



73447

U.S. Department
of Transportation
**Federal Aviation
Administration**

Memorandum

FAA-99-6717-38

Subject: ACTION: 207-Minute ETOPS Operation Criteria

Date: APR 20 1999

From: Associate Administrator for
Regulation and Certification, AVR- 1

Reply to
Attn. of:

To: Chief Counsel, AGC- 1

The attached request by the Air Transport Association for the FAA to issue a policy for **207-minute ETOPS** operation approval criteria is being forwarded for publication in the Federal Register. Please give the request a **45-day** comment period after publication in the Federal Register.

Thomas E. McSweeney
Thomas E. McSweeney

Attachment

*Correction
Pub. 5/16/97*

4/29/99

1999 APR 21 A 10: 58
OFFICE OF THE
CHIEF COUNSEL
RULES DOCKET

[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

[Docket No. 29547]

207-Minute Extended Range Operations with Two-Engine Aircraft (**ETOPS**) Operation
Approval Criteria

AGENCY: Federal Aviation Administration (FAA), DOT

ACTION: Request for public comment.

SUMMARY: This notice announces the request by the Air Transport Association for the FAA to issue a policy for **207-minute ETOPS** operation approval criteria. The material was presented to the FAA by mail dated March 22, 1999. In addition, this notice opens [29547] and that docket serves as a repository for all recorded material regarding the aforementioned meeting.

DATES: Comments must be received on or before [45 days after publication in the Federal Register].

ADDRESS: Comments on this notice should be mailed or delivered, in duplicate, to: Federal Aviation Administration, **Office** of Chief Counsel, Rules Docket Office, [29547], 800 Independence Avenue, SW., Room 915-G, Washington, DC 20591.

Comments may also be submitted electronically to the following Internet address:

9-NPRM-CMTS@faa.gov. Comments must be marked [29547]. Comments may be filed and/or examined in Room 915-G weekdays between 10:00 a.m. and 5:00 p.m., except on Federal holidays.

FOR FURTHER INFORMATION CONTACT: Eric van Opstal, Air Transportation Division (AFS-200), Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591, Telephone (202) 267-8166.

SUPPLEMENTARY INFORMATION:

Comments Invited:

Interested parties are invited to comment on the Air Transport Association's request by submitting such written **data**, views, or arguments to the address listed above. The FAA will consider all communications before taking action.

Following is the full text of the Air Transport Association letter. The FAA is publishing this request without endorsement. The purpose of this notice is to request comments on the Air Transport Association request for **207-Minute ETOPS Operation Approval Criteria**.

Air Transport Association

February 26, 1999

Mr. Thomas E. McSweeney

Associate Administrator for Regulation and Certification

Federal Aviation Administration

800 Independence Avenue, SW AVR- 1

Washington, DC 20591

Dear Mr. McSweeney:

In conjunction with the planning and implementation of Extended Range Operations with Two-Engine Aircraft (ETOPS) in the North Pacific area of operations, the Air Transport Association (ATA) member airlines determined that a need exists for expanded ETOPS authority beyond 180 minutes. The ETOPS Subcommittee established a process where associated airlines, the Pilots associations, Boeing, Federal Aviation Administration representatives and other parties worked together to determine the criteria to support the establishment of a proposed 15 percent operational extension to 180 minute ETOPS. The result of the effort is the attached draft proposal, including the associated application and approval criteria, for an ETOPS policy letter providing for 207 minute ETOPS authority.

As reflected in the proposed policy letter, it was determined that there would be additional requirements associated with the new authority. Most of these requirements are self evident. However, to assist in your analysis and review of this proposal, we have included an Executive Summary of the Boeing Reliability Study which was conducted in support of this effort.

There are many issues associated with 207 minute ETOPS, especially in the North Pacific area of operations. One example is the availability and support functions of Alternate and Emergency airports. ATA ETOPS operators have conducted airport visits and inspections of selected airports in Alaska and Russia, and are establishing plans to expand

these and foreign governments to ensure airport availability to support all international air Transport operations.

In conclusion, we request your consideration and approval of the attached policy letter establishing 207 minute **ETOPS** authority. Since there are airlines conducting **ETOPS** in the North Pacific now and three more airlines plan to start operations in that area this year, we respectfully request accelerated processing of this proposal.

Sincerely,

/s/ Captain Paul McCarthy

Executive Air Safety Chairman,

Air Line Pilots Association

/s/ Captain William **Borrelli**

President, Independent Association

of Continental Pilots

/s/ Robert **H. Frenzel**

Senior Vice President,

Aviation Safety and Operations,

Airlines Transport Association

Att.

