

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

In the matter of the petition of

Airbus SAS

for an exemption from §§ 25.901(c) and
25.981(a)(3) of Title 14, Code of Federal
Regulations

Regulatory Docket No. FAA-2014-1021

TIME-LIMITED PARTIAL GRANT OF EXEMPTION

By letter dated December 8, 2014, Mr. François Duclos, A330/A340 Chief Airworthiness Engineer, Airbus SAS, D2202, 1 rond-point Maurice Bellonte, 31707 Blagnac Cedex, France, petitioned the Federal Aviation Administration (FAA) for a time-limited exemption from the requirements of §§ 25.901(c) and 25.981(a)(3) of Title 14, Code of Federal Regulations (14 CFR). This exemption, if granted, would allow Airbus time to complete necessary design changes of the center wing tank fuel system wiring and fuel pump ground fault protection on Model A330-300 airplanes while permitting on-schedule delivery to its launch customers in the United States.

The petitioner requests relief from the following regulations:

Section 25.901(c), at Amendment 25-126, requires that for each powerplant and auxiliary power unit installation, it must be established that no single failure or malfunction or probable combination of failures will jeopardize the safe operation of the airplane except that the failure of structural elements need not be considered if the probability of such failure is extremely remote.

Section 25.981(a)(3), at Amendment 25-125, requires that 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. It must be demonstrated 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.

Related sections of 14 CFR:

Section 25.1309 states, in pertinent part, that required equipment, systems, and installations must be designed to ensure that they perform their intended functions under any foreseeable operating condition and that the occurrence of any failure condition that would prevent the continued safe flight and landing of the airplane be extremely improbable.

Section 26.35(d)(2) - *Changes to type certificates affecting fuel tank flammability*, states that applicants subject to paragraph (a)(2), or (a)(3)(i) of this section must comply with the requirements of 14 CFR 25.981, in effect on December 26, 2008.

The petitioner supports its request with the following information:

This section quotes the relevant information from the petitioner's request, with minor edits for clarity. The complete petition is available at the Department of Transportation's Federal Docket Management System, on the Internet at <http://regulations.gov>, in Docket No. FAA-2014-1021.

The extent of relief sought and the reason for seeking this relief

Airbus is seeking a 12-month relief for incorporating in production on the concerned A330-300 aircraft models a fuel system design that is fully and directly compliant with 14 CFR 25.981(a)(3) and 25.901(c) requirements identified above. The design changes identified as necessary for demonstrating full compliance following reviews with the FAA will indeed not be ready for incorporation on the first aircraft delivered to the US launch customer, Delta Airlines (first aircraft delivery currently targeted for end of May 2015). These design changes include:

- Extensive airplane wiring installation changes in the aircraft fuselage with impact on the aircraft structure in order to segregate the center tank fuel quantity indicating system (FQIS) wiring from other airplane wiring with a physical separation distance;
- Addition of a second ground fault interrupter (GFI) for each of the center tank fuel transfer pumps power supplies.

The 12-month relief is requested from the date of first A330-300 delivery to Delta Airlines; i.e., based on current delivery planning up until the end of May 2016. At the time of petitioning, it is estimated that around five aircraft would be delivered to Delta Airlines during this exemption period. There is no intention to retrofit these first five aircraft.

Reasons why granting this request would be in the public interest

Denial of this petition for exemption would imply a delay of several months in the delivery of the first A330-300 with fuel center tank activated to the US launch customer, Delta Airlines. This would therefore deprive Delta and its flying customers from the benefits brought by these aircraft which will allow carrying more payloads on longer

missions. Denial would also have negative impacts on the numerous US suppliers of Airbus (as an example, UTAS, A330/A340 fuel system supplier) due to the delivery delays. For these reasons, granting the request would benefit the US public as a whole.

