

	TANZANIA CIVIL AVIATION AUTHORITY DIRECTORATE OF SAFETY REGULATIONS AIRWORTHINESS	Revision: 1 Advisory Circular
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1.0 PURPOSE

- 1.1 This advisory circular (AC) provides guidance to the operator applying for operational approval for EDTO operations. This Advisory Circular (AC) states an acceptable means by which approval may be given for registered two-engine aeroplanes to operate over a route that contains a point farther than one-hour flight time at the normal one-engine inoperative cruise speed (in still air) from an adequate aerodrome. Specific criteria are included for deviation of 75 minutes, 120 minutes and 180 minutes from an adequate aerodrome.

2.0 REFERENCES

- 2.1 The Civil Aviation (Operation of Aircraft) Regulations.
2.2 The Civil Aviation (Air operator Certification and Administration) Regulations
2.3 The Civil Aviation (Airworthiness) Regulations

3.0 DEFINITIONS

Where the following terms are used in this AC, they have the meaning indicated:

3.1 Adequate alternate aerodrome

An adequate alternate aerodrome is one at which the landing performance requirements can be met and which is expected to be available, if required, and which has the necessary facilities and services, such as air traffic control, lighting, communications, meteorological services, navigation aids, rescue and fire-fighting services and one suitable instrument approach procedure.

3.2 Aeroplane system

An aeroplane system includes all elements of equipment necessary for the control and performance of a particular major function. It includes both the equipment specifically provided for the function in question and other basic related aeroplane equipment such as that required to supply power for the equipment operation. As used herein the power-unit is not considered to be an aeroplane system.

3.3 Extended range operation

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Any flight by an aeroplane with two turbine engines where the flight time at the approved one engine inoperative cruise speed (in ISA and still air conditions), from a point on the route to an adequate alternate aerodrome, is greater than 60 minutes (threshold time).

3.4 Engine

A unit used or intended to be used for aircraft propulsion. It consists of at least those components and equipment necessary for functioning and control, but excludes the propeller/rotors (if applicable).

3.5 Propulsion system

A system consisting of an engine and all other equipment utilised to provide those functions necessary to sustain, monitor and control the power/thrust output of any one engine following installation on the airframe.

3.6 Suitable alternate aerodrome

A suitable alternate aerodrome is an adequate aerodrome where, for the anticipated time of use, weather reports, or forecasts, or any combination thereof, indicate that the weather conditions will be at or above the required aerodrome operating minima, and the runway surface condition reports indicate that a safe landing will be possible.

4.0 INTRODUCTION

Rules regarding EDTO operations are promulgated in the Civil Aviation (Air Operator Certification and Administration) regulations.

No Air Operator Certificate holder may operate two-engine or three-engine aeroplanes, except a three-engine turbine powered aeroplane, over a route that contains a point further than one-hour's flight time (in still air) at normal cruising speed with one engine inoperative from an adequate aerodrome. It is significant to note that this requirement is applicable to reciprocating, turbo-propeller, turbo-jet and turbo-fan aeroplanes transiting oceanic areas or routes entirely over land.

5.0 BASIC CONCEPT

5.1 Threshold Time

The threshold time of 60 minutes established by the Authority is not an aircraft operating limit but one of the criteria to safeguard overall level of safety for twin-engine turbine-

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powered public transport aeroplanes with a MTWA greater than 5700 kg flying long distances away from adequate en-route alternate aerodromes approved for EDTO operations.

5.2 Diversion Time or Rule Time

An EDTO diversion time is a time limit that exceeds the threshold time limit of 60 minutes. It is the time needed to fly at approved single engine cruise speed from the EDTO route to an adequate en-route alternate aerodrome approved for the operation.

5.3 EDTO eligibility and eligibility progression

Subject to satisfactory operating track record and required operating experience, an operator is eligible to seek EDTO operational approval in accordance with the following EDTO diversion times:

120 minutes - 12 months of operating experience on the same airframe/engine combination at 60 minutes' diversion time.

