prevent someone entering the proposed forward lower lobe passenger compartment when it is not supposed to be occupied.

(g) There must be both visible and aural advisory/warning means in the forward lower lobe passenger compartment to notify the occupants that they must exit the forward lower lobe passenger compartment. Both means must be intelligible and must be seen and heard from any part of the forward lower lobe passenger compartment. These means must be controlled from the flightdeck.

11. There must be a means in the event of failure of the airplane's main power system, or of the normal forward lower lobe passenger rest compartment lighting system, for emergency illumination to be automatically provided for the forward lower lobe passenger rest compartment.

(a) This emergency illumination must be independent of the main lighting system.

(b) The sources of general cabin illumination may be common to both the emergency and the main lighting systems if the power supply to the emergency lighting system is independent of the power supply to the main lighting system.

(c) The illumination level must be sufficient for the occupants of the forward lower lobe passenger rest compartment to locate and transfer to the main passenger cabin floor by means of each evacuation route. This illumination level must be provided for sufficient time for all occupants to evacuate the compartment under worst case conditions.

(d) The illumination level must be sufficient with the privacy curtains in the closed position for each occupant of the forward lower lobe passenger rest compartment to locate a deployed oxygen mask.

12. There must be means for two-way voice communications between crewmembers on the flightdeck and occupants of the forward lower lobe passenger rest compartment. There must also be public address (PA) system microphones at each flight attendant seat required to be near a floor level exit in the passenger cabin per § 25.785(h) at Amendment 25-51. The PA system must allow two-way voice communications between flight attendants and the occupants of the forward lower lobe passenger rest compartment, except that one microphone may serve more than one exit provided the proximity of the exits allows unassisted verbal communication between seated flight attendants.

13. There must be a means for manual activation of an aural emergency alarm system, intelligible during normal and emergency conditions, to enable crewmembers on the flightdeck and at each pair of required floor level emergency exits to alert occupants of the forward lower lobe passenger rest compartment of an emergency situation. Use of a public address or crew interphone system will be acceptable, provided an adequate means of differentiating between normal and emergency communications is incorporated. The system must be powered in flight for at least ten minutes after the shutdown or failure of all engines and auxiliary power units (APU) or the disconnection or failure of all power sources that are dependent on the continued operation of the engines and APUs.

14. There must be a means, readily detectable by seated or standing occupants of the forward lower lobe passenger rest compartment, which indicates when seat belts should be fastened. In the event there are no seats, at least one means must be provided to cover anticipated turbulence (e.g., sufficient handholds). Seat belt type berthing restraints must be provided for berths and must be compatible for the sleeping attitude during cruise conditions. There must be a placard on each berth requiring that berthing restraints must be fastened when occupied. If compliance with any of the other requirements of these limitations is predicated on specific head location, there must be a placard identifying the head position.

15. In lieu of the requirements specified in § 25.1439(a), at Amendment 25-38, that pertain to isolated compartments, and to provide a level of safety equivalent to that which is provided for occupants of a small isolated galley, the following equipment must be provided in the forward lower lobe passenger rest compartment:

(a) At least one approved hand-held fire extinguisher appropriate for the kinds of fires likely to occur;

(b) Two protective breathing equipment (PBE) devices approved to Technical Standard Order (TSO)-C116 or equivalent, suitable for fire fighting, or one PBE for each hand-held fire extinguisher, whichever is greater; and

(c) One flashlight.

16. A smoke or fire detection system (or systems) must be provided that monitors each occupiable area within the forward lower lobe passenger rest compartment, including those areas partitioned by curtains. Flight tests must be conducted to show compliance with this requirement. Each system (or systems) must provide:

(a) A visual indication to the flightdeck within one minute after the start of a fire;

(b) An aural warning in the forward lower lobe passenger rest compartment; and

(c) A warning in the main passenger cabin. This warning must be readily detectable by a flight attendant, taking into consideration the positioning of flight attendants throughout the main passenger compartment during various phases of flight.

