Exemption No. 9302A

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
KANSAS CITY, MO 64106

In the matter of the petition of **Embraer** for an exemption from § 23.3(d) of Title 14, Code of Federal Regulations	**Regulatory Docket No. FAA-2006-26659**

AMENDMENT TO GRANT OF EXEMPTION

By letter dated October 11, 2006, Sergio Augusto Viana deCarvalho, Certification Manager, Embraer Empresa Brasileira de Aeronautica S.A., Av. Brig, Faria Lima, 2170, Putim, 12227-901 – Sao Jose dos Campos – SP, Brazil petitioned the Federal Aviation Administration (FAA) on behalf of Embraer for an exemption from 14 CFR part 23, § 23.3(d). The exemption was granted on June 1, 2007 to allow the EMB-505 to be certificated in the Commuter Category of 14 CFR part 23.

The exemption, as granted, allows the Embraer model EMB-505, a two engine turbojet airplane to be type certified in the commuter category. Under 14 CFR part 23, § 23.3(d), the commuter category is currently limited to propeller driven multiengine aircraft.

After granting the exemption, the FAA re-examined the *Conditions and Limitations* as originally granted. In comparing the *Conditions and Limitations* to the text of the applicant's exemption request letter, the FAA determined that while Embraer had voluntarily adopted the emergency landing dynamic conditions of 14 CFR part 23, § 23.562, (which are not required for commuter category airplanes), the requirement to comply with this regulation was not listed in the *Conditions and Limitations*. This amendment to the exemption adds the requirement to meet the provisions of § 23.562 to the *Conditions and Limitations* of this exemption to positively assert that compliance with § 23.562 is required as part of the granting of the exemption.

The petitioner requires relief from the following regulation:

Section 23.3(d) prescribes that "The commuter category is limited to propeller-driven, multiengine airplanes ...."

The petitioner supports its request with the following information:

(NOTE: The following is from the petitioner's letter of October 11, 2006.)

"Summary of Regulation and Description of the Relief Sought by Petition

"14 CFR § 23.3(d)

"The commuter category is limited to propeller-driven, multiengine airplanes that have a seating configuration, excluding pilot seats, of 19 or less, and a maximum certificated takeoff weight of 19,000 pounds or less. The commuter category operation is limited to any maneuver incident to normal flying, stalls (except whip stalls), and steep turns, in which the angle of bank is not more than 60 degrees.

"Petition Summary

"Embraer seeks relief from the limit in 23.3(d) that permits only propeller-driven airplanes to be certificated in commuter category. This petition will allow certification of the turbojet/turbofan-powered Embraer EMB-505 in the commuter category of 14 CFR Part 23.

"Why Granting this Petition will Result in a Level of Safety at least Equal to that Provided by the Rule From Which Exemption is Requested

"Embraer believes that certification in the commuter category of 14 CFR Part 23 of turbojet/turbofan-powered airplanes with gross weights between 12,500 lbs. and 19,000 lbs. is justified on safety grounds. As described in more detail below, there is a significant increase in the level of safety provided by jet powered airplanes compared to turbo-propeller powered airplanes of the same weight. This overall increase in safety significantly outweighs the small increases in the level of precaution required in some particular situations (as discussed below).

"Safety Comparison between Turbojet[/Turbofan] and Turboprop-powered Airplanes

"Similar to the jump in safety and robustness provided by turboprops compared to reciprocating engines, turbojet[/turbofan]-powered airplanes are similarly safer and more capable than those with turboprops. In almost every respect, a jet [turbojet/turbofan]-engine airplane is safer than a similar airplane with turboprops.

"The propulsion system is significantly more reliable because the complexity of the propeller and its governing system is removed. In addition to that, the remaining failure modes are more benign because propeller failures are eliminated and the engine-out handling qualities are much better than those of turboprops. Handling qualities in general are better because of the lack of propeller effect. The cockpit environment is much improved due to lower levels of noise and vibration, which causes less crew fatigue.

"The excess thrust for a jet is significantly higher in both the normal all-engine configuration as well as with one engine inoperative, which provides much better climb performance. The higher excess thrust also provides more protection from the adverse effect of icing on performance. The performance from jet engines provides the ability to climb above much adverse weather like icing, turbulence, and embedded thunderstorms. The higher cruise speeds provide more ability to maneuver around weather.