Reasons why granting the exemption would not adversely affect safety

The baseline design for the A330-300 fuel center tank is the well proven design of the A330-200 and A340-200/300 aircraft models (which has now accumulated more than 30 million hours of revenue flight time) with all SFAR 88 corrective actions mandated by the FAA including the fitment of a Ground Fault Interrupter (GFI) on the power supply of the two fuel transfer pumps. The same Flammability Reduction System (FRS) as designed for the A330-200 and A340-200/300 will also be incorporated, limiting the center tank flammability exposure to levels below 0.5%, i.e., well within the requirements of 14 CFR Appendix M25.1 at amendment 125.

In addition to this already safe baseline design that will be embodied on the first aircraft delivered to Delta Airlines, Airbus has voluntarily defined additional airplane wiring design improvements in the frame of the activation of the A330-300 fuel center tank. These improvements, listed below, will also be incorporated in the first aircraft delivered to Delta Airlines:

- Addition of clamps on electrical bundles in zone adjacent to the center tank in order to minimize the risk of chafing in case of an attachment point failure.
- Additional metallic overbraiding on the center tank FQIS wiring in order to limit the level of induced currents in case of lightning strike.
- Additional electrical and mechanical protection sleeve on the center tank FQIS wiring in order to prevent the risk of induced current from short circuits due to the co-routing with other low energy non-intrinsically safe (28VDC) airplane wiring.

For the FQIS wiring installation, those additional changes will already raise the level of robustness of the A330-300 modified areas against the risk of creating a fuel tank ignition over and above the already currently flying safe baseline. Compliance to the higher certification standard of 14 CFR 25.981(a)(3), Amendment 25-125, and to 14 CFR 25.901(c), Amendment 25-126, will be demonstrated except for the ‘no single failure in combination with probable (i.e., with a probability greater than extremely remote) latent failure condition provision due to the following extremely improbable specific residual risk: a foreign object or undue contact with an adjacent structure damaging the FQIS wiring protection sleeve and causing a short circuit between FQIS wiring and low energy non-intrinsically safe wiring outside the fuel tank in combination with a latent in-tank short circuit due to the filament heating phenomenon, during a period where the fuel tank is flammable (i.e., thanks to the FRS less than 0.5% of the Flammability Exposure Evaluation Time).

Based on these considerations, it can be determined that the design changes necessary to reach full compliance will be embodied on a design configuration which is considered as providing already an adequate level of safety. Therefore, granting the exemption to allow additional time to incorporate them and to deliver the first aircraft without later retrofit action will not adversely affect safety.

As far as the fuel transfer pumps GFI are concerned, the basic design incorporated on the first A330-300 with fuel center tank activated has already been demonstrated to be compliant with 14 CFR 25.981(a)(3), at Amendment 25-102, and with 14 CFR 25.901(c) (refer to ELOS memo TD0764ID-T-P-1). Section 14 CFR 25.981(a)(3), at Amendment 25-125, is unchanged compared to Amendment 25-102. However, compliance has been found by the FAA using an alternate (ELOS) methodology and the FAA notified Airbus that direct compliance to 14 CFR 25.981(a)(3), at Amendment 25-125 and 14 CFR 901(c) would be required for the A330-300 fuel center tank activation project. Additional design changes (addition of a second GFI on each transfer pump power supply) are necessary to achieve this direct compliance. Those changes will be embodied on a design configuration which has been already demonstrated as safe, based on in-service experience. Granting this exemption to allow additional time to incorporate them and to deliver the first aircraft without later retrofit action will therefore not adversely affect safety.

Federal Register publication

Although the petitioner requested that action on its petition not be delayed for publication in the *Federal Register*, the FAA found that the petition, if granted, would set a precedent. Therefore, to allow an opportunity for the public to comment on the petition, we published a summary of it in the Federal Register on January 20, 2015 (80 FR 2774). We received comments from the National Air Traffic Controllers Association (NATCA) and The Boeing Company. Neither commenter objected to the issuance of a time-limited partial exemption in this case. Below is a summary of the comments.

