



สำนักงานการบินพลเรือนแห่งประเทศไทย
The Civil Aviation Authority of Thailand

EXTENDED RANGE OPERATIONS WITH TWO-ENGINE AEROPLANES (ETOPS) GUIDELINES

CAAT-GL-OPS-ETOPS

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Abbreviations

Abbreviations	Meaning
<i>AFM</i>	Airplane Flight Manual(flight manual)
<i>APU</i>	Auxiliary Power Unit
<i>ATS</i>	Air Traffic Services
<i>OCC</i>	Operational Control Center
<i>CFSS</i>	Cargo fire suppression system
<i>CMP</i>	Configuration, Maintenance and Procedure document
<i>ECD</i>	ETOPS compliance document
<i>EEP</i>	ETOPS entry point
<i>ETP</i>	Equal time point
<i>FQIS</i>	Fuel quantity indicator system
<i>IAS</i>	Indicated airspeed
<i>IFSD</i>	In-flight engine shutdown
<i>MADT</i>	Maximum Approved Diversion Time (approved by Certification)
<i>MEL/MMEL</i>	(Master) Minimum Equipment List
<i>OSD</i>	Operational Suitability Data
<i>SB</i>	Service Bulletin
<i>TLS</i>	Time limited system

0. Introduction

0.1 Background

An approval for extended diversion time operations (ETOPS or CAT.OP.MPA.140(d)) is required to operation of a twin engine aeroplane, in commercial transport operations, on a route containing a point beyond the maximum distance from an adequate aerodrome, determined in accordance with CAT.OP.MPA.140 § (a) of TCAR OPS Regulation. This approval is valid:

- For maximum diversion time at approved One Engine Inoperative (OEI) speed (IAS),
- For a given operating area, and
- For a specific Airframe/Engine Combination (AEC).

0.2 Purpose

The purpose of this approval is to verify that processes have been put in place:

- To limit the probability of an in-flight engine shutdown (IFSD), through requirements related to the type design and airworthiness of the airframe/engine combination, the airworthiness and individual conformity of the aircraft, the monitoring of airworthiness, maintenance and reliability programme.
- To ensure the safe continuation of the flight to an adequate enroute alternate aerodrome, in the event of an in-flight engine shutdown, in particular through requirements:
 - Identical to those of the previous point, in order to reduce the risk to an acceptable level in case of total loss of propulsion due to independent causes;
 - Specific requirements of the minimum equipment list, with regard to the systems operating for limited durations;
 - Selection of suitable enroute alternate aerodromes, verification of their accessibility;
 - Verification of a critical fuel scenario, in order to ensure the possibility of a safe landing;
 - In-flight monitoring and support to the crew for decision-making during the flight.

0.3 Applicability

This Guide is applicable to the Commercial Air Transport Operator who operates with Twin Turbine aeroplane beyond maximum distance to an adequate aerodrome that are specified in CAT.OP.MPA.140 (a).

0.4 References

TCAR OPS Air Operation (Cover) Regulation and **TCAR OPS** Part, with the associated AMCs and GM including:

- CAT.OP.MPA.140
- SPA-Subpart F-Extended Diversion Time Operations (EDTO)

EASA Document “Extended Range Operation with Two-Engine Airplanes ETOPS Certification and Operation” (**AMC 20-6B**), AMC 20-6B applies:

- Performance Class A twin-engine aeroplanes with a passenger configuration of 20 or more operated beyond 60 minutes flight time from a suitable aerodrome at the approved one-engine inoperative (OEI) cruising speed.
- Performance Class A twin-engine aeroplanes with a passenger configuration of 19 or less, operated beyond 180 minutes flight time from a suitable aerodrome at the approved OEI cruising speed.

1. Type of ETOPS Approval

Many situations may lead an operator to request approval according to this user guide:

- First ETOPS approval: in the case of the first fleeting entry, for the operator, of an ETOPS certified aircraft type, or in the case of the start of the first ETOPS operations on an aircraft type already operated outside ETOPS;
- A new ETOPS approval in the case:
 - The fleeting of a new ETOPS-certified aircraft type;
 - The fleeting of an aircraft type already operated with a different engine;
 - The start of ETOPS operations on an aircraft type already operated outside ETOPS;
 - An increase in the maximum diversion time on an aircraft type already operated ETOPS;
 - An extension or modification of the ETOPS operating area.

Finally, an approval is also necessary in the case of a change relating to an ETOPS operation, for example:

- Evolution of fuel calculation methods related to ETOPS operations;
- Change in the operational flight plan format impacting information related to ETOPS; ...

It should be noted that any changes to the manuals or methods that served as justification for obtaining an ETOPS approval must be subject to change require prior approval.

Due to the multiplicity of approval request situations, this guide is designed so that an operator can identify which documents and supporting elements must accompany his request.

Approval depending on their situation. During the analysis of the application file, additional information may however be requested from the operator.

This guide notably indicates the alternative justifications that the operator can provide as part of an accelerated approval process (see §3.3).

1.1 Approval to CAT.OP.MPA.140§(d)

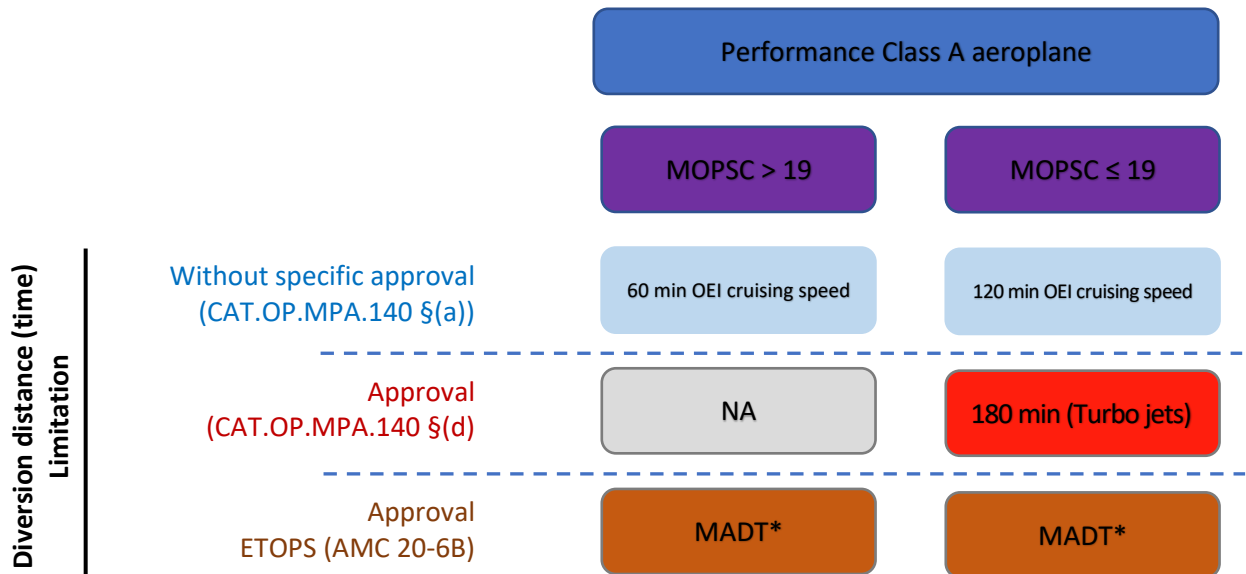
This guide also describes the process for issuing an approval under the CAT.OP.MPA.140(d), whose logic and objectives are similar to those of an ETOPS approval, but this approval specific to Performance class A aeroplane with a passenger seat capacity limited to 19 or less.

1.2 Associated Approval:

As mentioned in above paragraph, the following lists describe the associated items require an approval:

- EDTO Approval in accordance with TCAR OPS SPA.EDTO.105;
- Approval of the use of CAT II and CAT III minima for ETOPS enroute alternate aerodrome during flight preparation (planning phase): AMC 20-6B, appendix 5 §3;
- CAT.OP.MPA 180 Fuel/Energy Scheme.

The diagram below summarises the necessary approvals depending on the category of aircraft and the related Diversion Time.



Summary of Operational Approval with extended diversion time

* MADT - Maximum approved diversion time: see details given in §3.3

2. Approval Process

2.1 Creation of the Application file (by Operator)

The operator must submit its application for approval accompanied by all the supporting documents at least 3 months before the start of operation.

In the case of an application for ETOPS approval following an "accelerated" process (see §3.3), the operator will submit its application for approval 6 months before the start of operations, accompanied by an ETOPS process validation plan (see detail §3.3.1.b)). Subsequently, all the supporting documents must be sent at least 3 months before the start of operations.

The application file will consist of:

- A certificate of compliance and a compliance matrix,
- A change management / safety risk assessment (if necessary, according to the internal methods defined within the framework of the approved change management procedure),
- Depending on the type of request and the operator's situation, all the documents listed in chapter 3 of this guide.

A meeting to present the documentations can be organised at the request of the CAAT or the operator. The objective of this meeting is to study the options envisaged by the operator in terms of operations and maintenance, in particular in the case where the operator has no ETOPS experience but plans to use subcontractors-contractors and/or to use personnel with ETOPS experience (see §3.3).

