

# The European Association of Aerospace Industries

## AECMA

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Department of Transportation Dockets  
Docket N° FAA-99-6717  
400 Seventh Street, SW  
Room Plaza 401  
Washington, DC 20590  
USA

**Subject:** Docket N° FAA-99-6717 - 207-Minute Extended Range Operations with Two-Engine Aircraft (ETOPS) - Disposition of Comments - Policy statement for 207-minute ETOPS - Request for comments

Dear Sir

The attached comments from the European Association of Aerospace Industries (AECMA) concern the FAA disposition of comments and request for further comments regarding a Policy Letter requested by ATA and ALPA that would permit the extension of the maximum diversion time of certain ETOPS flights up to 207 minutes (Docket FAA-99-6717).

AECMA regroups and represents substantially more than one thousand companies that comprise the aerospace manufacturing industry from all fifteen member countries of the European Union plus the Czech Republic, with airframe, engine, appliances and component manufacturers as well as service companies and scientific research organizations.

In case of any question relating to this document, feel free to contact Mr. Alain Gros Secretary of the AECMA Airworthiness Committee (Telephone 32 2 775 8110 Fax 32 2 775 8111 e-mail info@aecma.org).

Yours faithfully



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AECMA ETOPS Coordinator

<b>Department of Transportation Dockets</b> <b>Washington DC 20590</b>	
In Re: 207-Minute Extended Range Operations with Two-Engine Aircraft (ETOPS) Disposition of Comments Policy statement for 207-minute ETOPS Request for comments	Docket N°. FAA-99-6717
<b>Comments from European Association of Aerospace Industries (AECMA)</b>	

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## **Comments from European Association of Aerospace Industries (AECMA)**

### 1 Introduction

The European Association of Aerospace Industries (AECMA) commented on the request by the ATA and ALPA (Federal Register dated April 27, 1999 pp. 22667-22669) for the FAA to issue a policy for approval of 207-Minute ETOPS operations. The Notice of Disposition of Comments and Further Request for Comments in Docket FAA-99-6717 informed the public of the FAA's intention to proceed with the adoption of the proposed policy and clarified some of the elements founding FAA's decision.

AECMA still does not support this policy process and disagrees with a number of assumptions used to justify the decision.

FAA announces modifications of the original proposal submitted by the petitioners, but a revised text is not provided. This limits the ability for interested parties to effectively analyze the policy impact and some of the changes may prove more significant than deemed by their authors.

AECMA regrets the years of delay before launching a formal regulatory review that was already advocated by JAA and AECMA as early as 1997. The hasty decision to adopt the 207-minute policy under economic pressure contrasts sharply with past slow pace when the safety concerns from experts were the only driving force.

### 2 General comment on the need for formal rulemaking

AECMA welcomes the announcement by the FAA of a formal rulemaking process by ARAC to review ETOPS as well as long-range operations with three and four engine aircraft. However, we consider that this process should precede, not follow, any decision regarding an increase of ETOPS maximum diversion time.

Following the adoption by JAA of the Terms of Reference of a Regulatory Working Group to prepare future long-range and extended-range rules and guidelines, AECMA recommends that FAA and other interested Aviation Authorities join JAA effort to ensure that harmonized regulations and guidelines are produced. We do not support the adoption of uncoordinated criteria outside the normal rulemaking process, We also very much recommend early involvement of the ICAO to achieve truly worldwide consultation.

Furthermore, we re-instate our position that current ETOPS criteria, primarily based on diversion time in still air, fail to take into account the much more significant effects of operating environment. These old criteria are inadequate to address the unique conditions prevailing on the northernmost tracks of the North Pacific route system in the winter season. Such operating area requires specific safety precautions that are not contained in current ETOPS guidelines from FAA and JAA. FAA's decision to allow dispatching certain flights with up to 207-minute diversion time in this area will increase the exposure to extreme operating environment and result in a clear decrease of operational safety margins.