DRAFT PROPOSAL February 4, 1999

INFORMATION: 207-minute ETOPS Operation Approval Criteria. ETOPS Policy Letter EPL

DISCUSSION:

It has been determined by the FAA that a need exists for an additional **ETOPS** authority beyond **180** minutes. The **ETOPS** concept has been successfully applied since **1985** and is now widely employed. The number of **ETOPS** operators has increased dramatically, and, in the North Atlantic, **U.S** operators have more twin operations than the number of operations accomplished by three- and four- engine airplanes. **ETOPS** is now well established.

It is apparent that the excellent propulsion related safety record and the success of two-engine airplane operations has not only been maintained, but potentially enhanced, by the process-related provisions associated with **ETOPS**.

The data shows **ETOPS** requirements and processes are generally applicable to all long-range operations including those by three- and four- engine airplanes. Ensuring availability of en route alternate airports, adequate fire fighting coverage at these airports, fuel planning to account for **depressurization** are sound operational practices for all airplanes including three- and four- engine airplanes.

It is the position of the FAA that a need exist to normalize the requirements for **enroute** alternates across all long-range operations. Because such operations operate over increasingly remote and demanding areas of operation, it is also necessary to develop a long term solution to the requirements of adequate levels of Rescue and Fire Fighting Services (**RFFS**) for non-destination airports. Until such consistent requirements addressing all “Long Range Operations” are established, the FAA will continue to use **AC 120-42A**, Extended Range Operation with Two-Engine Airplanes, and associated policy letters to allow two-engine operations on extended-range operations (**ETOPS**). The FAA has taken the following into consideration during the development of this Policy Letter:

- a. **180-minute ETOPS** is adequate to permit two-engine operation on almost all the heavily traveled routes in the world. Due to a number of factors (including occasional political concerns, airport suitability considerations due to higher weather minima at dispatch, various weather related events and operational necessities), a need exists for an additional **ETOPS** authority beyond **180** minutes on a flight-by-flight exception basis.

- b. A precedence for operational extension of maximum diversion time by up to **15** percent exists. **ETOPS** Policy Letter **EPL 95-1** dated December 19, 1994, reinstated the increase of up to **15** percent in maximum diversion time (maximum

diversion time being **120-minutes**) from suitable airports which was initially provided in the original guidance for extended-range operations with two-engine airplanes in Advisory Circular AC 120-42 dated June 6, 1985.

- c. This policy letter provides a **15%** extension on **180** minutes (similar to what was provided for **120** minutes) . It is intended that this extension will be applied on a flight-by-flight exception basis. Such extensions can only be applied to a route where adequate **enroute** alternate airports exist and are available and that, if defined as 'suitable' for dispatch as per paragraph 1 **0(d)(5)** of AC **120-42A**, the route could be flown at **180-minute ETOPS** authority. A **15** percent increase to **180** mathematically equates to **207**, and will therefore be addressed as the **207-minute ETOPS** authority.

- d. Allowing **207-minute ETOPS** extension is not intended to encourage or support further closures of en route alternate airports.

The FAA has found it appropriate to release a policy letter allowing **207-minute ETOPS** authority. This policy will be incorporated in Advisory Circular **120-42A** at the next revision cycle. The FAA is committed to harmonize Title **14** Code of Federal Regulations (**14 CFR**) and aviation policy with the Joint Aviation Authorities (**JAA**) wherever it is feasible, and harmonization in this specific area is desirable.

APPROVAL BASIS

Although the **207-minute ETOPS** authority is an extension of **180-minute ETOPS**, certain criteria will apply when the increase in diversion authority is being exercised.

The operator shall comply with all the operational approval requirements for **180-minute ETOPS**. Following are additional requirements for **207** minutes:

1. Operators shall use satellite communications (**SATCOM**) voice and /or **SATCOM datalink** as a minimum in order to meet **14 CFR** requirements for rapid and reliable communications.
2. Operators shall, prior to the extended range entry point, use **datalink** to update any revised flight plan (company communications) if required as a result of reevaluation of aircraft system capabilities and **enroute** alternates. Dispatch will review **enroute** alternates and advise the flight crew of all suitable alternates within **207** minutes of the planned routing.
3. The operator shall have single-engine **autoland** capability on the airplane and such systems must be operable for dispatch.