2.2 Training and operational evaluation

The operational aspects of the file of those relating to airworthiness and maintenance are examined by the CAAT.

Inspections prior to the issuance of the authorisation concerning the specific aspects of an ETOPS operation may be organised by the CAAT. These inspections may concern subcontractors whose experience and knowhow the operator wishes to use, in order to ensure their level of competence.

In addition, the operation of specific ETOPS procedures may be verified by simulation on non-ETOPS flights. Particular interest will be given to the process of flight preparation and in-flight assistance. On the other hand, depending on the case (diversion time approval or new type), a validation flight may be performed online as part of CAAT inspection or an internal operator check flight as requested by the CAAT. These flights may be preceded by simulator session(s) inspected by the CAAT.

2.3 Final meeting to issue approval

If necessary, before ETOPS approval is issued, a meeting with the CAAT and concerned party is organised in order to summarise the results of the study of the operator's application file and the operational assessment

2.4 After issuance of approval

As for any other area of the operator's operations, the CAAT may be called upon to assess the operation and effectiveness of the operator's ETOPS processes as part of its monitoring.

To this end, it may request a report on ETOPS operations from the operator, including in particular: airframe/engine combination reliability statistics for the operator and the world fleet, analysis of events in ETOPS operation, number of ETOPS flights carried out, number of ETOPS flights carried out within technical tolerance MEL and nature, fuel monitoring report, report on the availability/reliability of meteorological information, at the selected enroute/destination alternate aerodromes, report on the reliability of communications between the crew and dispatch, report on flight analysis.

3. Details of the applications file

As specified in the introduction chapter, this guide is constructed in such a way that an operator can identify which documents and which supporting elements must accompany their application for approval depending on the type of application and their situation.

Indeed, for each of the topics to be dealt with within the framework of an ETOPS approval, corresponding to §3.1 to 3.13, three levels are detailed, corresponding each time to expectations, to a list of information and documents to be provided:

1. **General case:** Case of a request for standard ETOPS approval. An operator without ETOPS experience is systematically in this level.
2. **Specific situations:** Case of certain changes in relation to an existing ETOPS approval, of certain situations for operators already operating in ETOPS, or specificities of certain ETOPS approvals involving additional requirements.
3. **Situations exempt from justification:** Case where the operator does not have to provide specific justification for the theme.
4. **CAT.OP.MPA.140(d) Approval:** information expected in a CAT.OP.MPA.140(d) approval application file.

The application file will therefore include, for each of the subjects detailed in paragraphs 3.1 to 3.13, the elements of justification and the documentation associated with the level chosen. The use of the appendix of §5 will allow the operator to indicate to the CAAT in which level(s) it is located.

During the analysis of the file, additional information may however be requested from the operator. In particular, in the event that the operator positions itself at the “exempted situation” level, the CAAT may have to request information in order to verify this position.

It should be noted that the procedures and reference system used for ETOPS operations can be integrated into the operations manual (OM-A 8.5 in particular) or be the subject of a dedicated manual. AMC 20-6B – Appendix 7 provides a structure for this manual. In the remainder of this guide, we will refer generically to the “Operations Manual”.

This guide does not replace the regulations which remain the only reference for the verification of regulatory compliance.

As an aid for the operator, the table below indicates, for the main cases of application for approval, the points to be detailed in the application file, among those described in paragraphs 3.1 to 3.13 of this guide:

Type of request	Point to cover in the application file
Operator with no ETOPs Approval	
Application for Initial ETOPS “In-Service” Approval	§3.1 to §3.13
Application for “Accelerated” Initial ETOPS Approval	§3.1 to §3.13 with specific indicated in §3.3

Application for approval CAT.OP.MPA.140(d)	§3.1 to §3.13 paragraph 4
Type of request	Point to cover in the application file
Operator already holding an ETOPS approval	
Standard addition of a new airframe/engine combination, operator without experience on this AEC	§3.1 to 3.4, to §3.8 to 3.13 (and §3.6 and 3.7 if diversion time restriction)
Accelerated addition of a new airframe/engine combination, operator without experience on this AEC	§3.1 to 3.4, to §3.8 to 3.13 (and §3.6 and 3.7 if diversion time restriction), with the specificities indicated in §3.3
Addition of a new airframe/engine combination with operator experience on the type (airframe)	§3.1 to 3.4, §3.8 to 3.13 (and §3.6 and 3.7 if diversion time restriction)
Addition of a new airframe/engine combination with operator experience on the engine (installed on other types)	§3.1 to 3.4, to §3.8 to 3.13
Increased approved diversion time for an airframe/engine combination	§3.1 to §3.13
Modification of the ETOPS area of operation for an airframe/engine combination	§3.4, §3.5, §3.7 to 3.9, §3.11
Change of technical means (communication tools, flight preparation tools, etc.)	§3.5 to 3.8, §3.11
Change in methods or organisation	§3.6, §3.10, §3.11, §3.13 (and §3.12 if the change is airworthy or maintenance))

3.1 Certification of the airframe/engine combination

SPA.ETOPS.105 §(a)

Approval CAT.OP.MPA.140(d): AMC1 CAT.OP.MPA.140(d) §(b)

3.1.1 General case

In its application file, the operator will specify:

- Proof of ETOPS eligibility and suitability for the specific airframe/engine combination,
- The capacity of systems operating on limited durations (Time-Limited System: TLS),
- The maximum diversion time authorised by certification for the airframe/engine combination.

- The individual compliance of each aircraft concerned with the ETOPS standard (ETOPS configuration, maintenance and procedures: CMP)

The following documents must be provided in the application file:

- ETOPS supplementary to the flight manual;
- CMP document specifying the specificities related to ETOPS operation;
- Evidence that the configuration of the aircraft complies with the ETOPS CMP: in particular application of the SBs for cargo fire suppression, time-limited systems (TLS), etc.
- ETOPS Compliance Documents (ECD) for an aircraft covered by the application for approval: document of compliance with the latest revision of the ETOPS CMP document and list of airworthiness directives for airplanes certified ETOPS by the FAA or by the EASA. This document is generally available on delivery of the aircraft and can therefore be provided on that date.

3.1.2 Situations exempt from justifications

No justification relating to this point is required in the event that the new application for approval relates to an airframe/engine combination already operated in ETOPS, with an identical time and diversion distance.

3.1.3 Case of CAT.OP.MPA.140(d) approval

The operational regulations do not set any requirements other than those of the CS 25 regulation (or equivalent), and do not impose ETOPS certification of the airframe/engine combination.

However, if the airplane(s) concerned are ETOPS certified and maintained at the standard defined by the ETOPS CMP, the operator will specify this.

3.2 Reliability of the airframe/engine combination

AMC 20-6B – Chap. III section 13

AMC 20-6B – Appendix 1

Approval CAT.OP.MPA.140(d): AMC1 CAT.OP.MPA.140(d) §(c)

3.2.1 General case

The operator shall ensure that the in-flight engine shutdown rates of its operations, as well as those of the worldwide fleet, are lower than the rates specified in Appendix 1 §3 of AMC 20-6B for the requested diversion time.

The following documents must be provided in the application file:

- In-flight engine shutdown rate (IFSD) of the operator (for the specific airframe/engine combination and airplanes equipped with the same type of engine), in ETOPS operations or not,
- In-flight engine shutdown rate considering the worldwide fleet (specific airframe/engine combination, specific airframe/engine combination compliant with the ETOPS standard, aircraft fitted with the same type of engine, and aircraft fitted with the same type of engine compliant with the ETOPS standard).

3.2.2 Situations exempt from justifications

No justification relating to this point is required in the event that the new application for approval relates to an airframe/engine pair already operated in ETOPS, with an identical time and diversion distance.

3.2.3 Case of CAT.OP.MPA.140(d) approval

The operator must describe its process for monitoring the reliability of the power plant, as defined by §(c) of the AMC1 CAT.OP.MPA.140(d):

- By indicating how he informs the holders of the airframe and engine type certificates, as well as the CAAT, of the engine events encountered and the hours of operation performed.
- By specifying how these events are analysed by the operator in coordination with the organisations mentioned above, and how it implements the associated corrective actions. This analysis will be done on a case-by-case basis in the case of a reduced operating and/or global fleet.

Note: The CAAT accepts the application of the criteria of §3.2.1 (compliance with the paragraphs of AMC-20-6B referenced above, at the top of §3.2) as being at least equivalent to the criteria above.

3.3 Maximum diversion time requested by the operator and approval process

AMC 20-6B - Chap. III – Section 4 to 7 and 10

AMC 20-6B - Appendix 3

3.3.1 General case

In its application file, the operator will specify the maximum diversion time requested for approval by the authority and the associated operating area.

Except in the specific case described in §3.3.2, the maximum diversion time requested by the operator for approval must not exceed the maximum diversion time authorised by certification for the airframe/engine combination (MADT), nor the capacity of systems operating for limited durations, minus 15 minutes.