NATCA does not object to a 12-month time-limited exemption that would allow delivery of approximately five non-compliant airplanes to a U.S. operator while Airbus develops and implements design changes necessary to bring the center wing tank installation into compliance with 14 CFR 25.901(c) and 25.981(a)(3). However, NATCA does not believe the petitioner's request complies with 14 CFR 11.81, specifically how the exemption "would not adversely affect safety, or how the exemption would provide a level of safety at least equal to that provided by the rule from which you seek the exemption." NATCA recommends that the FAA grant a time-limited exemption that includes a requirement for operators to modify their existing airplanes to bring those installations into compliance with 14 CFR 25.901(c) and 25.981(a)(3). NATCA notes two other time-limited exemptions involving 14 CFR 25.981(a)(3) that required modifying airplanes produced under the exemption to bring them into full compliance.

The Boeing Company has no objections to the Airbus petition as proposed. However, they commented on a draft advisory circular and questioned whether design changes are even necessary for Airbus to comply with 14 CFR 25.901(c) and 25.981(a)(3).

The FAA's analysis

The petitioner must show that granting this request is in the public interest, per 14 CFR 11.81(d), and 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, per 14 CFR 11.81(e).

The FAA agrees with the petitioner that adverse impacts on U.S. interests, including airplane operators and component manufacturers, as a result of delaying approval of this amended type design for approximately one-year is not warranted. We consider that this granting would not materially impact the level of safety given the limited number of noncompliant airplanes the petitioner expects to deliver and the compensating design features the petitioner will introduce for those airplanes.

The petitioner estimates that approximately five airplanes will be delivered before they are able to incorporate a fully compliant design into production. They also state that they have no plans to make service information available that would support bringing those five airplanes into full compliance.

The center wing fuel tank installation of the Model A330-300 series airplane is based on the current center wing fuel tank design of the Model A330-200 and Model A340-200/300 series airplanes. However, the petitioner has identified additional design features of the FQIS wiring installation intended to increase the level of safety over the existing design by providing increased protection from wiring damage and induced energy from lightning strikes.

The FAA considers that the current center wing fuel tank installation on Model A330-200 and Model A340-200/300 series airplanes, which includes flammability reduction means meeting 14 CFR 25.981(b) at Amendment 25-125, provides an adequate level of safety. The FAA also considers the addition of the limited number of airplanes into service with similar center wing fuel tank installations that also incorporate additional design features to protect FQIS wiring would not adversely affect safety. While the center wing fuel tank installation on these five A330-300 series airplanes will not be fully compliant with §§ 25.901(c) and 25.981(a)(3), we consider that the additional design features would in fact provide a greater level of safety than the current design in use on Model A330-200 and Model A340-200/300 series airplanes. For these reasons, we do not consider the retrofit of these airplanes with fully compliant designs necessary.

The petitioner's installation of a center wing fuel tank on the Model A330-300 series airplane meets the applicability requirements in 14 CFR 26.35(a)(3)(i), and therefore, they must meet 14 CFR 26.35(d)(2) requiring compliance with the requirements of 14 CFR 25.981 in effect on December 26, 2008 (Amendment 25-125). While not specifically included in the petition for exemption, we find that we should include 14 CFR 26.35(d)(2) in this granting since it requires compliance with 14 CFR 25.981 at Amendment 25-125.

One commenter, NATCA, stated that they do not believe the petition meets the conditions for granting an exemption per 14 CFR 11.81. We do not agree. We consider that the petition provided all of the necessary public interest and safety information and therefore meets the conditions required for granting an exemption.

NATCA requested the FAA grant only a time-limited exemption that includes a requirement for operators to modify their existing airplanes to bring those installations into full compliance with 14 CFR 25.901(c) and 25.981(a)(3) after the time-limited exemption expires. We infer that the commenter is proposing to only address the limited number of Model A330-300 series airplanes delivered with a center wing fuel tank installation that is not fully compliant with 14 CFR 25.901(c) and 25.981(a)(3) and not a request for operators to bring all Model A330-300 series airplanes into full compliance. We do not agree and as previously discussed, we consider the design proposed by Airbus for the limited number of airplanes that would not be fully compliant provides a greater level of safety than that of the existing Model A330-200 series airplanes with a similar center wing fuel tank installation and thus would not adversely affect safety.