4. MEL restrictions for **180-minute** operations shall be applicable. In addition, the following shall not be inoperative prior to dispatch for **207 minutes ETOPS**:
 - Fuel quantity indicating system (**FQIS**)
 - Auxiliary power unit (including electrical and pneumatic supply to its designed capability)
 - Autothrottle system
 - **SATCOM** voice and /or **SATCOM datalink**

 5. Operators shall ensure that adequate levels of **RFFS** for **enroute ETOPS** alternates are available. For the case of **207-minute ETOPS**, the aircraft must remain at all times within **207** minutes of at least one adequate airport (as defined in **AC 120-42A**, Appendix 3) which has a **RFFS** of International Civil Aviation Organization (**ICAO**) Category 7 or higher. If such equipment is not available on the airport, an equivalent level of support must be reasonably accessible given notification of the divert.

 6. Operators shall inform the flightcrew anytime an aircraft is dispatched under this authority and shall make available the dispatch considerations requiring such operations.

 7. Operators who are granted **207-minute ETOPS** authority shall submit to the FAA, on a regular monthly basis, a record of all **ETOPS** operations in that area. For each
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segment where the **207-minute** authority was exercised, the dispatch justifications must be delineated. Industry data for all such operations will be reviewed on a regular basis by an industry group to be determined by the FAA.

The airframe-engine must have **180** minutes type design approval. All requirements specified in the Configuration Maintenance and Procedures (**CMP**) for **180-minute ETOPS** will remain applicable. The airframe-engine combination shall be reviewed to determine if there are any factors which would affect safe conduct of **207-minute** operations on a flight-by-flight exception basis as defined in (c) of the 'Discussion' section of this policy letter. Such a review shall ensure:

1. Numerical Probability Analysis (**NPA**) provided to support **180** minutes will be reanalyzed to support a **207-minute** diversion.
2. The engine installations have adequate oil supply margins to support **207-minute** plus an additional allowance of **15** minutes (for holding, an approach and landing) for a total of **222** minutes **ETOPS** diversions per FAR 25.1011(b).
3. Time-related cargo **fire** limitations shall not be less than the approved **207** minutes plus an **additional** allowance of **15** minutes (for holding, an approach, and landing) for a total of **222** minutes.
4. If the airframe-engine combination has other time limited systems, the time limit for those systems shall not be less than **207** minutes plus an additional allowance of **15** minutes (for holding, an approach and landing) for a total of **222** minutes.

5. The risk of **uncontained** engine failures and subsequent fuel tank damage shall be reviewed to demonstrate continued compliance with FAR 25.903 (d)(1).
6. Engine **inflight** shutdown (**IFSD**) target level shall be at .019/1000 engine hours (based on Appendix 1 to AC 120-42A).
7. Electrical power to at least one fuel crossfeed valve shall be available as long as the main battery or a backup power source is available.
8. At least one fuel boost pump in each main fuel tank must be able to be powered by a backup electrical power source other than the primary engine driven or **APU** driven generator.
9. Any one of the engine or **APU** driven generator sources present shall be capable of powering main AC and main DC buses.

Amendments to the master minimum equipment list (**MMEL**) shall be made if the reliability analysis or if service experience indicates that the existing **MMEL** is no longer appropriate for **207-minute ETOPS**.

APPLICATION

Operators currently approved for **180** minutes **ETOPS** authority will be considered for **207-minute** authority upon application. When approved, **207-minute ETOPS** authority will be considered an extension of **180-minute ETOPS** (and the area of operation associated with that authority) and will be exercised by the operator on a flight-by-flight exception basis as defined in (c) of the 'Discussion' section of this policy letter.

Operators with existing **180-minute ETOPS** authority may apply for **207-minute ETOPS** authority by letter application to the Air Transportation Division, **AFS-200**, through the certificate holding district office (**CHDO**). The **ETOPS** authority will be granted by the Director, Flight Standards Service, **AFS-1**, and will be reflected in the operator's Operations Specifications. The application shall include the following information as a minimum:

1. Current **ETOPS** authority (i.e., **180** minutes).
2. Specify the airframe-engine combinations presently authorized for **ETOPS**, and the airframe-engine combinations for which **207-minute ETOPS** approval is being sought.
3. The area of operation requested for **207-minute ETOPS** authority.
4. Provide a summary of revisions made to operational documents.
5. Provide a summary of the revision to training curriculum for maintenance, dispatch, and flight crew personnel to distinguish **207-minute ETOPS** authority from **180-minute ETOPS** criteria.

A copy of this policy is to be disseminated to all **ETOPS** operators.

Executive Summary: B777 Reliability Study

During the past several years, Boeing, the aviation industry and government agencies have been working together to develop safer and more efficient methods of air transportation for the traveling public. One area of such particular focus has been extended range operations with twin engine airplanes (**ETOPS**).