"In a study done for the International Business Aviation Council, Robert Breiling and Associates conducted an analysis of accidents in business aircraft that occurred worldwide between 1998 and 2002. This study provides a good way to look at the level of safety provided by turbojet[/turbofan] and turboprop airplanes because it focuses on a type of operation where the fleet size and operating hours are relatively balanced between the two types of airplanes. Although commercial aircraft accident data is typically more reliable due to better recordkeeping and due to more in-depth accident investigations, the fleet is more heavily skewed to turbojet[/turbofan] engines. The report separates the data into different categories, like type of operation (charter or Part 91), professionally-flown compared to owner-flown, and between turbojets[/turbofans] and turboprops.

"The overall accident rate for turbojet[/turbofan]-powered business airplanes is three times lower than that for similar turboprops (0.53/100K hours compared to 1.47/100K hours). The fatal accident rate shows roughly the same difference (0.16/100K hours compared to 0.53/100K hours). This is a clear indication that, for airplanes being used in a similar operating environment, jet [Turbojet/Turbofan]-engine airplanes provide a significantly higher level of safety than turboprops.

"Certification Requirements in Excess of 14 CFR Part 23

"As part of the certification basis of the EMB-505, Embraer will voluntarily adopt the emergency landing dynamic condition requirements of Amendment 50 to 14 CFR § 23.562. This is currently not required for certification in commuter category, but will provide for increased occupant protection in the event of a crash landing compared to the existing requirements in 14 CFR Part 23.

"Situations when Turbojets[/Turbofans] May Require Higher Level of Precautions

"There are some situations when a jet [Turbojet/Turbofan]-engine airplane may require higher level of precautions because of the operating environment or because of special characteristics of jet [Turbojet/Turbofan]-engine airplanes, but in these cases there are either special certification requirements that provide compensation or other means (like pilot training) will be used to address the hazard.

"Jet [Turbojet/Turbofan] airplanes will operate at higher altitudes, where the risk of decompression sickness or hypoxia is higher in the event of cabin depressurization, but the EMB-505 will show compliance to the high altitude special condition which is designed to compensate for the risk from this more hazardous environment.

"The higher operating speeds of jet [Turbojet/Turbofan] airplanes could have an adverse impact on flight crew workload, but the EMB-505 will be certificated to the same workload standards of 14 CFR § 23.1523 for all approved kinds of operation (VFR, IFR, day/night, icing, RVSM). The human factors centered design and certification process will be similar to that used for Part 25.

"Some small jets [Turbojets/Turbofans] have had runway overruns, normally on landing. These problems have not typically been due to aircraft design problems or system failures, but rather from pilots failing to plan and fly the approaches so they reliably touch down in the touchdown zone at the correct speed. Because this issue is more related to pilot behavior than design, Embraer's ability to influence this issue is limited, but we do plan to augment the stopping ability of the EMB-505 as much as possible with the provisions of anti-skid and ground spoiler systems. This, coupled with special emphasis during training of the importance of airspeed and glidepath control during approach, will minimize the probability of overruns in service.

"FAA's FAR 125/135 ARC

"In 2003, FAA chartered a group to examine a range of regulatory issues including new aircraft types and technologies. As part of this effort, a working group examined the certification requirements for small jets. This group reviewed the applicable Part 23 requirements and the special conditions that have been levied for Part 23 jets. They also reviewed data from over 600 accidents that occurred in business jets, Part 23 turboprops, and light twins less than 6,000 lbs.

"The group determined that the existing Part 23 requirements are an appropriate certification standard for jets up to 19,000 lbs. The group expressed the concern that to levy additional requirements would serve as an economic disincentive to the development of safer airplanes.

"Why the Granting of This Exemption Petition Would be in the Public Interest

"As outlined above the granting of this exemption would actually improve the level of safety compared to other airplanes certificated in this category. This is obviously in the public interest.

"Certification in commuter category will allow the EMB-505 to be certified for lower cost compared to transport category. This cost savings will allow the benefits of safer jet [Turbojet/Turbofan]-powered travel to be available to more of the general public.

"Although the EMB-505 will be manufactured outside the United States, many of the suppliers of systems like the avionics, flight controls, and mechanical systems are from the United States, so there will be benefits to the American economy from increased gross domestic product, increased tax revenue, and improvements in the American balance of trade. These benefits will accrue to the general American economy which is in the public interest.