17. The forward lower lobe passenger rest compartment must be designed such that fires within the compartment can be controlled without a crewmember having to enter the compartment, or the design of the access provisions must allow crewmembers equipped for fire fighting to have unrestricted access to the compartment. The time for a crewmember on the main deck to react to the fire alarm, to don the fire fighting equipment, and to gain access must not exceed the time for the compartment to become smoke-filled, making it difficult to locate the fire source.

18. There must be a means provided to exclude hazardous quantities of smoke or extinguishing agent originating in the forward lower lobe passenger rest compartment from entering any other compartment occupied by crewmembers or passengers. This means must include the time periods during the evacuation of the forward lower lobe passenger rest compartment and, if applicable, when accessing the forward lower lobe passenger rest compartment to manually fight a fire. Smoke entering any other compartment occupied by crewmembers or passengers when the access to the forward lower lobe passenger rest compartment is opened, during an emergency evacuation, must dissipate within five minutes after the access to the forward lower lobe passenger rest compartment is closed. Hazardous quantities of smoke may not enter any other compartment occupied by crewmembers or passengers during subsequent access to manually

fight a fire in the forward lower lobe passenger rest compartment (the amount of smoke entrained by a firefighter exiting the forward lower lobe passenger rest compartment through the access is not considered hazardous). During the 1-minute smoke detection time, penetration of a small quantity of smoke from the forward lower lobe passenger rest compartment into an occupied area is acceptable provided it dissipates rapidly (i.e., less than 5 minutes). Flight tests must be conducted to show compliance with this requirement.

19. There must be a supplemental oxygen system within the passenger rest compartment as follows:

(a) There must be at least two masks for each berth, two masks for each seat that is not adjacent to another seat, and four masks for each divan that seats three occupants.

(b) There must also be an oxygen mask readily accessible to each occupant that can reasonably be expected to be either transitioning from the main cabin into the passenger rest compartment, transitioning within the rest compartment, or transitioning from the passenger rest compartment to the main cabin.

(c) The system must provide an aural and visual alert to warn the occupants of the passenger rest compartment to don oxygen masks in the event of decompression. The aural and visual alerts must activate concurrently with the deployment of the oxygen masks in the passenger cabin. To compensate for sleeping occupants, the aural alert must be heard in each section of the rest compartment and must sound continuously for a minimum of five minutes or until a reset switch within the rest compartment is activated. A visual alert that informs occupants that they must don an oxygen mask must be visible in each section.

(d) There must also be a means by which the oxygen masks can be manually deployed from the flightdeck.

(e) Procedures for rest compartment occupants in the event of decompression must be established. These procedures must be transmitted to the operator for incorporation into their training programs and appropriate operational manuals.

(f) The supplemental oxygen system for the passenger rest shall meet the same part 25 regulations as the supplemental oxygen system for the passenger cabin occupants.

(g) The illumination level of the normal passenger rest compartment lighting system must be sufficient for each occupant of the compartment to locate a deployed oxygen mask.

(h) A placard indicating the location of a reclined occupant's head is required if access to a deployed oxygen mask depends upon the orientation of the reclined occupant.

20. The following requirements apply to the several sections divided by installation of curtains or partitions:

(a) A placard is required adjacent to each curtain that visually divides or separates, for privacy purposes, the passenger rest compartment into small sections. The placard must require that the curtain(s) remains open when the private section it creates is unoccupied.

(b) For each section of the passenger rest compartment created by the installation of a curtain, the following requirements of these limitations must be met with the curtain open or closed:

- (1) No smoking placard (limitation 4(d)),
- (2) Emergency illumination (limitation 11),
- (3) Emergency alarm system (limitation 13),
- (4) Seat belt fasten signal or return to seat signal as applicable (limitation 14),
- (5) The smoke or fire detection system (limitation 16), and
- (6) The oxygen system (limitation 19).

21. Where a waste disposal receptacle is fitted, it must be equipped with a built-in fire extinguisher designed to discharge automatically upon occurrence of a fire in the receptacle.

22. Materials (including finishes or decorative surfaces applied to the materials) must comply with the flammability requirements of § 25.853, at Amendment 25-59. Mattresses must comply with the flammability requirements of § 25.853(b) and (c), at Amendment 25-59.

23. All lavatories within the forward lower lobe passenger rest compartment are required to meet the same requirements as those for a lavatory installed on the main deck except with regard to above condition 16 for smoke detection.