AECMA has no doubt that its safety concerns will be confirmed during the rulemaking process. This raises the question of FAA's ability to modify the interim policy when the time comes. Today's approvals may turn into a complex legal problem under predictable economic pressure.

### 3 Difference against ICAO standards and practices

Annex 6 to ICAO Chicago Convention (Paragraphs 4.7.1 and 4.7.2) requires the State of the Operator to follow prescribed standards for approval of ETOPS operations and to keep the operational approval within certified limits.

Annex 8 requires the State of Design to establish aircraft *limitations* appropriate to the maximum approved diversion time.

The operations requirements of Annex 6 specifically refer to the need to ensure that the airworthiness certification of the aircraft provides the overall level of safety intended by the ETOPS requirements of Annex 8.

Further guidance is found in the Attachments and Technical Manuals:

- Annex 6 Attachment E: *It is necessary that the airworthiness certification of the aeroplane type specifically permits operations beyond the threshold time.*
- Airworthiness Technical Manual Paragraph 6: *The Flight manual...should contain . . . the maximum flight time, one power-unit inoperative, for which the systems reliability has been approved in accordance with the airworthiness requirements established for extended range operations.*

FAA decision to change the status of the ETOPS Design and Reliability findings in the approved Aircraft Flight Manual and TCDS from a *limitation* to a *determination of suitability* appears as a deviation from ICAO published standards and recommendations. The decision to let certain US operators fly beyond the approved ETOPS capability of the aircraft without a re-certification of the design and reliability constitutes a further deviation.

AECMA noted that FAA does not indicate when it intends to notify the ICAO of these *differences*.

AECMA considers that FAA should inform ICAO without delay. This clarification is urgently needed to resolve the confusion caused by Boeing's announcements that FAA had certified the B777 for 207-minute ETOPS. Aviation Authorities of third countries are entitled to be informed that the process followed by FAA effectively differs from ICAO recommendations and that FAA policy decision does not constitute a certification of the aircraft design and reliability that could be validated and used by foreign parties.

### 4 Impact of FAA decision on international competition

FAA decision constitutes an administrative distortion to the competition between operators engaged in air services over the North Pacific.

Without a re-certification of the aircraft capability reflected in the approved Flight Manual and TCDS, third countries have no basis to grant similar operational approvals to their carriers. Foreign Aviation Authorities would also have to file *differences* with ICAO and perform their own assessment of the aircraft design and reliability without a published FAA basis to support a validation.

It is clearly impractical for foreign Aviation Authorities to change the upper limit in their ETOPS to 207 minutes and perform a direct re-certification of the aircraft capability while FAA has done no such thing as the prime certifying Authority for the aircraft.

## 5 Safety impact of the proposed policy

Former FAA policy allowing 138 minutes diversion time (instead of 120) over North Atlantic effectively contributed to safety by permitting operators to avoid higher risk alternates in Greenland (Sondre Stromfjord, Thule and Narsassuaq). On the contrary present 207-minute policy increases substantially the risk of North Pacific operations.

FAA indicates that the policy should place the flight within shorter distance from alternates that would be above landing minima at the time of their possible use, even though they were below planning minima at the time of dispatch. This claim is unsupported.

Wind patterns over North Pacific influence the position of the most economical tracks. Less fuel is needed when using the northernmost tracks in winter and the southernmost tracks in summer. In addition, less fuel is needed in all seasons if westbound flights to Japan are routed significantly more to the North than eastbound flights to the USA.

Still, all flights might be routed via southern tracks and remain within 150 minutes of more than twelve well equipped airports where weather conditions are most often good, predictable and stable:

- Several major airports in Japan,
- Airports in Guam, Saipan and Wake Island,
- Midway airport (Avoiding day flights from November to May due to bird risk)
- Several airports in Hawaii, and
- Several airports on the US West coast.

Simulations have shown that flights routed via the southern tracks have no risk of cancelled dispatch due to visibility forecast below ETOPS planning minima. At all times except when Midway airport is rendered unsafe by the presence of albatrosses, the crew has a choice of at least two diversion airports. Over a large portion of the route the possible alternates are reasonably close to each other so that crews retain a choice of two airports until late in the diversion. This situation is comparable to that observed on the North Atlantic where most ETOPS flights take place and serve as safety benchmark.