Otherwise, the AMC 20-6B distinguishes two ETOPS approval processes, which will influence the maximum diversion time that the operator can request:

- ETOPS in-service approval;
- Accelerated ETOPS approval.

a) ETOPS In-Service Approval

This approval process concerns operators with experience on the airframe/engine combination, who wish to start ETOPS operation or increase the diversion time approved for this airframe/engine combination. To approve a maximum diversion time, the CAAT will rely on the following elements, which must be provided in the application file:

Experience of the operator on the specific airframe/engine couple (in this case the operator will provide the number of flights and number of hours flown – in ETOPS operations or not),

- Experience of the operator on aircraft equipped with the same type of engine (in this case the operator will provide the number of flights and number of hours flown),

- Experience of the operator on other airframe/engine combination or other types, in ETOPS operations (in this case the operator will provide the number of flights and number of flight hours),
- Experience of the operator in the operating area and the routes that will be operated in ETOPS,
- In the case of an extension of the approved diversion time, reliability statistics of the airframe/engine combination for the operator and the world fleet, analysis of events in ETOPS operation (including IFSD and diversions), number of ETOPS flights carried out, number of ETOPS flights carried out within technical tolerance MEL and nature, fuel monitoring report, report on the availability/reliability of meteorological information, at the selected alternate aerodromes, report on the reliability of communications between the flight crew and flight dispatcher, report on flight analysis.

The maximum diversion time can be gradually increased by the CAAT as the operator accumulates ETOPS experience on the airframe/engine combination. Normally, authorisation with a maximum diversion time of 180 minutes is obtained after at least 12 months of experience within the operator, unless the operator can demonstrate compensating factors.

For this approval process, the documents and justifications to be provided in the application file will aim to demonstrate that all the processes are complete and sufficiently robust to cover the new operating limit.

b) Accelerated ETOPS approval

This approval process concerns operators with no experience in the airframe/engine combination, who wish to start operating this airframe/engine combination directly in ETOPS operations.

For this approval process, the documents and justifications to be provided in the application file will aim to demonstrate that all the processes are in place and that they are working, before the start of the operations, even if the start of ETOPS operations on this new type does not bring any change with respect to the existing approvals.

To this end, the operator will provide an ETOPS process validation plan for each of the themes developed in §3.4 to §3.13 below, in addition to the documents listed in these parts.

This ETOPS process validation plan will specify, for each of the themes:

- The validation method; for example:
 - Simulation (e.g. edition of ETOPS flight records);
 - Internal audit of the process;
 - Verification of settings, updating of databases, testing of tools;
 - Results of indicator/statistics of events;
 - ...
 - Dates of the planned validation acts. Progress meetings may be organised between the operator and the CAAT in order to study the results of this validation plan.

Where

- Evidence of acquired experience, for example:
 - Continuing airworthiness and maintenance: previous experience of the retained maintenance organisation on the same airframe/engine combination in ETOPS operations.

- Training: experience in ETOPS operations of flight crew on behalf of another operator on the same type,
- Training: experience in ETOPS operations of flight crew internally on another similar type. In this case, the operator will outline the differences between these two airframe/engine combination (crew operation, maintenance operations, etc.)
- Flight preparation and follow-up: experience in ETOPS operations of the flight preparation and follow-up service (internally or externally if the operator uses a subcontractor),
- ...

The following documents must therefore be provided in the application file:

- ETOPS process validation plan, including the details and dates of the planned tests or simulations as well as the documents attesting to the applicable justifications listed above.

Furthermore, to approve the maximum diversion time, the CAAT will rely on the following elements, which must also be provided in the application file:

- Experience of the operator on aircraft equipped with the same type of engine, if applicable (in this case the operator will provide the number of flights and number of flight hours),
- Experience of the operator on other airframe/engine combination or other types, in ETOPS operations (in this case the operator will provide the number of flights and number of flight hours),
- Experience of the operator on the area of operation and the routes that will be operated in ETOPS.

3.3.2 Specific situations

Additional requirements: Requested diversion time greater than 180 min, for MADT certified aeroplanes > 180 min

AMC 20-6B - Ch. III – Section 7 - §7.2.3.

Operators wishing to operate with a diversion time greater than 180 min, for aircraft certified for such a time, must first be authorised for a diversion time equal to 180 min on the same airframe/engine combination and have acquired adequate experience.

The operational need for an approval for diversion time greater than 180 minutes must be justified by a network that is too far apart from adequate ETOPS landing available on the routes or operating areas requested, or for reasons of operational flexibility, for example to compensate for occasional closures of support areas. The operator must demonstrate the operational need for such approval.

Additional requirements: Requested diversion time beyond the MADT for the airframe/engine combination

AMC 20-6B - Chap. III – Section 7 - §7.2.2. i), ii)

Operators wishing to operate with a diversion time greater than the certified diversion time for the airframe engine combination (MADT) can request an increase in the diversion time up to 115% of the MADT, when the latter does not exceed 180 min. This diversion time must remain less than the duration of the TLS minus 15 minutes.

These extensions must be subject to an evaluation by EASA (e.g. overall type design, TLS) and the development of a dedicated MEL, and will therefore be dealt with on a case-by-case basis. These extensions apply only on specific routes.

3.3.3 Situations exempt from justifications

No justification relating to this point is required in the event that the new application for approval relates to an airframe/engine combination already operated in ETOPS, with an identical time and distance, as well as in the same operating area.

3.3.4 Case of CAT.OP.MPA.140(d) approval

The diversion time is a maximum of 180 minutes. The operator will specify the value of the maximum diversion time, between 120 and 180 min, which it submits for approval.

3.4 Establishment of the ETOPS area of operations and the maximum diversion distance

CAT.OP.MPA.140

AMC 20-6B - Chap. I - Section 4 - (a)

AMC 20-6B - Chap. III – Section 10

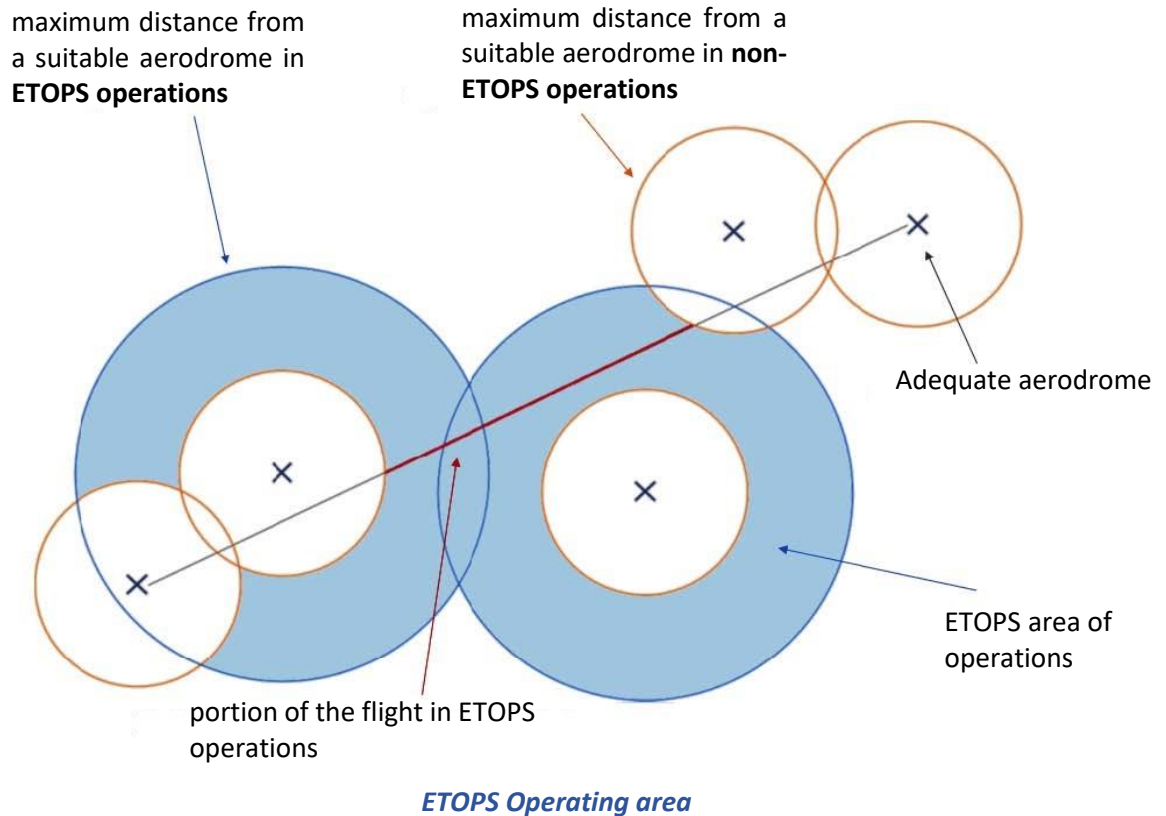
AMC 20-6B - Appendix 3 - §1 and §2

3.4.1 General case

a) ETOPS operating area

An operator approved for ETOPS operations is authorised to plan flights in an ETOPS operations area. This ETOPS operating area is defined by the operator as follows:

- Identification of geographical areas in which a large spacing of adequate aerodromes does not allow compliance with CAT.OP.MPA.140(a) on the planned routes
- Within these geographical areas, delimitation of areas from each suitable aerodrome by arcs:
 - Of maximum radius corresponding to the **maximum distance away from an ETOPS suitable aerodrome in ETOPS operations**, equal to the maximum diversion time approved by the CAAT (see §3.3) multiplied by the **cruising speed with one engine inoperative** (OEI expressed in TAS) approved by the CAAT, and
 - With a threshold radius (“threshold”) corresponding to the **maximum distance from an adequate aerodrome in non-ETOPS operations**, determined in accordance with point *CAT.OP.MPA.140 §(a) and §(b) combined*.