24. All enclosed stowage compartments within the forward lower lobe passenger rest compartment that are not limited to stowage of emergency equipment or airplane-supplied equipment (e.g., bedding) must meet the design criteria given in the table below. As indicated by the table, this condition does not address enclosed stowage compartments greater than 200 ft<sup>3</sup> in interior volume. The in-flight accessibility of very large enclosed stowage compartments and the subsequent impact on the crewmembers ability to effectively reach any part of the compartment with the contents of a hand fire extinguisher will require additional fire protection considerations similar to those required for inaccessible compartments such as Class C cargo compartments.

Fire protection features	Stowage compartment interior volumes		
	less than 25 ft <sup>3</sup>	25 ft <sup>3</sup> to 57 ft <sup>3</sup>	57 ft <sup>3</sup> to 200 ft <sup>3</sup>
Materials of Construction <sup>(a)</sup>	Yes	Yes	Yes
Detectors <sup>(b)</sup>	No	Yes	Yes
Liner <sup>(c)</sup>	No	No	Yes
Locating Device <sup>(d)</sup>	No	Yes	Yes

(a) Materials of Construction:

The material used to construct each enclosed stowage compartment must at least be fire resistant and must meet the flammability standards established for interior components per the requirements of § 25.853. For compartments less than 25 ft<sup>3</sup> in interior volume, the design must ensure the ability to contain a fire likely to occur within the compartment under normal use.

(b) Detectors:

Enclosed stowage compartments equal to or exceeding 25 ft<sup>3</sup> in interior volume must be provided with a smoke or fire detection system to ensure that a fire can be detected within a one-minute detection time. Flight tests must be conducted to show compliance with this requirement. Each system (or systems) must provide:

- (1) A visual indication in the flightdeck within one minute after the start of a fire;
- (2) An aural warning in the forward lower lobe passenger rest compartment; and
- (3) A warning in the main passenger cabin. This warning must be readily detectable by a flight attendant, taking into consideration the positioning of flight attendants throughout the main passenger compartment during various phases of flight.

(c) Liner:

If it can be shown that the material used to construct the stowage compartment meets the flammability requirements of a liner for a Class B cargo compartment, then no liner would be required for enclosed stowage compartments equal to or greater than 25 ft<sup>3</sup> in interior volume but less than 57 ft<sup>3</sup> in interior volume. For all enclosed stowage compartments equal to or greater than 57 ft<sup>3</sup> in interior volume but less than or equal to 200 ft<sup>3</sup>, a liner must be provided that meets the requirements of § 25.855, at Amendment 25-72, for a Class B cargo compartment.

(d) Device Location:

Detector areas which contain enclosed stowage compartments exceeding 25 ft<sup>3</sup> interior volume and which are located away from one central location such as the entry to the forward lower lobe passenger rest compartment or a common area within the forward lower lobe passenger rest compartment would require additional fire protection features and/or devices to assist the firefighter in determining the location of a fire.

25. Training Manuals and Training must include:

(a) Use and actions associated with the warnings and placards specified herein.

(b) Accessing and exiting the forward lower lobe passenger compartment including emergency evacuation (includes above limitations 3, 4, 5, 6, 8(a), 8(b), 8(c), 8(d), and 9.

(c) Maintaining an exit path aisle and access to the evacuation routes (associated with above condition 3(b).

26. Each stairway and ladder between the forward lower lobe passenger compartment and the main deck must meet the following requirements:

(a) The stairway must be straight, but can be in non-parallel segments, with adequate step size to comfortably stand on both feet. Handrails on each side of the stairway must allow support at any position on the stairs and allow people to steady themselves during foreseeable conditions, including, but not limited to, moderate turbulence in flight. The handrails must be constructed, so that there will be no obstruction on them which will cause the user to release his/her grip on the handrail or will hinder the continuous movement of the hands along the handrail. Handrails must be terminated in a manner that will not obstruct pedestrian travel or create a hazard. Adequacy of the design must be demonstrated by using persons representative of the 5 percent female and the 95 percent male.

(b) The ladder must be straight, one segment.