180 minutes - 12 months of operating experience on the same airframe/engine combination at 120 minutes' diversion time.

The general criteria described below provide an overview of the required level of safety for the grant of approval to the above diversion times.

For 120 minutes EDTO, the Authority may grant, subject to special considerations, extension to the diversion time of up to 138 minutes (15% of 120 minutes).

Specific to 207 minutes' diversion time limit (15% of 180 minutes), the Authority may consider granting Operational Approval of up to 207 minutes' maximum diversion time on a case-by-case basis provided that the operator complies with the 207 minute requirements.

5.4 EDTO Operational Considerations

To maintain the required level of safety for EDTO operations, it is necessary that the airworthiness certification of the aeroplane type, taking into account the aeroplane system design and reliability aspects, specifically permits operations beyond the threshold time; the reliability of the propulsion system is such that the risk of double engine failure from independent causes is extremely remote; any necessary special maintenance requirements are fulfilled; specific flight dispatch requirements are met; and necessary in-flight operational procedures are established.

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6.0 AIRWORTHINESS CERTIFICATION

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The operator must show that the design features of the particular airframe/engine combination are suitable for the intended EDTO operations. Evidence that the type design of an aeroplane with two turbine engines is approved for EDTO is normally reflected in the Aircraft Flight Manual (AFM) and Type Certificate Data Sheet (TCDS) or Supplement Type Certificate (STC), which contains directly or by reference the following information as applicable:

- (a) special limitations (if necessary), including any limitations associated with a maximum diversion time and time limited systems (e.g. the endurance of cargo fire suppression system);
- (b) additional markings or placards (if required);
- (c) reference to the performance section;
- (d) specific airborne equipment, installation and flight crew procedures required for EDTO operations;
- (e) description or reference to a document containing the approved aeroplane configuration, maintenance and procedures (CMP) standards.

Although EDTO certification is not required for aeroplane with more than two engines, a review of the time capabilities of the relevant EDTO time limited systems should be performed to adequately consider the relevant time capabilities during EDTO operations. On most aeroplanes with more than two engines, the only relevant time limited system is the cargo fire suppression system.

6.2 AIRWORTHINESS REQUIREMENTS

The operator should pay special attention to ensuring the required level of safety will be maintained under conditions which may be encountered during such operations, e.g. flight for extended periods following failure of an engine and/or essential systems.

Information or procedures specifically related to EDTO operations should be incorporated into the aeroplane flight manual, maintenance manual or other appropriate document.

For ETOPS, the maintenance programme required in the regulation 67 of the civil aviation (air operator certification and administration) regulations 2017 as amended may be the continuing airworthiness maintenance schedule approved by the TCAA. The

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operator should review the schedule to ensure that it provides an adequate basis for development of ETOPS maintenance requirements.

The operator is required to implement procedures to prevent identical action being applied to multiple similar elements. This may be achieved, if other procedural measures are not possible, by having the identical action being performed by different maintenance personnel or teams.

As part of an APU in-flight start programme, the operator should perform an APU in-flight start once every three months for each aircraft of its EDTO fleet. The result of the in-flight start shall be annotated in the Technical Log of the aircraft.

7.0 PROPULSION SYSTEM MATURITY AND RELIABILITY

The basic elements for EDTO authorization are the maturity and reliability of the propulsion system. These should be such that the risk of complete loss of power from independent causes is extremely remote.

The only way to assess the maturity of the propulsion system and its reliability in service is to exercise engineering judgment, taking account of the worldwide experience with the engine.

For a propulsion system whose reliability has already been assessed, the Authority will evaluate the ability of the operator to maintain that level of reliability, taking into account the operator's record of reliability vis-à-vis engines of closely related types.

The engine/APU oil consumption monitoring programme is part of the overall need to monitor engine reliability. For the purpose of monitoring the oil consumption, the operator should account for the amount of oil added at the departing ETOPS stations with reference to the running average consumption, i.e. monitoring should be continuous up to and including oil added at the ETOPS departure station. If appropriate, oil analysis should be included in the programme.