Note: In the event of the temporary unavailability of one or more of the adequate aerodromes usually selected, the operator will reconsider, for the flights concerned, the area of operation on the basis of the remaining adequate aerodromes.

b) Determination of the maximum distance away from an adequate ETOPS aerodrome

The cruise speed with approved one-engine inoperative (OEI) for ETOPS flights is an average reference speed, established with no wind and in standard conditions. It is based on a strategy (“speed schedule”) and a reference aircraft weight assumption at the beginning of the diversion, in order to be representative of the operating conditions.

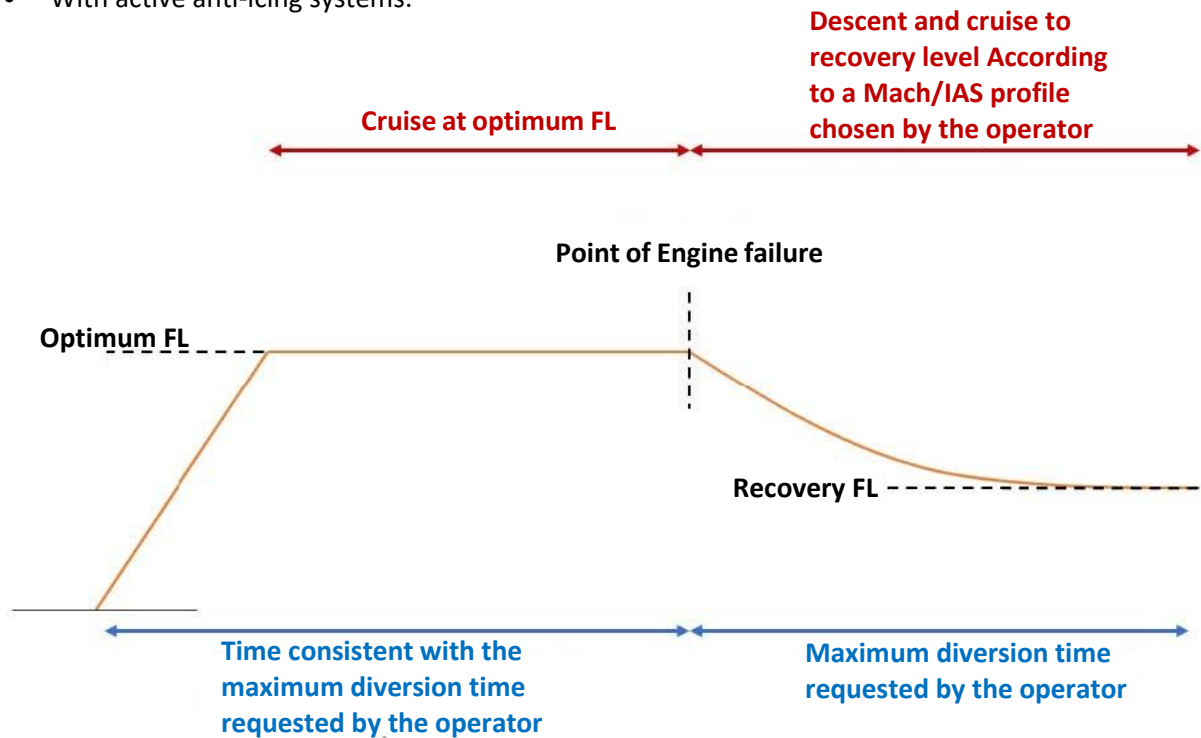
In practice, it is common for operators to directly determine the **ETOPS maximum diversion distance**, using the data provided by the manufacturer (specific data table or calculation programme). Generally, the scenario used considers a takeoff at MTOW, a climb to the optimum cruising level, then a cruise until a cumulative time since takeoff consistent with the maximum diversion time requested by the operator.

Cruise is normally considered at Long Range Cruise (LRC) speed and with the anti-icing systems inactive. At the end of this cruise at the optimum level, the failure of an engine is considered, at the corresponding aircraft weight, referred to reference aircraft weight (“reference weight”).

The maximum distance from an adequate ETOPS aerodrome in ETOPS operations then corresponds to:

- A descent with a Mach/IAS display, determined by the operator within the certified speed limits for the aircraft and consistent with the procedures in the operations manual, towards an appropriate one-engine cruising level (recovery),

- Continuation of one-engine cruise at this same IAS, for a cumulative flight time with the descent phase equal to the maximum diversion time requested by the operator.
- In ISA conditions, without wind,
- With active anti-icing systems.



Maximum distance from a suitable aerodrome in ETOPS Operations

Carrying out these calculations with assumptions different from those presented here (for example inactive anti-icing system) is possible, but must be justified by the operator.

The operator has the possibility of making these calculations for several diversion times, in order to obtain maximum diversion distances that can be used in the event that an operating constraint reduces the maximum diversion time for a given flight (eg: MEL).

It is important to note that the choice of Mach/IAS applied to demonstrate the approved One Engine Inoperative Cruise (OEI) speed must be compatible with the possible presence of high terrain in the ETOPS area of operation. Furthermore, a choice that is at least as penalizing in terms of fuel consumption must be used in determining the ETOPS critical fuel (see §3.8). Indeed, a high IAS cruising speed with one-engine inoperative (OEI) maximises the diversion distance, but lowers the level of recovery and increases fuel consumption.

In addition, the Mach/IAS applied to determine the speed with approved one-engine inoperative (OEI) must be announced to the flight crews, who will use it to manage a possible diversion (unless the captain considers that the safety of the diversion requires another choice). These Mach/IAS values and the approved One-Engine Inoperative (OEI) speed should therefore be included in the Operations Manual. They will also appear on the ETOPS approvals issued by the CAAT.

Furthermore, the diversion distance obtained from these calculations will correspond to the maximum allowable distance between a scheduled ETOPS route and an adequate aerodrome. Thus, the procedures or tools put in place by the operator must make it possible to comply with this requirement.

c) Determination of the maximum distance away from adequate aerodrome by non-ETOPS Operator-Threshold Distance

This diversion distance is established using a method similar to that described in b), with the differences as follows:

- the cumulative time from take-off until failure does not exceed the time specified in CAT.OP.MPA.140(a); and
- the cumulative OEI descent and cruise time since the failure is equal to the time authorised by CAT.OP.MPA.140(a) for the aircraft category.

In practice, this distance will be used to determine the ETOPS entry point (EEP), which corresponds to the first point of the route where the aircraft is beyond this distance in relation to an adequate aerodrome, as well as the ETOPS exit point (EXP), which corresponds to the last point of the route where the aircraft is beyond this distance from an adequate aerodrome.

d) Synthesis

In conclusion, the following documents must be provided in the application file:

- Details of the assumptions and calculation results, with software screenshots or aeroplane performance tables,
- Extract(s) from the operations manual specifying:
 - The descent Mach/IAS and the cruise IAS speed with one engine inoperative (OEI) chosen by the operator,
 - Maximum distance from an adequate aerodrome in non-ETOPS operations,
 - Maximum distance(s) from an adequate aerodrome in ETOPS operations, corresponding to the approved diversion times and the average OEI cruising speeds expressed in corresponding TAS,
 - Specified geographical zones (which can be, by default, the zone associated with the CAT when the diversion time requested does not exceed 180 min).
- Justification that the configuration of the flight preparation tools, or that the flight preparation procedures make it possible to ensure compliance with the maximum distance from an adequate ETOPS aerodrome.

3.4.2 Specific situations

Additional requirements: Requested diversion time greater than 180 min, for MADT-certified aeroplanes >180 min.

The request for such diversion time may correspond to:

- an optimisation of the routes operated by the company within the framework of area of operations: the operator lists the pairs of departure arrival sites between which a diversion time greater than 180 min is requested. This list should be specified in the operations manual and kept up to date.
- an objective of operational reliability, for example in order to compensate for closures of alternated aerodrome: the request may relate to an operating area. Prior contact with the CAAT is necessary on

the part of the operator before applying for this type of approval. These requests will be studied on a case-by-case basis by the CAAT.