(c) The steps of the ladder must have essentially rectangular treads. Treads and landings must be designed and demonstrated to be free of hazard. The landing area at the lower lobe and main deck level must be demonstrated to be adequate in terms of flow rate for the maximum number of people that will be using the stair in an emergency. Treads and risers must be designed to ensure an easy and safe use of the stairway.

(d) General illumination must be provided so that, when measured along the centerlines of each tread of the stairway or ladder, the illumination is not less than 0.05 foot-candle. In normal operation, the general illumination level must not be less than 0.05 foot-candles. The assessment must be done under day light and dark of night conditions.

(e) The stairway must accommodate the carriage of an incapacitated person from the lower lobe to the main deck. The crewmember procedures for such carriage must be established.

(f) The stairway must be designed such that evacuees can achieve an adequate rate for going up under probable emergency conditions, including a condition in which a person falls or is incapacitated while on a stairway.

(g) The stairway must have a wall or the equivalent on each side to minimize the risk of falling and to facilitate use of the stairway under conditions of abnormal airplane attitude.

(h) The stairway and ladder ends must be indicated by an exit sign visible to passengers when in the stairway. This exit sign must meet the requirements of § 25.812(b)(1)(ii).

(i) The public address system must be intelligible in the stairway during flight.

(j) "No smoking" and "return to seat" signs must be installed and must be visible in the stairway both going up and down and at the stairway entrances.

(k) Cabin crew procedures and positions must be established to manage the use of the stairs in flight under both normal and emergency situations. This may require that cabin crewmembers have specific dedicated duties for the management of the stairs during emergency and precautionary evacuations.

(l) It should not be hazardous for crewmembers or passengers who are returning to their seats to use the stairway during moderate turbulence.

#### **Upper Deck Occupancy and Main Deck to Upper Deck Curved Segmented Stairway:**

27. Occupancy of the upper deck passenger compartment is limited to one flight attendant only during taxi, take off, and landing. This flight attendant is required whenever passengers are carried on the airplane. There must be at least one takeoff and landing flight attendant seat on the upper deck. During flight nine passengers and one flight attendant can occupy the upper deck. There must be 9 passenger seats or berths in the upper deck passengers compartment. Each approved seat and berth must be able to withstand the maximum flight loads when occupied.

28. Emergency Exits:

The following limitations apply:

(a) At least one emergency exit meeting the dimensional requirements of a Type III exit must be installed on the upper deck cabin.

(b) At least one stairway must be installed between the upper deck and the main deck.

(c) Compliance with § 25.807, at Amendment 25-72, must be shown.

29. Emergency Exit Arrangement:

In addition to the requirements of § 25.809, at Amendment 25-34, the following apply:

(a) The upper deck emergency exit must have an approved means to assist the flight attendant in descending to the ground.

(b) The assisting means must be a self-supporting slide or equivalent.

(c) Assisting means must be automatically erected within 10 seconds from the time the opening means of the exit is actuated.

(d) Upper deck emergency evacuation slide must be useable in 25-knot winds, directed from the most critical angle, so as to evacuate passengers to the ground without outside assistance.

30. Emergency Exit Access:

In addition to the requirements of § 25.813, at Amendment 25-46, the emergency exit access must be evaluated for the following:

(a) Any minor obstructions to emergency exit access must lie outside the projected opening requirements for the door classification.

(b) Any procedures used to render the emergency exit accessible (such as removing divan back) must be accomplished before taxi, takeoff, and landing and must be verified by cabin crew as part of the cabin cross-check. Instructions for the preparation of the emergency exit must be conspicuously marked and readable by all persons seated adjacent to the exit.

(c) Any features that must be removed to render the emergency exit accessible must be stowed and restrained for taxi, takeoff, and landing in compliance with § 25.789 (a), at Amendment 25-45.

31. The following signs and placards must be provided in the upper deck passenger compartment:

There must both visible and audible advisory/warning means in the upper deck passenger compartment to notify the occupants that they must exit the compartment. The visible and audible warning must be visible and audible from any part of the upper deck passenger compartment. The visible and audible advisory/warning must be controlled from the flightdeck.