Using the northern tracks for winter operations (especially for westbound flights) results in a maximum diversion time up to 180 or 207 minutes. Northern routes depend on four critical alternates, poorly equipped and subject to extreme weather:

- Petropavlovsk and Magadan in Russia,
- Shemya and Cold Bay in the Aleutian Islands.

Only the alternates located in northern Japan and in Alaska offer a level of safety that meets the intent of original ETOPS criteria.

The risk of visibility forecast below ETOPS planning minima varies between 12% to 20% depending how frequently missing weather forecast for Russian airfields are treated. This problem prompted the demand for 207 minutes so that airports below planning minima or without valid weather forecast may be skipped.

Most of the time, the crew is committed to only one alternate. Both the maximum diversion time and the mean diversion time are drastically increased. The effective increase in diversion time when compared with the southern tracks varies from 30 minutes to almost one hour.

Many factors in the environment and equipment of the northern alternates further reduce the level of safety when considering an engine failure or failures of other aircraft systems. As mentioned in the original policy proposal and acknowledged by FAA in the notice of disposition of comments, such elements as political unrest in Russia, volcanic activity in the vicinity of the airports, ice and snow on the runways and other risk factors may need to be considered. The original policy proposal also included *operational necessities* (a term not defined and too vague for a regulatory policy) as possible cases of dispatch with increased diversion time. FAA fails to indicate in the notice how the policy would apply in relation with such risk factors.

AECMA expects that the rulemaking process started by JAA in Europe and the ARAC process announced by FAA will together confirm the need to modify current definitions of *adequate* and *suitable* airports, effectively including consideration of all significant safety factors.

Examples of concerns that may no longer be ignored are found at most alternates in North Siberia, Kamtchatka and the Aleutian Islands:

- Extreme cross wind combined with low runway friction coefficient as found in Shemya is an example of clearly unsafe condition that should not be ignored.
- The absence of rescue vehicles and medical service at all northern alternates is an other missing factor in the definition of *adequate*.
- Staff shortage and insufficient training also affect ATM and RFFS at many airfields in Russian Far East.

AECMA therefore disagrees that adopting the proposed policy would contribute to safety. On the contrary it would aggravate the exposure to adverse operating conditions and encourage excessive relaxation of the safety precautions when designating alternate airports.

## 6 Conditions and rate of use of 207-minute diversion time

The rate of use of 207-minute diversion time would directly depend on the operators interpretation of loose wording in the policy referring to *political concerns, airport suitability considerations due to higher weather minima at dispatch, various weather related events and operational necessities*.

Considering the seasonal effect of wind pattern moving the most economical routes to the North in winter when weather conditions at the northern airfields are worst, the rate of use of 207-minute diversion time would not be evenly distributed over the year. Winter flights and especially night flights, would definitely be exposed to frequent increases in diversion time, while summer flights and day flights would almost never be affected.

FAA did not retain the monthly reporting originally proposed by the applicants. The maximum permissible rate and precise conditions of use are not clearly defined. This leaves no means to effectively control how operators would use the approval.

AECMA considers that this does not conform to the declared intent of case by case (random) dispatch flexibility. On the contrary, the policy would result in a seasonal variation of the level of safety that would require formal rulemaking.

## 7 Numerical safety objectives for ETOPS

AECMA noted that FAA does not concur with JAA policy to set ETOPS probability objectives consistent with the safety criteria of FAR / JAR 25.1309. AECMA understands that FAA considers such objectives not applicable to the numerical assessment of unsafe conditions as may result from engine failures and operational factors. AECMA maintains its support to JAA position, opposite of that of FAA and leading to more conservatism.

The ETOPS reliability surveillance process instituted by the Aviation Authorities 15 years ago and still in place in Europe, effectively improved ETOPS level of safety to the point of it becoming consistent with FAR / JAR 25.1309 numerical safety objectives. AECMA considers that this safety achievement should be preserved and reinforced.