Currently, most Boeing twins have been type design approved for **ETOPS** up to **180** minutes. Until recently, this accommodated highly effective twin-engine operations, on those routes on which these airplanes were typically operated. Recently, however, the **180** minute limit has been shown to present certain obstacles to reliable operations in the North Pacific.

At times, some North Pacific alternates may be unavailable in the planning phase or during flight as a result of weather, volcanic eruptions or other temporary closures. While it is unlikely that all alternates would be unavailable during the actual flight, Advisory Circular **120-42A** applies a conservative alternate airport weather minima factor during **ETOPS** flight planning. This factor may at times cause an alternate airport to be considered unavailable in the planning phase, thereby requiring an **ETOPS** flight to be canceled, have a possible extended departure delay, or forcing it to follow a less direct route to stay within **180** minutes of other suitable alternate airports. However, this

conservative weather factor no longer applies once the flight dispatches. Thereafter, any decision to divert would be based on the actual suitability of the available alternate airports. Consequently, this well-intended weather factor may at times cause an airplane to be further away **from** the nearest suitable alternate airport if and when a diversion becomes necessary.

Boeing, pertinent airlines and pilot associations have been studying the impact of a **15%** operational extension, on an exception basis, to **180** minute **ETOPS**. This operational extension would only be exercised when typically used alternate airports are temporarily unavailable for reasons such as weather -- it is not intended to permit use of routes that cannot normally be operated with a **180** minute approval. The above parties **find** that such an extension to **207** minutes in the North Pacific will at times permit airlines to use routes that are most efficient and will likely, in the event a diversion is necessary, result in the airplane actually being closer to a suitable alternate airport, most, if not all of the time.

Boeing twin engine jetliners have logged close to **1.4** million **ETOPS** flights. During this vast experience, there has never been a diversion of **180** minutes' duration. In nearly half a century of commercial jet transportation, moreover, no airplane of any type-regardless of the number of engines-has ever performed an emergency diversion of **180** minutes or more to an alternate airport. Therefore, allowing a **15%** extension to **207-minute ETOPS** is unlikely to result in an actual diversions in excess of **180** minutes. However, it will

allow more-direct **routings**, as well as greater choice and flexibility for flight crews, should a diversion be necessary.

As **207-minute ETOPS** will in some cases permit shorter flights, it is not anticipated to result in diversions in excess of **180** minutes and may actually result in decreased diversion times. Such may actually yield a net decrease in risk. As a result, formal review of **B-777** certification-related data is probably unnecessary for approval of **207-minute ETOPS**. However, to assure that no compromise to safety occurs or might be perceived, an analysis of the **B-777** type design was nevertheless performed to assess the suitability of the **B-777** airplane to a **207-minute** diversion.

Using design and reliability data **from** the **B-777** airplane, a reliability analysis was performed on those systems considered important for **ETOPS** (electrical power generation system, hydraulic, bleed air, anti-ice, equipment cooling, fuel and propulsion). The exercise identified the necessary “top events” that needed to be analyzed to show compliance with the requirements posed by the **15%** increase. Where numerical probability analysis (**NPA**) was used, it ensured that **NPA** ground rules were applied to the **original** analysis. Where an existing **ETOPS NPA** was performed considering a **180** minute diversion, an analysis for a **207** minute diversion was completed to show compliance for the **15%** increase. However, if the existing **ETOPS NPA** was performed for the full **14** hours, not taking credit for the **180** minute diversion, no additional analysis was deemed necessary because that analysis showed **ETOPS** capability beyond **207**

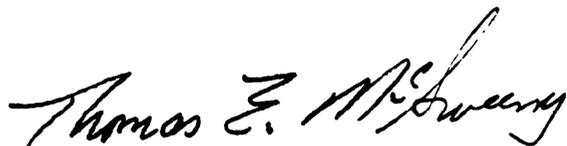
minutes. In all cases, the most conservative criteria with the greatest impacts were applied to this analysis.

In each case, the analysis showed that the probability of a catastrophic event was extremely improbable, even under the most extreme circumstances. In fact, this analysis confirmed **B-777** airplane design and reliability capability well in excess of the proposed **15%** extension.

Furthermore, the undersigned parties are prepared to offer a modification to the cargo fire protection system that accommodates the **15%** extension in **ETOPS** diversion time, even though risk analysis methodology does not demonstrate a need for such a modification.

The Boeing Company has reviewed the results of this analysis with Mr. Steve Clarke, the FAA's focal for **ETOPS** type design approval, as well as individuals **from** the Aircraft Evaluation Group (**AEG**). Boeing is prepared to conduct additional such reviews for the FAA upon request.

END OF **ATA** TEXT.



Thomas **E. McSweeney**
Associate Administrator for
Regulation and Certification