Alternate Requirements: Increased maximum requested diversion time

In the event that the new application for approval relates to an airframe/engine combination already operated in ETOPS, without change in the approved IAS speed with one-engine inoperative (OEI), the operator will only carry out the calculation for determining the distance from a suitable ETOPS aerodrome in ETOPS operations corresponding to the new maximum diversion time requested.

The following documents must be provided in the application file:

- Details of the assumptions and calculation results for this new maximum diversion time, with software screenshots or aeroplane performance tables,
- Extract(s) from the operations manual specifying:
 - Maximum distance away from an adequate aerodrome in non-ETOPS operations,
 - Maximum distance(s) away from an adequate aerodrome in ETOPS operations, corresponding to the new maximum diversion time, and average cruise speed OEI expressed in corresponding TAS,
 - Specified geographical zones (which can be, by default, the zone associated with the CAT when the diversion time requested does not exceed 180 min).
- Justification that the configuration of the flight preparation tools, or that the flight preparation procedures make it possible to ensure compliance with the maximum distance from an ETOPS adequate aerodrome.

3.4.3 Situations exempt from justifications

No justification relating to this point is required in the event that the new application for approval relates to an airframe/engine combination already operated in ETOPS, with an identical time and diversion distance, and with no change in approved OEI speed and used for flight preparation.

3.4.4 Case of CAT.OP.MPA.140(d) approval

The operator will indicate in his file the maximum distance away from an adequate aerodrome for the diversion time requested, in accordance with §3.4.1 (maximum distance away from an adequate aerodrome in non-ETOPS operations), by providing the same supporting documents as those specified in §3.4.1.

3.5 Preparation for long-term flights: method of selecting suitable aerodromes and area of operation

TCAR OPS - PART-SPA - SPA.ETOPS.110

AMC 20-6B - Ch. III – Section 7 - 7.1§(v), Section 9 and Section 11

AMC 20-6B - Appendix 5 - §1

AMC 20-6B - Appendix 4 - §8 (RFFS Level)

Approval CAT.OP.MPA.140(d): AMC1 CAT.OP.MPA.140(d) §(h)(4)

3.5.1 General case

The use of an aerodrome as an ETOPS support aerodrome requires that aerodrome be ETOPS adequate. The notion of ETOPS suitability is described by the **SPA.ETOPS.110** and by the **AMC 20-6B**, and complements the

notion of adequacy defined by the **CAT.OP.MPA.107**. To be ETOPS adequate, an aerodrome must in particular be equipped with at least one instrument approach.

The following documents must be provided in the application file:

- Extract(s) from the operations manual specifying the ETOPS adequacy criteria defined by the operator, including in particular the minimum acceptable RFFS level;
- Procedure describing the method for assessing the ETOPS suitability of aerodromes, if it exists;
- List of ETOPS suitable aerodromes.

As part of the processing of the approval, the CAAT may ask the operator to provide it with one or more example(s) of ETOPS suitability study(s) on aerodrome in the operating area.

3.5.2 Specific situations

Alternate Requirements: Changing the Area of Operation

In the case of operator have already obtained an ETOPS approval, which has only been carried out on an area of operation preferred by the operator at the start of its ETOPS operation, and the operator wishes to carry out ETOPS flights on another area or another route, even temporarily, without changing the method for selecting suitable ETOPS aerodromes, the following documents must be provided in the application file:

- Updated list of ETOPS suitable aerodromes;
- One or more example(s) of ETOPS suitability study(s) on aerodrome in the new area of operation.

Alternative requirements: ETOPS operation on a new airframe/engine combination, from an operator already holding an ETOPS approval.

An operator already holding an ETOPS approval, and who wishes to operate with a new airframe/engine combination on an unchanged operating area, will have to reassess the ETOPS suitability of the aerodromes for this new airframe/engine combination (in particular verification of landing/take-off performance and runway condition).

3.5.3 Situations exempt from justifications

No justification relating to this point is required in the event that the new application for approval relates to the same airframe/engine combination, does not bring any change in the methods for selecting suitable aerodromes, or in the area of operations previously carried out in ETOPS.

3.5.4 Case of CAT.OP.MPA.140(d) approval

The operator will provide in its file the list of adequate en-route alternate aerodromes taken into account in the area of operation. The adequacy criterion is that of the **CAT.OP.MPA.107**. There is no additional requirement such as for ETOPS en-route alternate aerodromes.

Note: The CAAT accepts the application of the criteria of §3.5.1 (compliance with the paragraphs of AMC-20-6B referenced above, at the top of §3.5) as being at least equivalent to the criteria above.

3.6 Preparation for short-term flights: general

TCAR OPS - PART-SPA - SPA.ETOPS.110

AMC 20-6B - Chap. III – Section 7 § 7.1§(iii) and Section 9

AMC 20-6B - Appendix 4

AMC 20-6B - Appendix 5

Approval CAT.OP.MPA.140(d): AMC1 CAT.OP.MPA.140(d) §(a), (h)(4) and (f)

3.6.1 General case

Flight preparation methods

ETOPS operations require specific flight preparation tasks, carried out by the crew and/or the dispatch/OCC function, which must be detailed in the operator's reference system.

These tasks relate in particular to:

- The determination of the ETOPS area, based on a selection of suitable ETOPS airfields (see. §3.5) and the maximum distance from an adequate aerodrome in non-ETOPS operations (see. §3.4);
- Verification of the technical condition of the aeroplane;
- Verification of the availability of ETOPS alternated aerodrome (NOTAMs);
- Verification of the accessibility (weather) of the ETOPS alternated aerodrome (see. §3.7);
- Verification of the coverage of the ETOPS area by available and accessible ETOPS alternated aerodrome;
- Verification that the diversion trajectories systematically allow a descent and a cruise at level FL100 or that the carriage of oxygen allows a higher flight level (see note §3.8);
- The determination of the critical fuel (see. §3.8).

The following documents must be provided in the application file:

- Extract(s) from the operations manual specifying the flight preparation tasks of the flight crew specific to ETOPS operations;
- If they exist, extract(s) from the operator's procedures describing the flight preparation tasks of flight dispatcher specific to ETOPS operations.

Content of the operational flight plan

An operational flight plan must be calculated for each flight. This must show in particular:

- The type of operations (e.g. ETOPS and the diversion time used for the preparation of the flight);
- The list of ETOPS alternate aerodromes selected;
- ETP calculation for ETOPS alternate aerodromes considering the most critical scenario (time, fuel, wind and temperature information must be associated);
- The fuel reserves calculated according to §3.8, corresponding to the critical scenario.

The following documents must be provided in the application file:

- Extract(s) from the operations manual detailing the content of the operational flight plan (including ETOPS specifics),
- One or more sample ETOPS operational flight plan(s).

Composition of the relevant information for flight planning folder/package

In addition to the documents usually constituting the flight planning file, specific information must be communicated to flight crews within the framework of ETOPS operations. The operator will detail, in its application file, how this information is communicated:

- Meteorological information (in particular wind, temperature) relevant en-route at diversion altitudes, or justification that on-board systems and procedures allow crews to access this information quickly and easily during the flight;
- Meteorological information and NOTAMs relating to the ETOPS support areas chosen, the schedules of planned use;
- ATS flight plan: must include the list of ETOPS alternated aerodromes;
- Meteorological information, NOTAMs, and information on airport infrastructure relating to suitable ETOPS aerodromes not selected because they are not accessible from a meteorological point of view, or justification that on-board systems and procedures allow crews to access this information quickly and easily during flight. This information may be used by the crew as a decision aid in the event that a diversion is necessary;
- A means of visualising the route, the ETOPS circles, as well as the EEP, ETP, EXP, in order to facilitate the crew's decision-making (e.g: plotting chart).

The following documents must be provided in the application file:

- Extract(s) from the operations manual specifying the content of the ETOPS flight plans,
- One or more example(s) of complete ETOPS flight plan(s).

3.6.2 Specific situations

Additional requirements: Request for approval for a diversion time greater than 180 min **AMC 20-6B - Ch. III - Section 7.2.3.**

ETOPS operations beyond 180 minutes bring a new logic for selecting ETOPS control points. Indeed, it is expected that operators minimise the time away from the chosen route. That is to say that the operator must, once the route at the approved outbound time has been chosen, study the accessibility of the aerodromes at an outbound distance less than that approved, and retain them as ETOPS support if they are accessible. This logic must be translated into the operator's procedures and/or software.

In addition, the operating time of the TLS (minus 15 min) should be compared with the planned diversion time under the conditions of the day, for the following two scenarios:

- TLS linked to the engine: diversion following an engine failure,
- TLS not linked to the engine (in particular the cargo fire suppression system - CFSS): diversion with all engines operating.

This comparison is generally integrated into the flight preparation software, which displays the result in the operational flight plan. Nevertheless, the operator could choose to propose, in its approval application file, a conservative demonstration that the duration of the TLS is in all cases greater than the durations of the scenarios above.

Alternative requirements: ETOPS operation on a new airframe/engine combination, from an operator already holding an ETOPS approval

In the event that the short-term flight planning methods are not modified, the operator will provide in its application file one or more example(s) of complete ETOPS flight file(s).