AECMA expects that the rulemaking process launched by JAA and the ARAC process announced by FAA will together actually prove the need for strict safety objectives in relation with increasing traffic in areas with extreme environment.

Continued assurance of excellent reliability of the airframe-engine combinations involved in such operations would be essential, with particular attention to very low and stable engine IFDS rates and immediate correction of any malfunction. AECMA is concerned that the FAA Notice does not define a mechanism to monitor reliability, while FAA no longer follows the process of ETOPS Propulsion System Reliability Tracking Board per AC 120-42A.

## 8 Airports

AECMA original comments highlighted a number of factors that increase the risk in case of diversion to one of the northern alternates in winter. FAA chose to ignore or dismiss these concerns without clear explanations. However, JAA and other organizations that reviewed the data concerning these airports do not support their use as ETOPS alternates.

AECMA has to assume that other FAA policies, some not known to its experts, are used to control the operational risk at northern airfields.

### 8.1 Airports closed at night

Petropavlovsk, Shemya and Cold Bay are closed at night. AECMA has to assume that FAA has a policy allowing the use of these airports based on means to contact the airport authorities in time to:

- Open airport
- Activate ATC
- Activate RFFS if available
- Open and prepare shelters to receive evacuees in the absence of hotel facilities
- Remove snow if necessary
- Bring medical assistance by air from Alaska or Japan in case of need.

AECMA is not aware of the demonstrations prescribed by FAA in this respect. Although the need for such demonstrations relates to the operating area rather than directly to the diversion time, AECMA considers that the demonstrations may have to be repeated for 207-minute ETOPS and that the method may need to be reviewed.

### 8.2 Crosswind and low runway friction coefficient

Shemya routinely experiences extreme wind and crosswind conditions combined with low runway friction coefficient because of snow and ice. These conditions significantly reduce the ability of the crew to complete a safe landing in case of engine failure or any other failure affecting aircraft control or braking.

AECMA is not aware of the precautions in terms of demonstrations and training requirement imposed by FAA in this respect and the resulting limitations.

JAA is currently working on crosswind criteria for JAR OPS, but AECMA is not aware of similar progress in the USA. AC 120-42A Appendix 3 Paragraph 1 .b states that *surface wind conditions and corresponding runway surface are within acceptable limits*. AECMA has to assume that specific FAA policies or guidance exist on these aspects, but its experts do not know this material.

Although this concern relates to the operating area rather than directly to the diversion time, AECMA considers that the adoption of the 207-minute ETOPS policy requires a review and adaptation of corresponding criteria.

### 8.3 Safety of evacuees

Winter conditions at the northern airfields exclude to perform a precautionary evacuation after landing. Precautionary evacuations are customary to the airlines when there is any doubt of fire (Cargo, engines, APU or brakes). AECMA is not aware of the precautions requested by FAA in terms of systems design, safety equipment (Arctic gear for occupants) and procedures. Although this concern relates to the operating area rather than directly to the diversion time, AECMA considers that the adoption of the 207-minute ETOPS policy requires a review of the corresponding operational precautions.

### 8.4 Design criteria in proposed 207-minute ETOPS policy

AECMA original comments highlighted a number of factors that need be considered in the design of aircraft systems to cope with the increased risk of operating under the extreme environment conditions, both in flight and on the ground, that affect the North Pacific northern tracks in winter. FAA chose to ignore or dismiss these concerns without clear explanations.

AECMA has to assume that other FAA policies, some not known to its experts, are used to control the operational risk level in this region, particularly when using the northern airfields.

The following comments only concentrate on selected key aspects. The original AECMA comments went into more details and are deemed to remain valid.

### 8.5 APU as third air bleed system

The 207-minute policy prescribes that APU be serviceable to serve as a third source of bleed air to pressurize the aircraft and maintain safe cockpit and cabin temperatures in case of failure of both engine air-bleeds. This provision actually results from regulatory discussions that involved ATA, FAA and JAA experts.