32. In lieu of the requirements specified in § 25.1439(a), at Amendment 25-38, that pertain to isolated compartments and to provide a level of safety equivalent to that which is provided for occupants of a small isolated galley, the following equipment must be provided in the upper deck passenger compartment:

(a) At least one approved hand-held fire extinguisher appropriate for the kinds of fires likely to occur;

(b) Two protective breathing equipment (PBE) devices approved to Technical Standard Order (TSO)-C116 or equivalent, suitable for fire fighting, or one PBE for each hand-held fire extinguisher, whichever is greater; and

(c) One flashlight.

33. There must be appropriate placard(s) displayed in a conspicuous place at each entrance to the upper deck passenger compartment to indicate:

(a) The maximum number of passengers allowed in the upper deck during flight is 9;

(b) In addition, at least one flight attendant must be in the upper deck at all times;

(c) That occupancy is prohibited during taxi, take-off and landing except by the flight attendant;

(d) That smoking is prohibited in the upper deck.

34. Curved Segmented Staircase:

In addition to the requirements of §§ 25.811, at Amendment 25-46; 25.812, at Amendment 25-31; and 25.813, at Amendment 25-46; the curved segmented staircase must be evaluated for the following:

(a) It must have entrance, exit, and gradient characteristics that would allow, with the airplane in level attitude and in each attitude resulting from the collapse of any one or more legs of the landing gear, the passengers of the upper deck, without assistance of a crewmember, to commingle with passengers of the main deck during an emergency evacuation and exit the airplane through a main deck exit. This must be shown by demonstration, tests, analysis or any combination thereof.

(b) The stairway must have a handrail on at least one side in order to allow passengers to steady themselves during foreseeable conditions, including but not limited to the condition of gear collapse on the ground and moderate turbulence in flight. The handrails must be constructed, so that there will be no obstruction on them which will cause the user to release

his/her grip on the handrail or will hinder the continuous movement of the hands along the handrail. Handrails must be terminated in a manner that will not obstruct passengers travel or create a hazard. Persons representative of the 5 percent female and the 95 percent male must demonstrate adequacy of the design.

(c) It must accommodate the carriage of an incapacitated person from the upper deck to the main deck. The crewmember procedures for such carriage must be established.

(d) It must be designed and located so as to provide evacuees an adequate descent rate under probable emergency conditions, including a condition in which a person falls or is incapacitated while on it.

(e) It must be designed and located to minimize damage to it during an emergency landing or ditching.

(f) General illumination must be provided so that when measured along the center lines of each tread and landing, the illumination is not less than 0.05 foot candle.

(g) Means must be provided to assist the occupants in locating the stairway in conditions of dense smoke.

(h) An emergency exit sign meeting § 25.812(b)(1)(i) must be provided in the upper deck near the stairway visible to passengers approaching along the main aisle as required by § 25.811(d)(1).

(i) The public address system must be intelligible in the stairway during all flight phases.

(j) "No smoking" and "return to seat" signs must be installed and must be visible in the stairway both going up and down and at the stairway entrances.

(k) Cabin crew procedures and positions must be established to manage the use of the stairs on the ground and in flight under both normal and emergency situations. This may require that cabin crewmembers have specific dedicated duties for the management of the stairs during emergency and precautionary evacuations.

(l) It should not be hazardous for crewmembers or passengers who are returning to their seats to use the stairway during moderate turbulence.

### 35. Interdeck Communication:

An intercom and a two-way alerting means between passenger decks and between each passenger deck and the flightdeck must be provided that meet the following requirements:

(a) They must remain operable in the event of the loss of the main power supply.

(b) They must be capable of providing crewmembers on all decks an immediate indication of an emergency situation on any deck.

36. Emergency Lighting System:

In addition to the requirements of § 25.812, the following apply:

(a) The upper deck emergency lighting system power supplies must be independent of the main deck emergency lighting system power supplies.

(b) The emergency lighting system must be designed so that after any single transverse vertical separation of the fuselage during a crash landing, not more than 25 percent of all required electrically illuminated emergency lights in the upper deck are rendered inoperative, in addition to the upper deck emergency lights that are directly damaged by the separation.

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*/s/ Robert D. Breneman*

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