For purpose of monitoring the engine condition the assessment of IFSD rate should include monitoring the following matters on a 12-month moving average basis –

- (a) engine hours flown in the period;
- (b) all causes for IFSD; and
- (c) engine removal.

When the IFSD rate exceeds the limits noted next paragraph below, the operator should –

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- a) notify TCAA as soon as possible; and
 - (b) conduct an immediate evaluation to ascertain the causes of the IFSD rate; and
 - (c) take such corrective action or restrict its operations as CAAS may advise.
- Unless otherwise specified by TCAA as part of the approval, the relevant IFSD rate is —
- (a) 0.05 per 1000 engine hours for 120-minute ETOPS;
 - (b) 0.03 per 1000 engine hours for ETOPS maximum diversion time of more than 120 minutes but up to 180 minutes; or
 - (c) 0.02 per 1000 engine hours for ETOPS maximum diversion time of more than 180 minutes.

8.0 FLIGHT DISPATCH REQUIREMENTS

- 8.1 In applying the general flight dispatch requirements, particular attention should be paid to the conditions which might prevail during EDTO operations, e.g. extended flight with one engine inoperative, major systems degradation, reduced flight altitude, etc. In addition to the requirement of published aerodrome minima, at least the following aspects should be considered:
- a) Pre-flight system serviceability;
 - b) Communication and navigation facilities and capabilities;
 - c) Fuel requirements; and
 - d) Availability of relevant performance information.

9.0 OPERATIONAL

PRINCIPLES

- 9.1 An aeroplane which is engaged in EDTO operation should:
- (a) normally fly to the nearest (in terms of flying time) suitable aerodrome and land in the event of: shutdown of an engine; a single or multiple primary aeroplane system failure unless it has been demonstrated, in view of the flight consequences of the failure and the probability and consequences of subsequent failures, that no substantial degradation of safety results from continuation of the planned flight; and
 - (b) Make appropriate adjustments to the flight plan when experiencing changes impacting the status of items on the minimum equipment list, the communications and navigation facilities, fuel and oil supply, en-route alternate aerodromes or aeroplane performance.

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10.0 OPERATIONAL APPROVAL

10.1 In authorizing the operation of an aeroplane with two engines on an EDTO route in accordance with the Civil Aviation Regulations and in addition to the requirements previously set forth in this AC, the Authority would verify that:

10.1.1 The operator's past experience and compliance record is satisfactory;

10.1.2 The operator has demonstrated that the flight can continue to a safe landing under the anticipated degraded operating conditions which would arise from:

Total loss of thrust from one engine; or

Total loss of engine generated electric power; or

10.1.3 Any other condition which the Authority considers to be equivalent in airworthiness and performance risk; that the operator's training programme for its flight crew and dispatchers as well as ground support and maintenance is adequate for the proposed operation; and that documentation accompanying the authorisation covers all relevant aspects.

10.2 Accelerated/Early and EIS (entry into service) EDTO

10.2.1 Accelerated and Early EDTO are terms for EDTO eligibility without going through the qualifying time progression while EIS is EDTO eligibility at launch of the airframe/engine type.

10.2.2 A matured operator with proven good track record and sound infra-structural supports for EDTO operation may apply to the Authority for Accelerated/Early or EIS EDTO citing such supports as international best practices satisfactory risk assessment including assessment of human performance limitations.

10.3 Notification of EDTO plan

10.3.1 In view of the complexity of this subject which requires heavy investment in manpower resources, the operators with EDTO plans are advised to notify the Authority as soon as possible.

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10.3.2 Subject to completeness and timeliness of application submission, processing of a standard EDTO application requires at least three months while that of an Accelerated/Early or EIS EDTO may take six months or more.

11.0 WITHDRAWAL OF EDTO OPERATIONAL APPROVAL

The grant of an EDTO operational approval is conditional upon the operator's demonstrated ability to comply with the terms of the approval and conform to international best practices.

The Authority may withdraw the EDTO operational approval granted to the operator should the operator breaches any of its conditions of the approval.



Director Safety Regulation