NATCA referred to two exemptions that required airplanes to be modified to bring them into full compliance with 14 CFR 25.981(a)(3). These exemptions granted much broader temporary relief from all aspects of 14 CFR 25.981(a)(3) involving all fuel tank systems on those airplanes. Due to the scope of the exemptions, we determined it necessary to bring the airplanes produced under the exemptions into compliance. We have granted other exemptions, similar in scope to this petition, where we did not require full-compliance modifications to in-service airplanes (e.g., Exemption Nos. 10767 and 10905).

Another commenter, Boeing, commented on FAA guidance regarding fuel pump protective features and did not propose any specific changes or propose we deny the petitioner's request. We infer the comments are in response to the proposed changes to Advisory Circular (AC) 25.981-1C that is currently open for comment. The FAA recommends Boeing refer to the FAA's Aircraft Certification Service website* for draft ACs that are open for comment for instructions and submit their specific comments on the draft AC for our consideration.

Boeing commented on the need for Airbus to redesign the Model A330-300 series airplane's fuel pump protection/GFI design and their position that it is unwarranted based on service experience and GFI failure conditions for current Boeing designs. We infer that Boeing requests the FAA deny the petitioner's request because they believe a redesign is unnecessary. We do not agree. Airbus requested this time-limited exemption because they are unable to demonstrate that their existing design directly complies with 14 CFR 25.901(c) at Amendment 25-126 and 14 CFR 25.981(a)(3) at Amendment 25-125. The GFI design features are required for a full compliance demonstration.

The FAA's decision

In consideration of the foregoing, I find that a time-limited partial grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701 delegated to me by the Administrator, I grant Airbus a partial exemption from 14 CFR 25.901(c) at Amendment 25-126, 14 CFR 25.981(a)(3) at Amendment 25-125 and 14 CFR 26.35(d)(2) as they pertain to fuel tank ignition prevention associated with the FQIS wiring and fuel pump GFI introduced by the installation of the center wing fuel tank on the Model A330-300 series airplanes until May 31, 2016. We grant the exemption to the extent necessary to allow Airbus time to incorporate a fuel system design that is fully and directly compliant into production on

* http://www.faa.gov/aircraft/draft_docs/ac/

the Model A330-300 series airplanes equipped with a center wing fuel tank while maintaining their current delivery schedule.

This exemption is subject to the following conditions:

1. No later than May 31, 2016, Airbus must;
 - a. Obtain FAA approval of a type design eliminating all noncompliant features as they pertain to fuel tank ignition prevention of the center wing fuel tank installation, and
 - b. Show that all new production Model A330-300 series airplanes equipped with a center wing fuel tank incorporate the FAA-approved amended type design that is fully and directly compliant with 14 CFR 25.901(c) at Amendment 25-126 and 14 CFR 25.981(a)(3) at Amendment 25-125.
2. Model A330-300 airplanes with center wing fuel tanks installed that are granted a certificate of airworthiness prior to May 31, 2016, are not required to incorporate the design changes developed for complying with condition 1. However, the following design features identified by the petitioner in their petition shall be mandatory for those airplanes:
 - a. Addition of clamps on electrical bundles in zones adjacent to the center tank in order to minimize the risk of chafing in case of an attachment point failure.
 - b. Additional metallic over-braiding on the center tank FQIS wiring in order to limit the level of induced currents in case of lightning strike.
 - c. Additional electrical and mechanical protection sleeve on the center tank FQIS wiring in order to prevent induced current from short circuits due to co-routing with other low energy, non-intrinsically safe (28VDC) airplane wiring.

Issued in Renton, Washington, on April 14, 2015.

/s/

Michael Kaszycki
Acting Manager, Transport Airplane Directorate
Aircraft Certification Service