

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

In the matter of the petition of

**Field Aviation Company Inc.**

for exemption from § 25.981(a)(3) of Title 14, Code  
of Federal Regulations

**Regulatory Docket No. FAA-2012-0585**

**DENIAL OF EXEMPTION**

By letter published in regulations.gov May 29, 2012, Mr. Wayne Sprigg, Director of DAO and Flight Test, Field Aviation Company Inc., 2450 Derry Road East, Mississauga, Ontario, Canada, L5S 1B2, petitioned for exemption from Title 14, Code of Federal Regulations (14 CFR) 25.981(a)(3) at Amendment 25-125. The petition was revised by letter dated August 7, 2012, to clarify the request for exemption to the portion of § 25.981(a)(3) that requires “Demonstrating that an ignition source could not result ... from all combinations of failures not shown to be extremely improbable.” The proposed exemption, if granted, would permit relief from the requirements for fuel-tank-ignition protection of auxiliary fuel systems on Bombardier Model DHC-8 100/200/300 series airplanes.

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

**Section 25.981(a)(3) at Amendment 25-125**, requires that:

(a) No ignition source may be present at each point in the fuel tank or fuel tank system where catastrophic failure could occur due to ignition of fuel or vapors. This must be shown by:

(3) Demonstrating that an ignition source could not result from each single failure, from each single failure in combination with each latent failure condition not shown to be extremely remote, and from all combinations of failures not shown to be extremely improbable. The effects of manufacturing variability, aging, wear, corrosion, and likely damage must be considered.

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

This section quotes the relevant information from the petitioner's revised request. Due to the proprietary content of the petition, the complete petition is available from Voyager Airways Limited. The following text is available at the Department of Transportation's Federal Docket Management System, on the Internet at <http://regulations.gov>, in docket no. FAA-2012-0585.

**Exemption Specifics and Extent of Relief**

Field Aviation, in this case the petitioner, wishes to apply for an exemption to FAR 25.981(a)(3) at Amendment 25-125 (Fuel Tank Explosion Prevention), specifically, *“the demonstration that an ignition source could not result from all combinations of failures not shown to be extremely improbable.”*

**Reason for Relief**

We have applied for a U.S. STC via the Canada U.S. Bi-Lateral Airworthiness Agreement, U.S. Project ref. ST7041 NY-T, to enable the installations of auxiliary fuel tank systems applicable to the Bombardier DHC-8-100, 200 and 300 legacy series of aircraft.

We are unable to fully comply with the requirements set forth within section (a) (3), specifically, *“the demonstration that an ignition source could not result from all combinations of failures not shown to be extremely improbable,”* and stipulate from our perspective that further means of compliance is impractical due to the fact that our auxiliary fuel tank installation is an aftermarket design that is incorporated within existing OEM aircraft wing structure.

**Public Benefit**

Public benefit is shown by the extent our design is compliant with the regulation. With respect to Fuel Tank Lightning, HIRF Protection and Component Failures, Field Aviation has incorporated within our installation design, to the maximum extent practical, three levels of highly reliable, independent and redundant protective features to prevent sources of ignition. In addition, Field Aviation has incorporated within our Instructions for Continued Airworthiness routine interval inspection criteria to support the continued functionality of protective features.

**Exemption – Effect on Safety**

Field Aviation's position is that the issuance of the exemption will result in no negative effect on safety. This is due to the quality of tank design and installation with respect to safety mitigation. Environmental exposure and failure protection measures coupled with routine interval inspection requirements facilitate, in our opinion, a level of equivalent safety. The Auxiliary Fuel Tanks are “substantiated to be conventional unheated aluminum wing tanks” per AC 25.981-1C.

## **Additional Information**

Field Aviation's proprietary compliance report (25370105) was included with the original letter of petition for exemption. Contained within the report are the following elements;

- Statements of Compliance - FAR 25.981 Amendment 25-125
- Heat Transfer Analysis
- Safety Assessment of Auxiliary Fuel System
- Fault Tree Diagram

## **Exemption Applicability**

This exemption request relates to lightning protection of fuel tank structure and the auxiliary fuel system in general. Field Aviation is seeking relief from FAR 25.981(a)(3) at Amendment 25-125, specifically sub paragraph ref; ***“the demonstration that an ignition source could not result from all combinations of failures not shown to be extremely improbable.”*** This exemption would be applicable to the Bombardier DHC-8-100/200/300 classic series aircraft

## **Description of Exemption**

Full compliance with the requirements set forth within section (a) (3) detailed in the aforementioned is not feasible, and we stipulate from our perspective that further means of compliance is also impractical due to the fact that our auxiliary fuel tank installation is an aftermarket design that is incorporated within existing OEM aircraft wing structure.

## ***Federal Register* publication**

The FAA has determined that good cause exists for waiving the requirement for *Federal Register* publication for public comment because the request is identical in all material respects to a previously denied exemption request; the exemption, if denied, would not set a precedent; and any delay in acting on this petition would be detrimental to Field Aviation Company Inc.

## **The FAA’s analysis**

The FAA has reviewed the information provided by Field Aviation Company Inc. and has concluded that granting this exemption is not in the public interest for the reasons described here.

The petition seeks an exemption, for systems portions of the design, from the ignition-prevention requirements of § 25.981(a)(3) specific to combinations of failures. In addition, the supporting proprietary information provided does not show the design would meet the requirement of § 25.981(a)(3) that requires “Demonstrating that an ignition source could not result .... from each single failure in combination with each latent failure condition not shown to be extremely remote.”

FAA Memorandum ANM-112-08-002 defines criteria that the FAA considers in granting exemptions related to lightning protection of fuel-tank structure. The Memorandum notes that the “relief ... provided by this policy is limited to areas of fuel-tank structure ...” and the scope

of the Memorandum is limited to lightning protection of fuel-tank structure. Because the petition requests an exemption relative to systems portions of the design for lightning protection, as well as for HIRF protection and component failures, it does not provide adequate support for granting the exemption.

Specific to fuel-tank structural aspects, the petition does not provide the information in FAA Memorandum ANM-112-08-002 showing that compliance is not practical.

Furthermore, the petition lacks sufficient information to show that an exemption would not adversely affect safety, or how an exemption would provide a level of safety at least equal to that provided by the existing standard. The petition also lacks sufficient information to show that an exemption would benefit the public as a whole.

### **The FAA's decision**

In consideration of the foregoing, I find that a grant of exemption is not in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701, delegated to me by the Administrator, Field Aviation Company Inc. is hereby denied an exemption from § 25.981(a)(3) to permit relief from the requirements for fuel-tank-ignition protection of auxiliary fuel systems on Bombardier Model DHC-8 100/200/300 series airplanes.

Issued in Renton, Washington, on January 24, 2013.

*/s/ Ali Bahrami*

Ali Bahrami  
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Aircraft Certification Service