3.6.3 Situations exempt from justifications

No justification relating to this point is required in the event that the new application for approval relates to an airframe/engine combination already operated in ETOPS, with an identical time and diversion distance, without change in the approved OEI speed and used for the preparation of flights and that the new application for approval does not bring about any change in the methods of preparation for short-term flights covered in this chapter, or the composition of the flight file.

3.6.4 Case of CAT.OP.MPA.140(d) approval

Paragraph §3.6.1 applies,

AMC1 CAT.OP.MPA.140(d) §(f) specifies the conditions for carrying out the verification of the technical condition of the aircraft through a check before the departure of the flight (pre-departure check).

3.7 Preparation of short-term flights: specificities related to the verification of accessibility (weather) of ETOPS alternated aerodromes

TCAR OPS - PART-SPA - SPA.ETOPS.115

AMC 20-6B - Ch. III – Section 7 - § 7.1 §(ii)(B), 7.1§(iii) and Section 9

AMC 20-6B - Appendix 4 - §5 and §7

AMC 20-6B - Appendix 5 - §2 and §3

Approval CAT.OP.MPA.140(d): AMC1 CAT.OP.MPA.140(d) §(h)(4)

3.7.1 General case

At the flight planning stage, the operator must ensure that one or more ETOPS enroute alternated aerodromes are available within the maximum diversion distance limit approved for the operator, or reduced due to the MEL status. The aerodromes selected must be accessible according to criteria specific to ETOPS operations, which include:

- The time window over which the meteorological minima are checked, called the "accessibility window";
and,
- The increases made to the operating minima.

Accessibility according to these criteria must be checked until the departure of the flight (dispatch). In addition, if the departure of the flight is delayed by more than one hour, the accessibility of the alternated aerodrome must be reassessed by updating the departure schedule. From the start of the flight, the minima corresponding to the instrument approach available are applicable.

Determining the accessibility window

The accessibility window is a period delimited by the first hour from which the ETOPS alternated aerodrome is likely to be used, and by the last time until which the ETOPS alternated aerodrome is likely to be used, plus one hour. This window will need to be updated if the flight departure is delayed by more than one hour from the originally scheduled time.

In its application file, the operator will specify the scenarios used in determining the start and end of the accessibility window.

Example:

- For SID,

we use the EEP to calculate the earliest ETA, because it is the point where ETOPS begin. Before the EEP, the usual 60 min regulations apply.

- For a generic airport, the earliest ETA is computed as follows:

In practice, the earliest ETA at an alternate aerodrome is equal to the sum of all of the following:

- The estimated time of departure
- The flight time to reach the ETP between the considered alternate airport and the previous alternate airport along the route
- The diversion flight time (Associated with a diversion at the normal cruise speed and flight level) from this ETP to the considered alternate airport.

the latest ETA at an alternate airport is equal to the sum of all of the following:

- The departure time
- The flight time to reach the ETP between the considered alternate airport and the next alternate airport along the route
- The diversion flight time from this ETP to the considered alternate airport, associated with a diversion at LRC speed and FL 100, or Minimum Off Route Altitude (MORA).

The following documents must be provided in the application file:

- Extract(s) from the operations manual specifying the method for determining the accessibility window,
- Extract(s) from the procedures used by the flight preparation function (flight dispatcher), from the technical specifications of the flight preparation software, or screenshots of this software, specifying the method for determining the accessibility window.

Flight preparation minima

AMC 20-6B - Appendix 5§2 specifies the minimum (increased) flight preparations applicable to the ETOPS alternated aerodrome. These must be checked on the determined accessibility window, according to the approach procedure available on this window (precision approach, or direct or indirect “circling” non-precision approach). The precision approach retained can only be a category I approach, unless specifically approved (see §3.7.2).

The following documents must be provided in the application file:

- Extract(s) from the operations manual specifying the approach procedures that can be used and the minima applicable at the flight preparation stage;

- Extract(s) of the procedures used by the flight preparation function, of the technical specifications of the flight preparation software, or screenshots of this software, specifying the approach procedures that can be adopted and the applicable minima.

3.7.2 Specific situations

Additional Requirements: Application for Approval to Use CAT II/CAT III Approaches

Verification of the accessibility of an ETOPS alternated aerodrome based on the use of a category II or III approach is subject to specific approval, in accordance with **AMC 20-6B - Appendix 5 §3**. The operator will specify in his application file his wish to obtain this approval, which can be issued jointly with an ETOPS approval, or separately.

This approval requires the operator to hold an LVO CAT II/CAT III approval and airframe/engine combination certified for single-engine CAT II/CAT III approaches. The systems required for CAT II /CAT III approaches must also be operational at the flight preparation stage in order to be able to use the associated minima.

The following documents must be provided in the application file:

- LVO CAT II/CAT III approval held by the operator on the aircraft type;
- AFM/FCOM extract justifying for single-engine CAT II/CAT III landing capability,

In addition, the CAAT may ask the operator to draw up an inventory of systems necessary for carrying out single-engine CAT II/CAT III approaches, the unavailability of which at the flight preparation stage does not call into question the ability to CAT II / CAT III all engine operating approach according to the MEL. If such systems are identified, they should be known by the flight dispatcher and/or the flight crews so that CAT I minima are taken into account for the flights concerned by the unavailability of one of these systems.

3.7.3 Situations exempt from justifications

No justification relating to this point is required in the event that the new application for approval does not bring any changes to the methods for verifying the accessibility of ETOPS alternated aerodromes, and does not involve the use CAT II/CAT III approaches on an aircraft type not previously operated in ETOPS.

3.7.4 Case of CAT.OP.MPA.140(d) approval

The checks to be carried out are similar to those indicated in §3.7.1, with the same supporting documents to be provided in the file. But with the following differences:

Determining the accessibility window

The accessibility window is, depending on the CAT.OP.MPA.182, the period from one hour before to one hour after the scheduled time of use of the en-route alternate aerodrome concerned.

However, this scheduled time of use depends on the assumptions used for the diversion, which the operator will specify in its application file, in particular:

- The points from which the diversion to the en-route alternate aerodrome is initiated,
- The cruising speed consideration.

Flight preparation minima

The flight preparation minima applicable to en-route alternate aerodromes are those defined by the **CAT.OP.MPA.182**, taken into account on the accessibility window determined above, according to the approach procedure available on this window.

Note: The CAAT accepts the full application of the criteria of §3.7.1 (compliance with the paragraphs of AMC-20-6B referenced above, on top of §3.7) as being at least equivalent to the above criteria.

3.8 Preparation for short-term flights: specificities related to the fuel determination method (critical fuel)

AMC 20-6B - Ch. III – Section 7 - § 7.1§(ii)(C) and Section 9

AMC 20-6B - Appendix 4 - § 4

Approval CAT.OP.MPA.140(d); AMC1 CAT.OP.MPA.140(d) §(h)(1)

3.8.1 General case

The quantity of fuel on board must allow the requirements of paragraph CAT.OP.MPA.180. The need to carry additional ETOPS fuel is determined by comparing the fuel on board at the start of the flight and the critical fuel. The ETOPS fuel calculation methods must indeed allow the operator to ensure that at each of the ETPs defined for an ETOPS flight the quantity of fuel on board is greater than or equal to the critical fuel, i.e. to the greater of the following quantities of fuel:

- Scenario 1: Case of an engine failure
 - Quantity required to reach the ETOPS alternated aerodrome at N-1 trust limit, at the approved OEI speed; and
 - Quantity corresponding to a descent to 1 500 ft above the alternate aerodrome, a 15-minute hold, then an instrument approach.
- Scenario 2: Case of pressurisation system failure
 - Quantity needed to reach the ETOPS alternated aerodrome at FL100 level¹; and
 - Quantity corresponding to a descent to 1 500 ft above the alternate aerodrome, a 15-minute hold, then an instrument approach.
- Scenario 3: Case of an engine failure combined with a failure of the pressurisation system
 - Quantity required to reach ETOPS alternated aerodrome at N-1 trust limit, at approved OEI speed, at FL100* level; and
 - Quantity corresponding to a descent to 1 500 ft above the alternate aerodrome, a 15-minute hold, then an instrument approach.

In the study of the fuel quantities associated with these 3 scenarios, the following parameters must be taken into account:

- Wind and temperature forecasts at planned flight altitudes,
- Inaccuracies in wind forecasts,
- Operation of the airframe and engine anti-icing systems, and consideration of ice accretion on unprotected surfaces if icing conditions are expected during the diversion,
- Degradation of aircraft performance, in the event that the operator does not have a fuel consumption monitoring programme,
- Overconsumption associated with certain MEL or CDL items,

¹ Note: or a flight level above FL100, if the operator ensures that adequate oxygen reserves to supply the occupants in accordance with CAT.IDE.A.235 are on board the aircraft. In the event that the minimum flight altitudes on the possible diversion trajectories are higher than FL100, these altitudes and associated speeds must be considered in the calculation of the critical fuel.