"Operating with the Exemption outside the United States

"As an airplane manufacturer, Embraer will not operate under this exemption outside the United States. Owners and operators of US-registered EMB-505s, which will hold US certificates of airworthiness, will be able to operate outside the United States.

"ICAO Annex 8 does not include provisions for a specific certification category similar to commuter category. Certification of airplanes above 12,500 lbs. (5,700 kilograms) maximum takeoff weight with 14 CFR Part 23, regardless of type of propulsion, is therefore technically not compliance with Annex 8. FAA has previously filed a difference with ICAO addressing this issue and the granting of this petition is within the limits of that filing.

"Summary

"As outlined above, the small [turbojet/turbofan] jets provide a significantly higher level of safety than turboprop airplanes. The benefits in reliability, failure effect, human factors, and performance provided by [turbojet/turbofan] jet-powered airplanes are reflected in accident rates. In the specific areas where jets have design-related differences where the risk for jets is higher, special conditions will be used to impose Part 25-like requirements.

"The introduction of small jets like the EMB-505 will do much to increase the level of safety afforded to the public desiring to use this type of transportation. To levy increased requirements like those in Part 25 will add little or nothing to safety while significantly increasing cost, and may actually result in a lower level of safety by impeding the development of cost-competitive turbojet[/turbofan] powered airplanes.

"Embraer believes that granting this petition would serve the public interest. The higher level of safety of [turbojet/] turbofan engine aircraft then [sic] turboprop and the high level of technological development of these new small [turbojet/] turbofan airplanes has created the potential for simple, low-cost aircraft with a greater utility and higher level of safety. This increased level of safety, coupled with the economic benefits described above, are sufficient to meet the requirements of 14 CFR § 11.81 to justify the granting of this petition."

Comments on published petition summary:

A summary of this petition was published in the FEDERAL REGISTER for public comment on January 31, 2007 (72 FR 4557). The comment period closed February 20, 2007. No comments were received.

The FAA has reviewed the petitioner's supporting information and provides the following:

To obtain this exemption, the petitioner must show, as required by § 11.81, that: (1) granting the request is in the public interest, and (2) the exemption will not adversely affect safety, or that a level of safety will be provided that is equal to that provided by the rules from which the exemption is sought.

While not agreeing with the petitioner's every detail, the FAA agrees with the substance of the supporting information and finds no reason to deny the petition.

On October 9, 2006, Embraer applied for type certification of the EMB-505 a multiengine turbofan aircraft in the commuter category under 14 CFR part 23 including Amendments 23-1 through 23-55, 14 CFR 34 and 36, and special conditions. While the commuter category represents an overall higher level of safety than the normal category, the commuter category is limited to propeller-driven, multiengine airplanes. The special conditions, which mainly address airplane performance, in conjunction with part 23 commuter category standards provide a level of safety for the EMB-505 that is above part 23 normal category and is appropriate to a turbofan-powered business jet.

Regarding public interest we believe that granting the exemption helps realize the potential public benefit created by the advent of newer smaller turbofan engines. The resultant simpler, lower-cost business jets having weights up to 19,000 lbs. provide the public with greater utility and an extended range of choices.

In consideration of the foregoing, I find that a grant of exemption is in the public interest and will not adversely affect safety. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701, as amended, delegated to me by the Administrator, Embraer is granted exemption from 14 CFR § 23.3(d), to the extent necessary to permit type certification of the SJ30-2 airplane in the part 23 commuter category. This exemption is subject to the following conditions and limitations.

Conditions and Limitations

Conditions:

1. The EMB-505 shall not be eligible for operations under 14 CFR part 121. A note to this effect will be placed on the type certificate data sheet.

2. The EMB-505 maximum certificated takeoff weight shall not exceed 19,000 pounds.

3. The EMB-505 shall have a seating configuration, excluding pilot seats, of 19 or fewer.

4. The EMB-505 shall comply with § 23.562 at amendment level 23-50 (the latest amendment as of October 9, 2006, the date of application.)

Issued in Kansas City, Missouri on May 20, 2009.

Kim Smith

Kim Smith
Manager, Small Airplane Directorate
Aircraft Certification Service