The reasons that lead the experts to recommend this precaution relate to the temperature and exposure time for North Pacific winter flights using the northern tracks. These reasons are not directly related to the increase in diversion time from 180 minutes to 207. The same risk exists for flights limited to 180 minutes; therefore this precaution should apply to all concerned flights.

#### 8.6 Electrical power supply for fuel boost pumps in case of electrical emergency

The 207-minute policy prescribes that at least one fuel boost pump in each tank remains powered in case of electrical emergency to avoid gravity feeding with a risk of engine flame-out in case of severe turbulence. This provision is actually derived from a JAA requirement. A comprehensive list of essential services to be powered by back-up electrical generators may be found in JAA ETOPS criteria (IL 20). All European-built two-engine aircraft currently approved for 180-minute ETOPS comply with this requirement. Such aircraft include Airbus A310, A300-600 and A330 series.

AECMA is in favor of reducing the regulatory gap between FAA ETOPS and the more conservative JAA ETOPS. However, the JAA requirement on electrical power for fuel boost pumps is clearly not related with 207-minute diversion time. The JAA adopted this precaution against severe turbulence at single engine altitude; such conditions may exist over North Pacific in winter irrespective of the diversion time.

#### 8.7 Early ETOPS assessment as method to establish required safety level

FAA wrongly assumes that the B777 “Early ETOPS” assessment is a unique case of an aircraft being *designed from the start for ETOPS operation* and to preclude *all possible failure modes of past airplanes and engines*. European-built Airbus A330 was subject to similar tests and analyses more than one year before the B777, as a complement to the normal statistical reliability assessment (based on its already certified sister aircraft the A340) as prescribed by ETOPS criteria.

The early ETOPS assessment of the B777 was conducted to support the aircraft and engine reliability demonstrations, as a substitute for the absence of directly relevant service experience. This method has proven reasonably effective for design derived from previous applications. However completely new design, such as VSCF electrical generators and duct-cooled APU, experienced reliability problems in service that were not predicted by the “Early-ETOPS” assessment.

AECMA fails to understand the link between the “Early ETOPS” assessment and 207-minute ETOPS. The B777 has now accumulated service experience in excess of the minimum amount necessary to support a direct statistical evaluation of the engines and aircraft systems safety and reliability. The original need for a theoretical determination of the safety and reliability is gone. Service experience should now be the basis for FAA determination of the aircraft and engine reliability, not the analyses from the original “Early-ETOPS” process.

AECMA cannot support the view that only aircraft whose original ETOPS approval used the “Early-ETOPS” methodology as a substitute for real service experience should be eligible for a future increase of their maximum diversion time beyond 180 minutes.

Considering that the normal way to demonstrate safety and reliability for ETOPS is a statistical assessment of service experience. In the case of aircraft approved through an “Early-ETOPS” reliability assessment, AECMA considers that it should not be permitted to exceed 180 minutes, until the normal amount of required service experience has been accumulated by the world fleet.

As was found at the occasion of the B777 program, the “Early-ETOPS” method does not provide a high level of confidence for new technology features. Such uncertainty is not compatible with the increased risk of North Pacific operations and 207-minute diversion time.

## 9 Conclusion

AECMA does not support the introduction of any new ETOPS criteria in the form of policies, prior to the coordinated completion of the formal regulatory review undertaken by JAA and the ARAC process announced by FAA.

Current ETOPS criteria do not take into account the extreme operating conditions of North Pacific winter flights using the northern tracks. Adopting the proposed 207-minute ETOPS policy further increases the inconsistency of the US ETOPS criteria, reduces significantly the level of safety of concerned ETOPS flights and distorts international competition. AECMA fails to see other motives than economic to this move.

FAA notice of disposition of comments does not address a number of the key concerns expressed by AECMA and several other organizations.

AECMA does not understand the urgency of adopting this policy that may become an embarrassing precedent when the results of the JAA and ARAC regulatory work become available.