- Operation of the APU if it is one of the energy sources required within the meaning of the **AMC 20-6B– Chap. II – Section 7 - §(8) and §(9)**,
- Any ATS constraint (“routing” imposed, closed airspace, etc.) or known terrain.

Any additional ETOPS fuel will therefore be determined at the flight preparation phase, by comparing, for each ETP, the fuel on board at the time the aircraft flies over this ETP, calculated according to the standard method (non-ETOPS flight), and the fuel critical determined for this ETP. This quantity of fuel on board must not take into account any quantity of additional fuel from an MEL item.

The operator should ensure that their operations manual contains sufficient data to calculate critical fuel reserves and single engine performance.

The following documents must be provided in the application file:

- Extract(s) from the operations manual specifying the scenarios for calculating the critical fuel, and the methods, values and/or package retained for all the parameters listed above.
- Justification that the configuration of the flight preparation tools, or that the flight preparation procedures make it possible to ensure that the minimum flight altitude on the diversion paths is taken into account in the calculation of the critical fuel.
- One or more example(s) of ETOPS operational flight plan(s) if the speeds and flight levels taken into account in the different scenarios are visible there, or, if these elements are not visible, an extract of the procedures used by the flight preparation functions, technical specifications of the flight preparation software, or screenshots of this software.

3.8.2 Specific situations

Alternative requirements: ETOPS operation on a new airframe/engine pair, from an operator already holding an ETOPS approval

In the event that the critical fuel calculation methods are not modified, the operator will provide the following documents in its application file:

- Extract(s) from the operations manual specifying the values and/or packages retained for all the parameters listed above;
- One or more example(s) of ETOPS operational flight plan(s) if the speeds and flight levels taken into account in the different scenarios are visible, or, if these elements are not visible, an extract from the procedures used by flight preparation functions, technical specifications of the flight preparation software, or screen shots of this software.

3.8.3 Situations exempt from justifications

No justification relating to this point is required in the event that the new application for approval does not bring any change in the fuel calculation methods used, in the configuration of the flight preparation tool if existing, as well as only in the standard values or speeds used for the calculation.

3.8.4 Case of CAT.OP.MPA.140(d) approval

§3.8.1 above applies, with the following differences:

- Scenario 1 may not be studied; scenario 3 should be considered, except if the consumption on 2 engines is greater than that on just one, in which case scenario 2 applies.

- When, in application of the note above, the safety altitudes do not allow a diversion at FL 100, and that a quantity of oxygen sufficient to supply the occupants of the aircraft up to the aerodrome of clearance is taken, the diversion is to be considered at the lowest flight level of FL250 or the recovery level on one engine.
- In addition to the 15 min hold and the instrument approach at the alternate aerodrome, a missed approach at the applicable minima must be taken into account, followed by a new approach and a complete landing.
- Among the parameters listed in §3.8.1 likely to increase fuel consumption, the operation of the APU should be considered when its operation is necessary during the diversion to provide an additional source of electrical energy.

3.9 Minimum Equipment List

AMC 20-6B - Ch. III – Section 7 - § 7.1(ii)(A)

AMC 20-6B - Chap. III – Section 9

AMC 20-6B - Appendix 4 - § 2

AMC 20-6B - Appendix 5 - § 2 (Selection of the approach procedure)

Approval CAT.OP.MPA.140(d); AMC1 CAT.OP.MPA.140(d) §(g)

3.9.1 General case

The Minimum Equipment List must be completed if necessary to take into account the ETOPS specificities corresponding to the maximum diversion time requested. The Minimum Equipment List should reflect system redundancy levels for the intended area of operation.

The operator must define the way in which any limitations of ETOPS operations (reduction of the maximum diversion time, excess fuel consumption, etc.) linked to an MEL item are taken into account at the flight preparation stage. In particular, the technical condition of the aircraft, if it affects the approach minima or the types of approaches that can be used, must be taken into account at the stage of the accessibility verification of the ETOPS support areas.

The following documents must be provided in the application file:

- Minimum Equipment List (MEL) of the airframe/engine combination
- Master Minimum Equipment List - MMEL
- Justification that the configuration of the flight preparation tools, or that the flight preparation procedures make it possible to ensure that the impact of MEL items on ETOPS operations is taken into account.

3.9.2 Specific situations

Additional requirements: Requested diversion time greater than 180 min

In the context of a diversion time greater than 180 min, certain systems must be functional at the flight dispatch, such as the on-board fuel indication system (FQIS) and certain communication systems. The extension of the diversion time beyond this duration must therefore be systematically associated with an evolution of the MEL, or at least with the verification that it meets the requirements of AMC 20-6B - Appendix 4 - § 2(in particular items q) to t)).

3.9.3 Situations exempt from justifications

No justification relating to this point is required in the event that the new application for approval relates to an airframe/engine combination already operated in ETOPS, with an identical time and diversion distance, and without changes in procedures or tools. allowing consideration of the impact of MEL items on ETOPS operations.

3.9.4 Case of CAT.OP.MPA.140(d) approval

§3.9.1 applies.

3.10 Conduct of the flight and flight monitoring

AMC 20-6B - Ch. III – Section 7 7.1§(vi) & Section 9 AMC

20-6B - Appendix 4 - §3, §6, §8, §9 and 10

Approval CAT.OP.MPA.140(d): AMC1 CAT.OP.MPA.140(d) §(e)

3.10.1 General case

Conduct of the flight by the flight crew

Before the ETOPS entry point (EEP), the crew must assess the technical condition of the aircraft and on-board systems, the fuel on board, the weather forecast and the accessibility of the alternated airports, to ensure that ETOPS operations are possible. For this evaluation, flight crew must rely on the Operations Manual, the assistance of the OCC or on data that they can receive in flight (via a datalink, e.g. ACARS SATCOM). In flight, the meteorological accessibility of the ETOPS alternated airports is verified with the operating minima of the considered approach (visibility and ceiling), it is not a dispatch (planning) minima.

In addition, throughout the flight, weather conditions and fuel consumption must be monitored. If conditions likely to prevent landing on one of the ETOPS alternated airport are identified, the flight crew must take appropriate measures, such as re-routing, if necessary, to remain as much as possible in the diversion time approved for the operator.

In its application file, the operator will specify the sources of information used for the pre-EEP assessment and for in-flight meteorological and fuel monitoring.

In addition, the operator must establish a decision-making procedure for flight crews indicating when a change of route or a diversion is recommended. This procedure must in particular cover the case of engine failure. Factors that may be considered in the decision are described in the **§8 of Appendix 4 of AMC 20-6B**.

Finally, specific ETOPS in-flight procedures, such as in-flight APU ignition tests, may be required by the CMP document.

Flight monitoring

Throughout the flight, the crew must be informed of any significant change in the conditions of access to the selected alternated airports (particularly weather and significant NOTAMs). In addition, unless the crew has a simple and reliable means of accessing this information, the OCC will have to provide, before the EEP, the information necessary for the pre-EEP evaluation described above. Finally, the OCC must be able to provide information at the request of the flight crew, in particular to assist them in their decision to divert, and in the event of an actual diversion. These transmissions must be fast, reliable, and available for all ETOPS flights.

Means of communication – OCC

The aircraft must be equipped with one or more voice and/or “data link” communications systems, allowing reliable and two-way contact between the aircraft and the OCC. These must cover all the flight altitudes planned for the flight or for the diversion scenarios, and must be functional at the start of the flight. In addition, as far as the operating area allows it, the aeroplane should be equipped with at least a voice communication system.

Case of ETOPS “re-routing”

The operator must define a procedure to cover the case where a "re-routing" is necessary during an ETOPS flight, or those where a "re-routing" causes a non-ETOPS flight to become ETOPS. This procedure must make it possible to ensure that all of the dispatch's operational requirements are verified, except for the meteorological minima on the alternated airports, which must be higher than the published approach minima.

Justification documents

The following documents must be provided in the application file:

- Crew procedures relating to the assessment before EEP, and in-flight fuel/weather monitoring,
- Diversion decision support procedure used by the crews,
- If applicable, ETOPS in-flight procedures,
- Extract(s) from the operations manual or procedures describing the monitoring and assistance of OCC for ETOPS flights,
- Description of the communications systems installed and justification that these allow Aircraft-OCC contact at any time,
- Crew and OCC procedures relating to the use of these communication systems,
- Extract(s) from the operations manual or procedures describing the verification of operational requirements in the case of a “re-routing”.

3.10.2 Specific situations

Additional requirements: Requested diversion time greater than 180 min

In the context of a diversion time of more than 180 min, the aeroplane must be equipped with at least reliable two-way voice and/or "Data Link" systems, by VHF/HF and/or satellite communications system (SATCOM), and will have to rely on these systems to demonstrate that it is able to guarantee a functional means of communication when operating beyond 180 min.

Alternative requirements: ETOPS operation on a new airframe/engine combination, from an operator already holding an ETOPS approval

Where an operator already holds an ETOPS approval and the new approval does not result in a change in flight monitoring methods, the operator will provide an analysis of the differences in the systems used for flight monitoring or communications, and indicate how OCC staff will be trained on these differences (e.g. training, communication).

Furthermore, if the operating area changes, the operator must check that the onboard systems are functional in the new area.

3.10.3 Situations exempt from justifications

No justification relating to this point is required in the event that the new application for approval relates to an airframe/engine combination already operated in ETOPS, without changes to the communication systems, the operating area, and that the new request for approval does not bring any change in the methods of flight monitoring by the OCC or the flight crew, or in the communication procedures.

3.10.4 Case of CAT.OP.MPA.140(d) approval

§3.10.1 applies, However, the paragraphs relating to the evaluation before EEP and to the procedures linked to the CMP document are not mandatory.

3.11 Training

SPA.ETOPS.105 §(b)

AMC 20-6B - Ch. III – Section 7 - § 7.1§(iv) and Section 12

AMC 20-6B - Appendix 6

Approval CAT.OP.MPA.140(d): AMC1 CAT.OP.MPA.140(d) §(e)

3.11.1 General case

Flight Crew Members (FCMs)

AMC 20-6B - Appendix 6 specifies the content of initial and recurrent theoretical (§1, 2 and 3) and practical (§4) training for flight crew. In its application file, the operator should provide the content of the defined training programme (excerpt from the operations manual).

In the event that only some of the FCMs are trained in ETOPS operations, the operator must demonstrate how it ensures that ETOPS flights are operated by qualified crew members.

Flight Operation Officers/Flight Dispatcher: FOOs/FDs

AMC 20-6B - Appendix 6 - §5 specifies the content of the initial and recurrent theoretical training of FOOs/FDs. In its application file, the operator will provide the content of the defined training programme (excerpt from the operations manual). This training can be differentiated between staff providing only the flight preparation function, and those also providing the flight assistance function.

3.11.2 Specific situations

Alternative requirements: ETOPS operation on a new airframe/engine combination, from an operator already holding an ETOPS approval

An operator already holding an ETOPS approval, and who wishes to operate with a new airframe/engine combination, can offer training programmes adapted to the previous training of flight crew and flight operation officers. These programmes may in particular be based on an OSD if existing. If the operator assesses that no additional training is necessary, this must be precisely justified.

3.11.3 Situations exempt from justifications

No justification relating to this point is required in the event that the new application for approval relates to the same airframe/engine combination, and does not bring any change in the methods of preparation or monitoring of the flight by the crews and by flight operations officers.

3.11.4 Case of CAT.OP.MPA.140(d) approval

AMC1 CAT.OP.MPA.140(d) §(e), specifies the content of the initial and recurrent training of the flight crew members for these operations. In its application file, the operator will provide the content of the defined training programme (excerpt from the operations manual).

In the event that only some of the flight crew are trained in these operations, the operator must demonstrate how it ensures that the flights are operated by qualified crew members.

If operations staff take part in the preparation and monitoring of extended diversion time flights, the operator will provide the content of the training programme defined for these staff (excerpt from the operations manual). This training can be differentiated between agents providing only the flight preparation function, and those also providing the flight assistance function.

3.12 Continuing airworthiness and maintenance

AMC 20-6B - Chap. III – Section 7 - § 7.1§(i)

AMC 20-6B - Appendix 8

Approval CAT.OP.MPA.140(d): AMC1 CAT.OP.MPA.140(d) §(d)

3.12.1 General case

The CAAT/AIR, has responsibility to carries out a study of the file relating to the aspects relating to continued airworthiness and maintenance, and sends the operator the resulting of discrepancies and additional requests. When the operator has cleared all the discrepancies and responded to any additional requests, CAAT/AIR will communicate the result of assessment and opinion to the CAAT/OPS on the management aspects of continuing airworthiness and maintenance. This opinion is necessary for the issuance of the approval by the CAAT.

3.12.2 Situations exempt from justifications

The study of the application file by the CAAT/AIR is not necessary in the case where the new application for approval relates to the same airframe/engine combination, the same maximum diversion time and does not bring any change in continuing airworthiness and maintenance processes.

3.12.3 Case of CAT.OP.MPA.140(d) approval

The operator must, in addition to the standard maintenance programme, describe the measures for monitoring engine oil consumption and monitoring engine trends, and the corrective actions in the event of adverse trends, in accordance with the engine manufacturer's instructions.

In addition, the operator establishes procedures for checking the technical condition of the aircraft through a pre-departure check, as indicated in §3.6.4. **When these checks are carried out by the flight crew, they must be trained in accordance with §3.11.4.**

The CAAT/AIR, has responsibility to carries out a study of the file relating to the aspects relating to management of continued airworthiness and maintenance, and sends the operator the resulting of discrepancies and additional requests. When the operator has cleared all the discrepancies and responded to any additional requests, CAAT/AIR will communicate the result of assessment and opinion to the CAAT/OPS on the management aspects of continuing airworthiness and maintenance. This opinion is necessary for the issuance of the approval by the CAAT.

3.13 Monitoring of operations by the operator as part of its SMS

AMC 20-6B - Ch. I - Section 4 §(f)

AMC 20-6B - Chap. III - Section 13

AMC 20-6B - Appendix 1 - §3 AMC

20-6B - Appendix 8 - §2

Approval CAT.OP.MPA.140(d): AMC1 CAT.OP.MPA.140(d) §(c)

3.13.1 General case

An operator holding an ETOPS approval should ensure that the in-flight engine shutdown rates of its operations, as well as those of the worldwide fleet, remain below the rates specified in **AMC 20-6B, Appendix 1 §3** for the requested diversion time.

Furthermore, the **§2 of Appendix 8** lists a certain number of events, including IFSDs and diversions, which must be notified to the authority (CAAT) and to the manufacturer with a maximum delay of 72 hours after occurrence of the event. In its application file, the operator will specify:

- The means implemented to monitor the engine shutdown rate of its fleet or worldwide;
- The system for notifying the authority of events relating to ETOPS operations.

3.13.2 Situations exempt from justifications

No justification relating to this point is required in the event that the new application for approval is made by an operator already holding an ETOPS approval, and does not bring any change in the methods of notification of events relating to operations. ETOPS, or Global or Operator Fleet Engine Shutdown Rate Tracking.

3.13.3 Case of CAT.OP.MPA.140(d) approval

In its application file, the operator will specify:

- The implementation means to monitor engine events in its fleet and the world fleet,
- The system for notifying manufacturers and the authority of events relating to operations with extended diversion times (in particular engine events).
- The process for implementing corrective actions or operational restrictions in the event of deterioration in engine reliability.

Appendix

The table below should be appended to the application file in order to indicate to the CAAT at which level(s) the operator is situated.

	General Case	Specific Situation	Exemption situation & Justification
1. Airframe/Engine Combination certification	<input type="checkbox"/>	<i>Not applicable</i>	<input type="checkbox"/> Rational:
2. Reliability of the airframe/engine combination	<input type="checkbox"/>	<i>Not applicable</i>	<input type="checkbox"/> Rational:
3. Requested Maximum Diversion Time	<input type="checkbox"/> Accelerated approval <input type="checkbox"/> In-service approval	<input type="checkbox"/> Diversion time > 180 min <input type="checkbox"/> Diversion time > certified (+15%)	<input type="checkbox"/> Rational:
4. ETOPs Area of Operations and Maximum diversion distance	<input type="checkbox"/>	<input type="checkbox"/> Increased requested maximum diversion time <input type="checkbox"/> Diversion time > 180 min	<input type="checkbox"/> Rational:
5. Long term pre-flight planning –selection of ETOPs alternate/adequate airport	<input type="checkbox"/>	<input type="checkbox"/> Modification of the area of operation <input type="checkbox"/> New airframe/engine combination	<input type="checkbox"/> Rational:
6. Short term pre-flight planning – general	<input type="checkbox"/>	<input type="checkbox"/> Diversion time > 180 min <input type="checkbox"/> New airframe/engine combination	<input type="checkbox"/> Rational:
7. Short term pre-flight planning – Accessibility of ETOPs alternated airport	<input type="checkbox"/>	<input type="checkbox"/> Use of CAT II/III Approaches	<input type="checkbox"/> Rational:
8. Short term pre-flight planning – Critical Fuel	<input type="checkbox"/>	<input type="checkbox"/> New airframe/engine combination	<input type="checkbox"/> Rational:

9. MEL	<input type="checkbox"/>	<input type="checkbox"/> Diversion time > 180 min	<input type="checkbox"/> Rational:
10. Conduct of flight and Flight monitoring	<input type="checkbox"/>	<input type="checkbox"/> Diversion time > 180 min <input type="checkbox"/> New airframe/engine combination	<input type="checkbox"/> Rational:
11. Training	<input type="checkbox"/>	<input type="checkbox"/> New airframe/engine combination	<input type="checkbox"/> Rational:
12. Continuing airworthiness and maintenance	<input type="checkbox"/>	<i>Not applicable</i>	<input type="checkbox"/> Rational:
13. Monitoring of operations	<input type="checkbox"/>	<i>Not applicable</i>	<input type="checkbox"/> Rational:

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